Original Article

A Population-based Survey of Mental Disorders in Singapore

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Abstract

Introduction: Mental illnesses are not only a growing public health concern but also a major social and economic issue affecting individuals and families throughout the world. The prevalence of mental disorders, the extent of disability caused by these disorders, and services utilisation of these patients has been well studied in developed countries. The aim of this study was to establish the prevalence of select mental disorders and their associated sociodemographic correlates in the adult Singapore resident population. Materials and Methods: This was a cross-sectional, population-based, epidemiological study of adult Singapore residents aged 18 years and above. The subjects were randomly selected using a disproportionate stratified sampling method. The diagnoses of selected mental disorders including major depressive disorder (MDD), dysthymia, bipolar (bipolar I & II) disorders, generalised anxiety disorder (GAD), obsessive compulsive disorder (OCD), alcohol abuse and alcohol dependence were established using the Composite International Diagnostic Interview, which is a fully structured diagnostic instrument that assesses lifetime and 12-month prevalence of mental disorders. Results: Among the 6616 respondents (response rate of 75.9%), 12.0% had at least one lifetime affective, anxiety, or alcohol use disorders. The lifetime prevalence of MDD was 5.8% and that of bipolar disorder was 1.2%. The combined lifetime prevalence of the 2 anxiety disorders, GAD and OCD was 3.6%, with the latter being more common than GAD (0.9% and 3.0% respectively). The lifetime prevalence of alcohol abuse and dependence were found to be 3.1% and 0.5% respectively. Age, gender, ethnicity, marital status and chronic physical illnesses were all significant correlates of mental disorders. Conclusion: The identified associated factors would help guide resource allocation, policy formulation and programme development in Singapore.

Ann Acad Med Singapore 2012;41:49-66

Key words: Affective disorders, Alcohol, Anxiety disorders, Population-based survey

Introduction

Mental illnesses are not only a growing public health concern but also a major social and economic issue affecting individuals and families throughout the world.[1] In 2007, Singapore rolled out its first National Mental Health Blueprint, and as we scale up the mental health services for the country, good quality and comprehensive analysis of the rates of important mental disorders and their associated factors, the unmet needs, and potential barriers to care would be needed for the rational allocation of resources.

Over the last decade, the prevalence of mental disorders, the extent of disability caused by these disorders, and services utilisation of these patients have been well studied in a number of developed countries (Britain, United States, Australia, New Zealand, and Japan).[2-6] In Singapore, we have yet to make a comprehensive and detailed study of the rates of the myriad of mental disorders and its protean consequences. The studies to date[7,8] have mainly established the prevalence of a rather limited range of mental disorders without examining the levels of disability, treatment gaps and the access to care. One of the earliest studies, carried out in 1978 (by the Ministry of Health) revealed a prevalence of 8.4% of the population as suffering from 'neurosis'. The

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Singapore Association for Mental Health (1989) estimated that 18% of the population was experiencing 'minor psychiatric morbidity'. This cross-sectional population survey of over 3000 subjects[7] established a point prevalence of 16.6% with 'minor psychiatric morbidity'. The National Mental Health Survey 2004 reported lifetime prevalence of depression to be 5.6% of the population and that of anxiety disorders to be 3.4%.[8]

In the past, we had often used expert opinions or studies done elsewhere (usually American, Australian or British) to estimate the prevalence, disability, and treatment rates. However, such extrapolations are simple and fraught due to differences in cultural, social, political, and economic factors. This paper presents an overview of the prevalence of selected mental disorders and their associated sociodemographic correlates in the adult Singapore resident population. Subsequent papers in this journal will elaborate on the other aspects of the Singapore Mental Health Study (SMHS).

Materials and Methods

Sample

The SMHS surveyed adult Singapore Residents (including Singapore Citizens and Permanent Residents) aged 18 years and above. The study was approved by the ethics committee (National Healthcare Group, Domain Specific Review Board) and all participants and parents/guardians gave written informed consent for participating in the study. The detailed methodology of the study has been described in our prior article.[9] The respondents were randomly selected from a national registry that maintains the names, socio-demographic details such as age, gender and ethnicity, and household addresses of all residents in Singapore. Those residents who were incapable of doing an interview due to severe physical or mental conditions, language barriers, living outside the country, institutionalised or hospitalised at the time of the survey, and those who were not contactable due to incomplete or incorrect address were excluded from the survey. A disproportionate stratified sampling (by age groups and ethnicity) was used where the 3 main ethnic groups (Chinese, Malays, and Indians) were sampled in equivalent proportion of about 30% each. Individuals aged 50 and older were also over sampled. This is to address the possibility of not getting an adequate sample in minority ethnic groups to accurately establish the prevalence of an uncommon disorder. The sample size was derived from a statistical power calculation for binary proportions using established prevalence rate of mental disorders in Singapore. We found the margin of error using this sample distribution for the overall prevalence estimate was between 1.5% to 3%, while the margin of error for the strata defined by age and ethnic groups was 1.0 to 3.5%. Note that as the margin of error (or precision) of a binary proportion depends on the estimate, we also computed the relative standard error (RSE), which was below 30%. Figure 1 illustrates the sampling strategy adopted for the study.

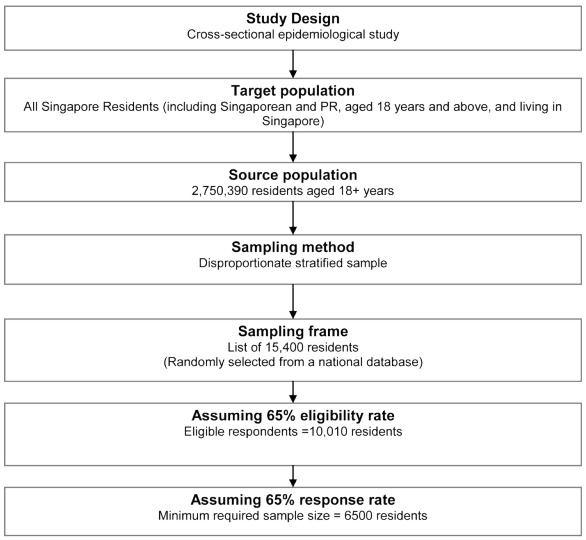

Fig. 1. SMHS sampling strategy.

Assessments

The diagnoses of mental disorders were established using the World Mental Health Composite International Diagnostic Interview (WMH-CIDI).[10] We decided to use the WMH-CIDI for a number of reasons: (1) it has been widely used across many countries, and therefore allows us to perform cross-country comparison analysis; (2) a validated Chinese version[11] is available in addition to the English version; (3) it captures vital information on service use, and social relationships and; (4) it can be easily administered by trained non-clinician interviewers. The WMH-CIDI is a fully structured diagnostic instrument that assesses lifetime and 12-month prevalence of disorders using hierarchy rules of diagnosis. CIDI has been validated by comparing it with clinician-administered non-patient edition of the Structured Clinical Interview for DSM-IV (SCID) in probability subsamples of the World Mental Health surveys in France, Italy, Spain, and the US and moderate to good individual-level CIDI-SCID concordance was found for lifetime prevalence estimates of most disorders.[12] The WMH-CIDI sections cover the most common mental disorders (namely anxiety, affective and substance use disorders) based on diagnostic criteria from the 2 major psychiatric classification systems − the 10th Edition of the International Classification of Diseases (ICD-10) and the Diagnostic and Statistical Manual, Fourth Edition, of the American Psychiatric Association (1994) (DSM-IV).

The entire WMH-CIDI takes an average of approximately 2 hours to administer in most general population samples.

However, interview time varies depending on the number of diagnostic sections for which the respondent screens positive and the history of the disorder. Given the limitations imposed by time and the administrative burden on the respondent, we decided to use only select modules from the WMH-CIDI to examine those disorders that are likely to have the greatest impact for the Singapore population. This selection was made from a comprehensive review of the scientific literature, consultation with the relevant stakeholders and local expert consensus. The following DSM-IV mental disorders were finally included in the survey: affective disorders, anxiety disorders and alcohol abuse disorders.

The WMH-CIDI tends to be oversensitive in diagnosing schizophrenia and other non-affective psychoses.[13-15] For the purposes of SMHS, we used the Psychosis Screen which estimates the prevalence of psychotic symptoms in the community. All the modules of WMH-CIDI selected for the SMHS were translated into Bahasa Melayu i.e. Malay. Along with assessing specific mental disorders, the interview gathered information on a range of chronic physical conditions. We used a modified version of the CIDI checklist of chronic medical disorders for this purpose and respondents were asked to report any of the disorders listed in the checklist. The question was read as, "I'm going to read to you a list of health problems some people have. Has a doctor ever told you that you have any of the following…" This was followed by a list of 15 chronic medical disorders which were re-classified into 8 types of physical disorders: (1) respiratory disorders (asthma, chronic lung disease such as chronic bronchitis or emphysema); (2) diabetes; (3) hypertension and high blood pressure; (4) chronic pain (arthritis or rheumatism, back problems including disk or spine, migraine headaches); (5) cancer; (6) neurological disorders (epilepsy, convulsion, Parkinson's disease); (7) cardiovascular disorders (stroke or major paralysis, heart attack, coronary heart disease, angina, congestive heart failure or other heart disease) and; (8) ulcer and chronic inflamed bowel (stomach ulcer, chronic inflamed bowel, enteritis, or colitis).

Pilot and Fieldwork

The survey was conducted from December 2009 to December 2010. Prior to the survey, the randomly selected samples was divided equally into planned replicates (or batches) taking care that the proportion of people belonging to the different age and ethnic strata were similar across all replicates. The sample was released in replicates — the preceding replicate had to be at least 80% exhausted (i.e. either termed as ineligible, successfully interviewed or refused participation) before the release of the next replicate for the survey. Before the samples were released in planned replicates and prior to the actual survey, each of the selected households was notified in advance with a mailed letter. There was also extensive press coverage to create public awareness of this survey and its importance to the local population. For the SMHS, we used the computerised version of the English and Chinese CIDI 3.0 and the Paper and Pencil Instrument (PAPI) version of the translated CIDI in Malay. The SMHS was preceded by an extensive training programme for the field interviewers who were trained in batches by the core research team. These lay interviewers were older than 21 years of age, experienced in door-to-door surveys and were familiar with computer assisted interviewing techniques. In all, 87 interviewers were trained (in 6 batches) over the course of the study. The structured training programme for the field interviewers was conducted over a period of 3 weeks, after which each interviewer was individually tested. Those who failed the assessment were not allowed to proceed. The IMH researchers were certified trainers who had been trained and certified by the official WMH-CIDI Training and Research Centre at the University of Michigan, USA and at the Institute of Mental Health, Peking University in the use of the Chinese CIDI.

Field Supervision and Quality Control

We assigned one field supervisor to every 10 interviewers. One of the main roles of the supervisor was to monitor the interviewer's work including direct observation of actual interviews. Vigorous efforts were made to contact each respondent to complete the entire interview. The interviewers had to make up to 10 attempts at different times and days before classifying a particular household as 'non-response'. Regular meetings were held with the interviewers and field supervisors to ensure early identification of any emergent problems in the field. A systematic quality assurance process was implemented. The number of interviews completed by each interviewer was tracked, and 20% of the cases (5% through face-to-face validation and 15% via telephone calls to the respondents) were subjected to detailed verification to detect any falsification of data.

Data Analyses

Statistical analyses were carried out using the Statistical Analysis Software (SAS) System version 9.2 (SAS Institute, Cary, NC). To ensure that the survey findings were representative of the Singapore population, the data were weighted to adjust for oversampling and post-stratify by age and ethnicity distributions between the survey sample and the Singapore resident population in 2007. Descriptive analyses were performed to establish the prevalence of lifetime disorder as well as describe the socio-demographic profile of the study population. Prevalence

of lifetime disorder was estimated from the proportion of respondents who had ever had a given disorder up to their age at interview, while the 12-month prevalence rate was estimated as those who experienced the disorder at some point during the year prior to the interview. Lifetime risk is a projected estimate of the proportion of people in the population who would ever have experienced a disorder by the end of their lifetime or by a specified age such as 75 years. In our analysis, projected lifetime risk as of age 75 years was estimated using actuarial method. We used retrospective age-of-onset in each DSM disorder to estimate conditional probability of first onset at each year of life, up to and including age 75 years. This method assumes constant conditional risk of onset during a given year of life across the cohort and is a more accurate way of estimating the cumulative probabilities of lifetime risk as compared to the more familiar Kaplan-Meier method especially when the number of observations is large. The actuarial method also known as the life-table method can produce estimates and plots of the hazard function[16,17] Lifetime risk is useful when considering the burden of disease in a population and for service planning purposes. It is not possible to obtain the actual lifetime risk from cross-sectional surveys, as at the time of the interview many people will not yet have experienced disorders that will occur to them later.

Associations between lifetime mental disorders and socio-demographic variables were examined using logistic regression. Standard errors (SE) and significance tests were estimated using the Taylor series' linearisation method to adjust for the weighting. Multivariate significance was evaluated using Wald X^2 tests based on design corrected coefficient variance-covariance matrices. Statistical significance was evaluated at the 0.05 level using 2-sided tests. For ease of interpretation, all data were presented as weighted frequencies and percentages for categorical variables, and weighted means and standard deviations or medians and interquartile ranges (IQR) for continuous variables.

Results

Of the 13,500 cases released to the field, 9116 (67.5%) selected individuals were identified successfully at the households. Of the remaining cases, 2256 (16.1%) households selected respondent could not be identified, 1070 (7.9%) refused to be screened, 633 (4.7%) could not be contacted despite maximum contact attempts, 402 (3%) were either invalid or wrong addresses or demolished or vacant housing units and 23 (0.2%) were voided due to frame error. Among the 9116 respondents, 6648 (72.9%) respondents were successfully interviewed, 845 (9.4%) refused to participate in the study, 664 (7.3%) were either away for the entire duration of the survey (535), were not

Table 1. Socio-demographic Characteristics of the Study Sample (n=6616)

	Unweighted		Weighted	Population Figures by Singapore Census, 2010
	n	%	% (SE)	%
Age				
Mean (SE), SD	42.0	14.5	43.9(0.3)	
Age Group				
18-34	2293	34.7	31.7(0.0)	31.2
35-49	2369	35.8	34.1(0.0)	32.2
50-64	1542	23.3	23.1(0.0)	25.1
65+	412	6.2	11.1(0.0)	11.4
Ethnicity				
Chinese	2006	30.3	76.9(0.0)	74.1
Malay	2373	35.9	12.3(0.0)	13.4
Indian	1969	29.8	8.3(0.0)	9.2
Others	268	4.1	2.4(0.0)	3.3
Gender				
Female	3317	50.1	51.5(0.9)	49.3
Male	3299	49.9	48.5(0.9)	50.7
Marital Status				
Never married	1825	27.6	28.9(0.6)	
Currently married	4290	64.9	62.4(0.8)	
Divorced/ Separated	262	4.0	4.2(0.4)	
Widowed	237	3.6	4.4(0.4)	
Education				
Pre-primary	307	4.6	5.5(0.4)	
Primary	929	14.0	14.7(0.6)	
Secondary	1975	29.9	27.6(0.8)	
Pre-U/Junior college/ Diploma	1342	20.3	22.4(0.7)	
Vocational	721	10.9	7.9(0.4)	
University	1342	20.3	21.9(0.7)	
Employment				
Employed	4594	71.5	71.0(0.8)	
Economically inactive*	1522	23.7	24.5(0.7)	
Unemployed	313	4.9	4.5(0.4)	
Income				
Below S$20,000	3392	54.0	51.3(0.8)	
S$20,000-S$49,999	1924	30.7	31.2(0.8)	
Above S$50,000	962	15.3	17.5(0.7)	

*P <0.05

Table 2. Lifetime and 12-month Prevalence of Psychiatric Disorders

Disorder	Unweighted	Total	Age Group, Years				X^2 (df)	*P* Value
			18-34	35-49	50-64	65+		
	n	% (SE)	% (SE)	% (SE)	% (SE)	% (SE)		
Lifetime								
Major depressive disorder	417	5.8(0.4)	8.6(0.8)	5.4(0.7)	3.6(0.7)	3.8(1.5)	18.7(3)	0.0003
Dysthymia	25	0.3(0.1)	0.3(0.2)	0.3(0.2)	0.3(0.2)			
Bipolar I & II disorders	93	1.2(0.2)	2.0(0.4)	1.4(0.4)	0.4(0.2)			
Generalised anxiety disorder	71	0.9(0.2)	1.2(0.3)	1.2(0.3)	0.4(0.2)			
Obsessive compulsive disorder	230	3.0(0.3)	4.0(0.5)	3.5(0.5)	2.3(0.6)	0.1(0.1)	23.2(3)	<0.0001
Alcohol abuse	215	3.1(0.3)	4.2(0.6)	3.2(0.5)	2.4(0.6)	1.5(0.9)	6.6(3)	0.0850
Alcohol dependence	41	0.5(0.1)	1.1(0.3)	0.4(0.1)	0.01(0)	0.1(0.1)	37.6(3)	<0.0001
Any disorder	874	12.0(0.6)	16.9(1.1)	12.5(1)	7.8(1)	5.4(1.7)	40.3(3)	<0.0001
Co-morbidity	194	2.5(0.3)	3.8(0.5)	2.7(0.5)	1.6(0.5)	0.1(0.1)	27.4(3)	<0.0001
12-month								
Major depressive disorder	181	2.2(0.2)	3.8(0.5)	2.2(0.4)	0.9(0.3)	0.7(0.6)	18.7(3)	<0.0003
Dysthymia	25	0.3(0.1)	0.3(0.2)	0.3(0.2)	0.3(0.2)			
Bipolar I & II disorders	59	0.6(0.1)	1.1(0.3)	0.6(0.2)	0.2(0.2)			
Generalised anxiety disorder	33	0.4(0.1)	0.5(0.2)	0.6(0.2)	0.4(0.2)			
Obsessive compulsive disorder	82	1.1(0.2)	1.4(0.3)	1.5(0.4)	0.7(0.3)	0.1(0.1)	9.7(3)	0.0210
Alcohol abuse	29	0.5(0.1)	1.1(0.3)	0.4(0.2)	0.01(0.01)			
Alcohol dependence	19	0.3(0.1)	0.7(0.2)	0.2(0.1)	1.9(0.5)			
Any disorder	345	4.4(0.3)	7.0(0.7)	4.9(0.6)	0.5(0.2)	0.7(0.6)	32.3(3)	<0.0001
Comorbidity	73	0.9(0.2)	1.7(0.4)	0.9(0.3)				

contactable within maximum contact attempts (84) or were deceased (45), 554 (6.1%) respondents had permanently moved to another location or country and 396 (4.3%) were ineligible due to language barrier or incapability to conduct the survey. Of the completed interviews, 32 were voided due to quality failure and were not included in the analysis.

The individual response rate for the survey was calculated by dividing the number of completed and valid interviews (n = 6616) with the number of eligible cases (n = 8720) cases (number of individual who were successfully identified at the households (n = 9116) − the ineligible 396 cases) and presented as percentage which was 75.9% [6616 / (9116 − 396)]. No significant differences were found among responders and non responders with respect to age and gender. However, there were significantly more non-responders belonging to Chinese and other ethnic groups. The mean age of the respondents was 43.9 years. Table 1 shows the socio-demographic distribution of the respondents.

Prevalence of Key Psychiatric Disorders

The lifetime and 12-month prevalence rates of DSM-IV mental disorders are shown in Table 2. The lifetime prevalence of at least 1 affective, anxiety or alcohol use disorder was 12.0% in the adult population. The 12-month

prevalence was 4.4%. Based on the population census for the year 2007, these prevalence rates mean that overall, approximately 330,200 adults had 1 of these mental disorders in their lifetime while 121,384 (55,089 men and 66,295 women) of them had a mental illness in the past 1 year. Of the 3 types of affective disorder (major depressive disorder (MDD), bipolar disorder, and dysthymia) assessed in the SMHS, the lifetime prevalence rate of dysthymia was relatively rare (0.3%). The lifetime prevalence of bipolar disorder was 1.2% and affected men and women more or less equally (1.3% and 1.2% respectively) and that of MDD was 5.8%.

The combined lifetime prevalence of the 2 anxiety disorders: generalised anxiety disorder (GAD) and obsessive

Table 3a. Socio-demographic Predictors of Lifetime Risk of Major Depressive Disorder

Variables	Univariate Analysis		Multivariate Analysis			
	%	SE	OR	95% CI		*P* Value
Age Group						
18-34	8.6	0.8	1			
35-49	5.4	0.7	0.5	0.3	0.8	0.008
50-64	3.6	0.7	0.3	0.2	0.6	0.001
65+	3.8	1.5	0.5	0.2	1.1	0.095
Ethnicity						
Chinese	5.5	0.5	1			
Malay	4.5	0.4	0.8	0.6	1.1	0.252
Indian	8.1	0.6	1.4	1.1	1.8	0.020
Others	13.1	2.2	2.1	1.3	3.7	0.005
Gender						
Male	4.3	0.5	1.0			
Female	7.2	0.6	1.8	1.3	2.5	<0.001
Marital Status						
Single	6.4	0.7	1			
Married	4.6	0.4	1.3	0.8	2.0	0.289
Divorced/Separated	18.9	3.4	6.5	3.5	12.0	<.0001
Widowed	7.3	3.0	3.1	1.1	8.5	0.031
Education						
University	7.8	1.0	1			
Pre-U/Junior college/Diploma	6.8	0.9	0.8	0.5	1.3	0.435
Vocational	6.2	1.3	0.8	0.4	1.4	0.410
Secondary	5.1	0.7	0.7	0.4	1.2	0.169
Primary	3.4	0.9	0.4	0.2	0.9	0.040
Pre-primary	3.3	1.8	0.3	0.1	1.1	0.074
Any Chronic Physical Condition						
No	5.1	0.5	1			
Yes	6.7	0.7	1.7	1.3	2.4	0.001
Employment						
Employed	5.9	0.5	1			
Economically inactive	4.8	0.9	0.8	0.5	1.3	0.351
Unemployed	9.7	2.4	1.7	0.9	3.2	0.124
Income						
Below S$20,000	5.6	0.6	1			
S$20,000-S$49,000	6.3	0.7	1.0	0.6	1.5	0.881
Above S$50,000	6.2	1.0	0.8	0.4	1.5	0.484

Table 3b. Socio-demographic Predictors of Lifetime Risk of Dysthymia

Variables	Univariate Analysis		Multivariate Analysis			
	%	SE	OR	95% CI		*P* Value
Age Group						
18-34	0.3	0.2	1			
35-49	0.3	0.2	0.7	0.1	7.4	0.762
50-64	0.3	0.2	0.3	0.04	2.5	0.266
65+	-	-	-	-	-	-
Ethnicity						
Chinese	0.2	0.1	1			
Malay	0.3	0.1	1.3	0.4	4.7	0.649
Indian	0.5	0.2	2.0	0.6	6.7	0.254
Others	0.5	0.5	-	-	-	-
Gender						
Male	0.04	0.02	1.0			
Female	0.5	0.2	19.8	4.4	88.3	<.0001
Marital Status						
Single	0.2	0.1	1			
Married	0.2	0.1	2.1	0.1	61.0	0.671
Divorced/Separated	2.1	1.3	16.0	0.5	559.0	0.126
Widowed	0.1	0.1	2.6	0.0	219.6	0.680
Education						
University	0.2	0.2	1			
Pre-U/Junior college/Diploma	0.5	0.2	3.6	0.2	53.8	0.352
Vocational	0.1	0.1	0.5	0.02	13.5	0.670
Secondary	0.2	0.1	0.7	0.03	13.4	0.785
Primary	0.1	0.1	0.3	0.02	5.9	0.457
Pre-primary	0.7	0.7	4.7	0.3	85.1	0.291
Any Chronic Physical Condition						
No	0.1	0.03	1			
Yes	0.5	0.2	10.8	3.5	33.4	<.0001
Employment						
Employed	0.3	0.1	1			
Economically inactive[@]	0.1	0.1	0.04	0.004	0.3	0.002
Unemployed	1.2	0.9	1.9	0.5	7.1	0.312
Income						
Below S$20,000	0.4	0.2	1			
S$20,000-S$49,000	0.1	0.04	0.1	0.03	0.5	0.005
Above S$50,000	0.2	0.2	0.4	0.03	4.8	0.457

[@]includes homemakers, students and retirees/pensioners; -inadequate sample size to estimate coefficient

compulsive disorder (OCD) was 3.6% with the latter being more common than GAD (0.9% and 3.0% respectively). The lifetime prevalence of alcohol abuse and dependence were found to be 3.1% and 0.5% respectively. Among this adult population only 2.5% of people had 2 or more mental disorders (Table 2). The 12-month prevalence of MDD was 2.2% while that of bipolar disorder was 0.6%. The 12-month prevalence of the 2 anxiety disorders: GAD and OCD were 0.4% and 1.1% respectively. The combined 12-month prevalence of alcohol abuse and dependence was less than 1%.

Demographic Correlates and Lifetime Risk of Mental Disorders

Women had higher odds than men for having lifetime affective disorders (prevalence of MDD was 7.2% versus 4.3%, P <0.0003; dysthymia was 0.5% versus 0.04%, P <0.001). However, the rates of bipolar disorder, GAD and OCD were not significantly different across genders (Tables 3a, 3b and 3c). However, women had lower odds compared to men for lifetime alcohol abuse (prevalence of 1.2% versus 5.2%, P <0.001) (Table 3f). The prevalence of lifetime MDD among the Indians (8.1%) was significantly higher than that among the Chinese (5.5%) and Malays (4.5%) and Indians had higher odds of having MDD as compared to Chinese (P = 0.018). Similarly, rates and odds

Table 3c. Socio-demographic Predictors of Lifetime Risk of Bipolar Disorder

Variables	Univariate Analysis		Multivariate Analysis			
	%	SE	OR	95% CI		*P* Value
Age Group						
18-34	2.0	0.4	1			
35-49	1.4	0.4	0.6	0.3	1.3	0.163
50-64	0.4		0.1	0.2	0.3	0.001
65+	-	-	-	-	-	-
Ethnicity						
Chinese	1.1	0.2	1			
Malay	1.6	0.3	1	0.6	1.8	0.997
Indian	1.4	0.3	1.2	0.6	2.1	0.611
Others	1.2	0.7	1.2	0.3	4.9	0.75
Gender						
Male	1.2	0.2	1			
Female	1.3	0.3	1.2	0.6	2.2	0.636
Marital Status						
Single	1.5	0.3	1			
Married	1.0	0.2	1.3	0.6	2.7	0.504
Divorced/Separated	3.9	1.7	4.3	1.5	11.7	0.005
Widowed	-	-	-	-	-	-
Education						
University	0.6	0.3	1			
Pre-U/Junior college/Diploma	1.3	0.4	2.1	0.6	7.4	0.247
Vocational	2.7	0.9	4.8	1.1	20.6	0.035
Secondary	2	0.4	4.5	1.1	17.5	0.032
Primary	0.2	0.1	0.5	0.1	2.7	0.438
Pre-primary	-	-	-	-	-	-
Any Chronic Physical Condition						
No	1.0	0.2	1			
Yes	1.5	0.3	2.2	1.1	4.1	0.018
Employment						
Employed	1.3	0.2	1			
Economically inactive[@]	0.7	0.3	0.6	0.2	1.7	0.345
Unemployed	2.8	1.4	2.1	0.7	6.3	0.171
Income						
Below S$20,000	1.3	0.3				
S$20,000-S$49,000	1.2	0.3	0.7	0.3	1.4	0.276
Above S$50,000	1.2	0.5	1.1	0.2	4.5	0.938

[@]includes homemakers, students and retirees/pensioners; -inadequate sample size to estimate coefficient

Table 3d. Socio-demographic Predictors of Lifetime Risk of Generalised Anxiety Disorder

Variables	Univariate Analysis		Multivariate Analysis			
	%	SE	OR	95% CI		*P* Value
Age Group						
18-34	1.2	0.3	1			
35-49	1.2	0.3	1.3	0.4	4.1	0.643
50-64	0.4	0.2	0.3	0.05	2.2	0.249
65+	-	-				
Ethnicity						
Chinese	0.8	0.2	1			
Malay	1.0	0.2	1.4	0.7	2.8	0.407
Indian	1.5	0.3	1.9	0.9	3.7	0.054
Others	0.9	0.7	1.3	0.3	6.0	0.719
Gender						
Male	0.6	0.2	1.0			
Female	1.1	0.2	2.0	0.9	4.6	0.109
Marital Status						
Single	1.2	0.3	1			
Married	0.8	0.2	0.8	0.3	2.4	0.756
Divorced/Separated	1.6	1.0	1.6	0.4	7.1	0.552
Widowed	-	-	-	-	-	-
Education						
University	0.9	0.3	1			
Pre-U/Junior college/Diploma	1.4	0.4	1.6	0.6	4.5	0.393
Vocational	0.3	0.1	0.4	0.1	1.4	0.144
Secondary	0.9	0.3	1.1	0.3	4.3	0.932
Primary	0.5	0.3	0.9	0.1	5.4	0.885
Pre-primary	-	-	-	-	-	-
Any Chronic Physical Condition						
No	0.9	0.2	1			
Yes	0.8	0.2	1.2	0.6	2.4	0.674
Employment						
Employed	0.8	0.2	1			
Economically inactive[@]	0.7	0.3	0.9	0.3	3.0	0.889
Unemployed	3.0	1.5	4.8	1.8	12.5	0.001
Income						
Below S$20,000	0.8	0.2	1			
S$20,000-S$49,000	0.8	0.3	0.9	0.3	2.3	0.799
Above S$50,000	1.1	0.4	1.1	0.3	4.3	0.941

[@]includes homemakers, students and retirees/pensioners; -inadequate sample size to estimate coefficient

of lifetime alcohol dependence were also higher among Indians (prevalence rate among Indian was 1.0% versus Chinese (0.3%) and Malays (0.2%), P <0.001(Table 3g). The prevalence of alcohol abuse among Malays (2.4%) was significantly lower than the Chinese (3.0%) and Indians (3.1%) (P <0.001) (Table 3f).

Age had some association with the risk for MDD. The highest rates were found in the youngest age group i.e. in those aged 18 to 34 years. Thereafter, it decreased and leveled off with increasing age. The same applied to those with bipolar disorder. Respondents who were separated or divorced (18.9%), or widowed (7.3%) had a much higher

rate of MDD than those who were never married (6.4%) (P <0.001 and P = 0.031 respectively) (Table 3a). Those who were separated or divorced also had higher odds of bipolar disorder and OCD (Tables 3b, 3c, 3d and 3e). Respondents belonging to the younger age group (18 to 34 years) (P <0.001), those who were separated or divorced (P <0.001), unemployed (P = 0.001) or having any chronic physical condition (P = 0.003) were more likely to have a comorbid mental disorder (Table 3i).

Comorbid Physical Illness

There was a significant association between comorbid

Table 3e. Socio-demographic Predictors of Lifetime Risk of Obsessive Compulsive Disorder

Variables	Univariate Analysis		Multivariate Analysis			
	%	SE	OR	95% CI		*P* Value
Age Group						
18-34	4.0	0.5	1			
35-49	3.5	0.5	1.1	0.6	1.9	0.746
50-64	2.3	0.6	0.7	0.3	1.4	0.3
65+	0.1	0.1	0.1	0.01	0.3	0.001
Ethnicity						
Chinese	2.8	0.4	1			
Malay	3.4	0.4	1.2	0.8	1.8	0.306
Indian	3.8	0.4	1.2	0.8	1.8	0.325
Others	5.5	1.5	1.5	0.7	3.2	0.352
Gender						
Male	2.8	0.4	1			
Female	3.2	0.4	1.1	0.7	1.7	0.597
Marital Status						
Single	4.0	0.6	1			
Married	2.4	0.3	0.8	0.5	1.5	0.526
Divorced/Separated	9.0	2.6	3.5	1.6	7.6	0.002
Widowed	0.1	0.1	-	-	-	-
Education						
University	3.8	0.7	1			
Pre-U/Junior college/Diploma	3.4	0.6	0.7	0.4	1.4	0.342
Vocational	2.4	0.8	0.5	0.2	1.2	0.104
Secondary	3.4	0.6	0.8	0.4	1.5	0.448
Primary	1.6	0.5	0.4	0.1	0.9	0.036
Pre-primary	0.8	0.7	0.4	0.1	2.5	0.344
Any Chronic Physical Condition						
No	2.5	0.3	1			
Yes	3.6	0.5	1.8	1.2	2.8	0.004
Employment						
Employed	3.2	0.4	1			
Economically inactive[@]	2.3	0.5	0.8	0.4	1.6	0.562
Unemployed	4.3	1.6	1.2	0.5	3	0.641
Income						
Below S$20,000	2.8	0.4	1			
S$20,000-S$49,000	3.4	0.6	0.9	0.6	1.5	0.756
Above S$50,000	3.0	0.7	0.6	0.3	1.3	0.241

[@]includes homemakers, students and retirees/pensioners; -inadequate sample size to estimate coefficient

Table 3f. Socio-demographic Predictors of Lifetime Risk of Alcohol Abuse

Variables	Univariate Analysis		Multivariate Analysis			
	%	SE	OR	95% CI		*P* Value
Age Group						
18-34	4.2	0.6	1			
35-49	3.2	0.5	0.6	0.3	1.0	0.056
50-64	2.4	0.6	0.4	0.2	0.9	0.023
65+	1.5	0.9	0.5	0.1	2.2	0.362
Ethnicity						
Chinese	3.0	0.4	1			
Malay	2.4	0.3	0.6	0.4	0.9	0.022
Indian	3.1	0.4	0.9	0.6	1.3	0.547
Others	12.5	2.1	5.1	2.9	9.2	<.0001
Gender						
Male	5.2	0.6	1			
Female	1.2	0.3	0.2	0.1	0.4	<.0001
Marital Status						
Single	3.8	0.6	1			
Married	3.0	0.4	1.0	0.6	1.9	0.932
Divorced/Separated	4.2	1.6	1.5	0.5	4.2	0.432
Widowed	-	-	-	-	-	-
Education						
University	2.5	0.5	1.0			
Pre-U/Junior college/Diploma	3.2	0.6	1.7	0.8	3.4	0.138
Vocational	6.0	1.4	3.0	1.3	7.1	0.012
Secondary	3.8	0.7	3.4	1.5	8.0	0.004
Primary	2.3	0.7	2.2	0.7	6.7	0.176
Pre-primary	0.8	0.7	1.3	0.2	10.2	0.786
Any Chronic Physical Condition						
No	2.6	0.3	1			
Yes	3.9	0.5	1.8	1.2	2.8	0.004
Employment						
Employed	3.7	0.4	1			
Economically inactive[@]	0.9	0.3	0.4	0.1	1.0	0.058
Unemployed	6.1	2.1	2.2	0.9	5.0	0.068
Income						
Below S$20,000	2.6	0.4	1			
S$20,000-S$49,000	4.0	0.6	1.3	0.7	2.3	0.365
Above S$50,000	3.8	0.8	1.3	0.5	3.3	0.569

[@]includes homemakers, students and retirees/pensioners; -inadequate sample size to estimate coefficient

physical illness and all the disorders except GAD (Table 3). Among those with mental disorders, 50.6% had a chronic physical disorder: the most common comorbid chronic physical illness was hypertension (15.8%), followed by asthma (15.3%) and migraine headaches (12.5%).

Age of Onset and Projected Lifetime Risk

The median age of onset was the earliest for OCD (19 years). The age of onset for these disorders in our population occurred over a relatively narrow range: with an interquartile range (IQR) of 12 years for GAD and 7 years for alcohol abuse. MDD had the median age of onset of 26 years and

it also had the greatest difference between projected risk at age 75 years and lifetime prevalence (8.5% vs. 5.8%). On the basis of the age of onset, the projected lifetime risk of any of the mental disorders covered in this study of 15.6%, is higher than the lifetime prevalence of 12.0% (Table 4).

Discussion

This is the first comprehensive and in-depth mental health survey of a representative sample of the adult resident population in Singapore. Of note is that mental disorders can be screened for and identified by a standardised interview in

Table 3g. Socio-demographic Predictors of Lifetime Risk of Alcohol Dependence

Variables	Univariate Analysis		Multivariate Analysis			
	%	SE	OR	95% CI		*P* Value
Age Group						
18-34	1.1	0.3	1			
35-49	0.4	0.1	0.3	0.1	1	0.057
50-64	0.01	0	0.01	0.001	0.1	0.001
65+	0.1	0.1	0.1	0.01	1.3	0.079
Ethnicity						
Chinese	0.3	0.1	1			
Malay	0.2	0.1	0.4	0.1	1.4	0.175
Indian	1.0	0.2	2.7	1.1	6.8	0.036
Others	4.7	1.4	17.3	5.1	59.1	0.001
Gender						
Male	0.7	0.2	1			
Female	0.3	0.1	0.5	0.2	1.5	0.225
Marital Status						
Single	1.0	0.3	1			
Married	0.3	0.1	0.5	0.2	1.5	0.204
Divorced/Separated	0.6	0.3	1.3	0.3	5.3	0.712
Widowed	-	-	-	-	-	-
Education						
University	0.4	0.2				
Pre-U/Junior college/Diploma	0.7	0.3	2.7	0.4	17.5	0.29
Vocational	0.9	0.5	4	0.5	33.6	0.2
Secondary	0.5	0.2	5	0.8	33.1	0.094
Primary	0.1	0.1	2.7	0.2	36	0.46
Pre-primary	0.1	0.1	4.6	0.2	106.5	0.343
Any Chronic Physical Condition						
No	0.3	0.1	1			
Yes	0.7	0.2	3.5	1.4	8.6	0.006
Employment						
Employed	0.6	0.1	1			
Economically inactive[@]	0.2	0.1	0.5	0.1	3.1	0.473
Unemployed	0.9	0.8	1.2	0.2	9.5	0.839
Income						
Below S$20,000	0.5	0.1	1			
S$20,000-S$49,000	0.5	0.2	1	0.3	2.9	0.978
Above S$50,000	0.6	0.3	1.6	0.3	8.8	0.583

[@]includes homemakers, students and retirees/pensioners; -inadequate sample size to estimate coefficient

Table 3h. Socio-demographic Predictors of Lifetime Risk of At Least One DSM-IV Disorder

Variables	Univariate Analysis		Multivariate Analysis			
	%	SE	OR	95% CI		*P* Value
Age Group						
18-34	16.9	1.1	1			
35-49	12.5	1	0.6	0.4	0.8	0.003
50-64	7.8	1	0.3	0.2	0.5	<0.001
65+	5.4	1.7	0.4	0.2	0.8	0.01
Ethnicity						
Chinese	11.3	0.7	1			
Malay	10.8	0.6	0.9	0.7	1.1	0.217
Indian	15.4	0.8	1.3	1.1	1.6	0.011
Others	29	2.9	2.9	2	4.3	<0.001
Gender						
Male	12.7	0.8	1			
Female	11.4	0.8	0.9	0.7	1.2	0.569
Marital Status						
Single	14.3	1.1	1			
Married	10.0	0.6	1	0.8	1.4	0.766
Divorced/Separated	31.1	4	4.5	2.8	7.3	<0.001
Widowed	7.3	3	1.5	0.6	4	0.406
Education						
University	13.6	1.2	1			
Pre-U/Junior college/Diploma	13.3	1.2	1	0.7	1.4	0.952
Vocational	15.4	2	1.1	0.7	1.7	0.652
Secondary	12.7	1.1	1.3	0.8	1.9	0.269
Primary	7.4	1.2	0.7	0.4	1.2	0.221
Pre-primary	4.1	1.9	0.4	0.2	1.2	0.117
Any Chronic Physical Condition						
No	10.3	0.7	1			
Yes	14.3	0.9	1.9	1.5	2.4	<0.001
Employment						
Employed	12.9	0.7	1			
Economically inactive[@]	7.6	1	0.6	0.4	0.9	0.014
Unemployed	20.2	3.3	1.8	1.1	2.9	0.02
Income						
Below S$20,000	11.1	0.8	1			
S$20,000-S$49,000	13.6	1.1	1	0.8	1.4	0.91
Above S$50,000	13.3	1.4	0.9	0.6	1.4	0.702

[@]includes homemakers, students and retirees/pensioners

a population survey conducted by trained lay interviewers, and respondents in our local population could accept an extensive and potentially sensitive interview. The main finding from the SMHS is that 12.0% of the adult resident population met lifetime criteria for the common affective, anxiety, or alcohol use disorders.

Besides OCD, the rates of other disorders among our population are considerably lower than in Western countries. Table 5 shows the rates reported in surveys that have used the WMH-CIDI as the main instrument. This pattern is consistent with other studies that reported lower prevalence in Asian countries.[18,19] Whether this

represents true differences in the rates could be debated. For one, it has been suggested that there might be some degree of under-reporting because of the greater reluctance and reticence in revealing negative states, emotional and psychological problems to a stranger.[18,19] Another possibility is that these symptoms as expressed by Asian people might not properly be captured by the American DSM categories. However, a cross-national analysis of the structure of the depressive symptoms which was based on item response theory methods, showed the latent structure of depressive symptoms were closely associated with the specific depressive symptoms across the various countries, countering the suggestion that cross-national differences in the nature of depression explained the variation in the

Table 3i. Socio-demographic Predictors of Lifetime Risk of Psychiatric Comorbidity

Variables	Univariate Analysis		Multivariate Analysis			
	%	SE	OR	95% CI		*P* Value
Age Group						
18-34	3.8	0.5	1			
35-49	2.7	0.5	0.7	0.4	1.2	0.199
50-64	1.6	0.5	0.3	0.1	0.7	0.005
65+	0.1	0.1	0.02	0.0	0.1	<.0001
Ethnicity						
Chinese	2.2	0.3	1			
Malay	2.4	0.3	0.9	0.6	1.4	0.579
Indian	3.5	0.4	1.4	1.0	2.2	0.082
Others	8.1	1.8	3.8	1.9	7.7	0.000
Gender						
Male	2.1	0.3	1			
Female	2.9	0.4	1.6	1.0	2.5	0.062
Marital Status						
Single	3.2	0.5	1			
Married	1.9	0.3	1.1	0.6	2.1	0.785
Divorced/Separated	8.8	2.5	4.4	2.0	9.8	0.001
Widowed	0.2	0.1	0.2	0.0	1.6	0.127
Education						
University	2.3	0.5	1			
Pre-U/Junior college/Diploma	3.4	0.6	1.5	0.7	3.0	0.283
Vocational	3.1	1.0	1.7	0.7	4.3	0.284
Secondary	3.0	0.5	1.7	0.7	3.9	0.208
Primary	0.7	0.3	0.5	0.2	1.7	0.283
Pre-primary	1.5	1.0	2.4	0.6	10.7	0.240
Any Chronic Physical Condition						
No	2.1	0.3	1			
Yes	3.1	0.4	2.0	1.3	3.1	0.003
Employment						
Employed	2.5	0.3	1			
Economically inactive[@]	1.6	0.4	0.7	0.3	1.5	0.375
Unemployed	7.5	2.2	3.3	1.7	6.6	0.001
Income						
Below S$20,000	2.5	0.4	1			
S$20,000-S$49,000	2.6	0.5	0.9	0.5	1.6	0.653
Above S$50,000	2.5	0.7	0.9	0.3	2.2	0.763

[@]includes homemakers, students and retirees/pensioners

Table 4. Age in Years at Selected Percentiles on the Standardised Age-of-Onset Distributions of Disorders with Projected Lifetime Risk at 75 Years

Disorder	Age at Selected Age-of-onset Percentiles								IQR*	Projected Lifetime Risk at Age 75 years, % (SE)**	
	5%	10%	25%	50%	75%	90%	95%	99%		%	SE
Major depressive disorder	12	15	18	26	35	45	52	60	17	8.5	0.5
Dysthymia	14	15	18	25	29	38	38	50	11	0.5	0.1
Bipolar disorder	12	13	17	24	34	40	41	45	17	1.5	0.1
Generalised anxiety disorder	12	13	18	20	30	44	40	50	12	1.1	0.2
Obsessive compulsive disorder	5	5	13	19	28	40	50	62	15	3.9	0.3
Alcohol abuse	16	18	20	23	27	40	48	55	7	4.5	0.5
Alcohol dependence	18	18	18	21	25	30	35	41	7	0.5	0.1
Any disorder	9	13	17	22	31	43	50	58	14	15.6	0.6

*IQR (Interquartile ranges): The number of years between the 25th and 75th percentile of the age of onset distributions
**Based on the actuarial life table method

Table 5. Lifetime and 12-month Prevalence Across Countries

Countries	Major Depressive Disorder		Bipolar Disorder		Generalised Anxiety Disorder		Obsessive Compulsive Disorder		Alcohol Abuse		Alcohol Dependence	
	Lifetime	12-month	Lifetime	12-month	Lifetime	12-month	Lifetime	12-month	Lifetime	12-month	Lifetime	12-month
USA	16.6[3]*	6.8[3]*	2.1[36]*	1.4[36]*	5.7[37]*	2.7[37]*	2.3[37]*	1.2[37]*	13.2[3]*	3.1[3]*	5.4[3]*	
Europe	12.8[38]*	3.9[38]*			2.8[38]*	1.0[38]*			4.1[38]*	0.7[38]*	1.1[38]*	0.3[38]*
China	3.6[39]*	1.8[39]*	0.1[40]*		1.2[42]#	0.8[42]#			4.7[40]*	1.6[41]*	1.0[40]*	0.6[41]*
Australia	11.6[43]*	4.1[4]*	2.9[43]*	1.8[44]¤	5.9[43]*	2.7[4]*	2.8[43]*	1.9[4]*	18.9[45]*	2.9[45]*	3.8[45]*	1.4[45]*
Japan		2.9[5]*		0.1[5]*		1.2[5]*				1.6[5]*		0.4[5]*
New Zealand	16.0[6]*	5.8[6]*	1.7[46]*	1.0[46]*	6.0[6]*	2.0[6]*	1.2[6]*	0.6[6]*	11.4[6]*	2.6[6]*	4.0[6]*	1.3[6]*
Singapore	5.8	2.2	1.2	0.6	0.9	0.4	3.0	1.1	3.2	0.5	0.5	0.3

*using WMH-CIDI; #using CIDI 1.0; ¤using CIDI v2.1

rates of depressive disorders.[20] Comparing the overall rate of mental disorders in our population with that in other countries, would require also comparisons of age and sex-matched samples using the same diagnostic criteria. The presence of other hard-to-discern cultural differences and influences limit the meaningfulness of such inter-national comparisons and efforts to compare the rates of different countries should be treated with considerable caution. Moreover, for purposes of and choices about domestic policy, international comparisons are seldom relevant.

It is well known that the prevalence rates of many psychiatric disorders differ by gender. We found women had a higher risk for MDD and dysthymia and a lower risk for alcohol abuse. Other studies have established that women are more likely to meet diagnostic criteria for mood and anxiety disorders, whereas men are more likely to meet criteria for substance use disorders.[3] The greater lifetime risk for MDD in women is one of the most well-established findings in the epidemiology of psychiatric disorders and various risk factors have been postulated. These include biological susceptibility arising from hormonal mechanisms, greater likelihood of help-seeking, difficulties and stresses stemming their social and cultural roles in society, but these have yet to be determined with any certainty.[21] The association with marital status and mental illness could be bidirectional and possibly reflect a number of different social processes. Persons with mental illness may be less likely to marry and more likely to have marital difficulties ending in divorce,[22,23] separation or the death of a spouse may adversely affect a person's mental health; and on the other hand, marriage may be protective against mental illness. At this point, we have no explanation for why Indians are at higher risk for MDD and alcohol dependence and whether it could be due to some yet to be elucidated

biological vulnerability or environmental factors which remain to be ascertained with further research.

Unemployment was found to be significantly associated with GAD, having at least one comorbid mental illness. Unemployment can be both a cause and a consequence of mental health problems. There are many reasons for high unemployment rates among people with mental illness. These include symptoms of these health problems, time spent on treatment and recovery, lack of education or training, and discrimination. However, both the financial strain of unemployment as well as the absence of non-financial benefits provided by one's job such as social status, self-esteem, physical and mental activity, and use of one's skills, can increase the risk of mental illness.[24,25]

Our findings of the common occurrence of physical disorders is consistent with other research elsewhere that shows a high rate of physical illnesses among mentally ill people.[26,27] Due to the cross-sectional nature of our study, we could not establish the temporal relation of mental disorder and the physical illness although it is possibly bi-directional. A persistent chronic illness would affect a person's ability to function normally and potentially exerts a negative effect on quality of life and wellbeing[28] and patients with chronic physical illness typically have anxiety and depression.[29] On the other hand, studies have shown that depression increases the risk for development of type II diabetes.[30,31] Healthcare providers should therefore be aware of this common co-occurrence and exert the necessary care in screening and treatment.

No country has the resources to treat everyone with mental illness and some triage based on clearly articulated principles to select the priority areas would be needed. Factors that need to be taken into account would include the relative rate of these mental disorders, the nature of the disorder in terms of their age of onset and course, their severity in terms of disease burden, and the availability of evidence-based treatment. In this aspect, MDD is the most common while OCD is third most common and together they affect 8.2% of the population. They also tend to run a chronic course if they are not treated—hence the burden of disease would be correspondingly high—the 2004 Singapore Burden of Disease Study ranked depression and anxiety as the second leading cause of disability after diabetes mellitus.[32] Based on our findings of the differences in the rates of some mental disorders among the 3 ethnic groups, a more targeted and non-stigmatising approach in raising awareness and detection of these specific disorders ought to be considered.

There are some limitations to our study. First, it was not possible to establish the prevalence of all mental disorders due to time, costs, and the burden of data collection. Second, the sample was based upon individuals residing in households so it excluded residents of nursing homes and hospitals and inmates in prisons. Although they comprise a very small proportion of the total Singapore population, these groups are likely to have higher rates of mental disorders than the general population. Several surveys done in Western countries that have sampled the residents of nursing homes and hospitals have found that the inclusion of these groups added only a small fraction (about 1%) to the estimated percentage of the population with a mental disorder.[2,33] Third, about 24% of the sample was not interviewed which could lead to selection bias as well as underestimation of the true rates—for example, in the US National Comorbidity Survey (also on mental disorders), special efforts were made to estimate the rate of disorders among persons who initially refused to participate in the survey through a briefer interview, and it showed that persons who initially declined to be interviewed had higher rates of mental disorder than did those who agreed to participate.[34] Fourth, previous research has suggested that lifetime prevalence is sometimes under-reported because of respondents' reluctance to admit mental illness.[35] Thus, true prevalence estimates may be higher in the Singapore population.

Conclusion

This study has provided a rich body of information on the prevalence of mental disorders throughout the adult resident population in Singapore regardless of whether or not they have been in contact with health services. This data provides vital information for policy analysis and formulation as well as the basis for future tracking and identification of trends of the mental health status of the Singapore population and would help evaluate the combined impact of the National Mental Health Blueprint.

Acknowledgements

This study was supported by funding from the Singapore Millennium Foundation and the Ministry of Health, Singapore.

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