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Prevalence and correlates of heart disease among adults in Singapore

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ABSTRACT

Heart disease is one of the leading causes of morbidity and mortality worldwide and it has been well established that it is associated with both mental and physical conditions. This paper describes the prevalence of heart disease with mental disorders and other chronic physical conditions among the Singapore resident population. Data were from the Singapore Mental Health Study which was a representative, cross-sectional epidemiological survey undertaken with 6616 Singapore residents, between December 2009 and December 2010. The Composite International Diagnostic Interview Version 3.0 was used to establish the diagnosis of mental disorders, while a chronic medical conditions checklist was used to gather information on 15 physical conditions, including various forms of heart disease. Health-related quality of life was measured using the Euro-Quality of Life Scale (EQ-5D). The lifetime prevalence of heart disease was 2.8%. Socio-demographic correlates of heart disease included older age, Indian ethnicity, secondary education (vs. tertiary) and being economically inactive. After adjusting for socio-demographic variables and other comorbid physical and mental disorders, the prevalence of major depressive disorder and bipolar disorder were significantly higher among those with heart disease, as were diabetes, arthritis, kidney failure and lung disease. These findings highlight important associations between heart disease and various socio-demographic correlates, mental disorders and physical conditions. Given the high prevalence of mood disorders among heart disease patients, timely and appropriate screening and treatment of mental disorders among this group is essential.

1. Introduction

Heart diseases (HD) including conditions such as ischaemic heart disease, coronary heart disease, angina and congestive heart failure are among the leading causes of morbidity and mortality in many countries worldwide, with over 7 million people dying each year from coronary heart disease alone (World Health Organization, 2011; Deaton et al., 2011). It has been predicted that by 2030, one of the leading causes of death and burden of disease in the world will be ischaemic heart disease (Mathers and Loncar, 2006). Common risk factors for HD include high cholesterol, high blood pressure, diabetes mellitus, overweight/obesity, smoking and lack of exercise, many of which are related to lifestyle behaviour and are therefore modifiable. Research has shown that certain demographic correlates such as older age and lower education (Ormel et al., 2007) are also associated with increased risk of HD.

HD, like several other non-communicable diseases such as diabetes, chronic respiratory disease and cancer, share the same behavioural risk factors including smoking, unhealthy diet and physical inactivity. HD itself is also a risk factor for the development of other chronic conditions such as kidney disease (Rodriguez-Iturbe and Correa-Rotter, 2010), while at the same time, physical conditions like arthritis are a risk factor for HD and cardiovascular disease (CVD) (Kramer and Giles, 2011). Increased comorbidity between psychiatric disorders and HD has also received growing attention in recent times. Research has shown that HD is significantly more prevalent among people with mental illness and it has been reported that people with severe mental illnesses such as major depressive disorder (MDD), bipolar disorder or schizophrenia have an increased mortality associated with physical illnesses, with the most common cause of death being CVD (Brown et al., 2009; De Hert et al., 2009). Furthermore, comorbid physical and mental health conditions can result in a

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combined negative impact on disease-related outcomes (Gadalla, 2008) and therefore not only is screening for such conditions critical but also vital for the effective management of patients with multimorbidities.

In Singapore, over 20% of all deaths in 2011 were due to HD and it was among the most common cause of hospitalization, constituting 6.0% of hospital admissions in 2011 (Ministry of Health, 2013a). The Singapore Burden of Disease Study undertaken in 2004 found diabetes mellitus, ischaemic heart disease and stroke to be the top three causes of premature death (Phua et al., 2009). Whilst previous research in Singapore has shown than both HD and mental disorders are not uncommon, less is known about the comorbidity of HD with mental disorders. The aims of the present study were to establish the prevalence and comorbidity of HD with mental disorders and other chronic physical conditions among the adult resident population in Singapore. In addition, quality of life was also assessed among those with HD.

2. Methods

2.1. Sample

The Singapore Mental Health Study (SMHS) was a cross-sectional, epidemiological survey of a representative household sample of Singapore residents (citizens and permanent residents), aged 18 years and above who were fluent in English, Mandarin or Malay. The participants were randomly selected from a national registry that maintains the names, socio-demographic details such as age, gender, ethnicity and household addresses of all residents in Singapore.

Upon agreeing to participate, written consent was obtained from all participants and for those under the age of 21, consent was also obtained from a parent or guardian. Those residents who were incapable of doing an interview due to severe physical or mental conditions, language barriers, living outside the country, and those who were not contactable due to incomplete or incorrect address were excluded from the survey. The survey was carried out between December 2009 and December 2010, after approval from the relevant Institutional Review Boards. A total of 6616 people completed the face-to-face interview, yielding an overall response rate of 75.9%. Additional information relating to the methods and procedures undertaken as part of the SMHS has been described elsewhere (Subramaniam et al., 2012).

2.2. Measures

2.2.1. Composite International Diagnostic Interview (CIDI) Version 3.0

Psychiatric disorders were established using the Composite International Diagnostic Interview (CIDI) Version 3.0 (Kessler and Ustun, 2004). CIDI 3.0 is a fully structured diagnostic instrument that assesses 12-month and lifetime prevalence of disorders based on definitions and criteria from the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV) and the International Classification of Disease, 10th Revision (ICD-10). The SMHS used a modified version of the CIDI which included diagnostic modules on MDD, Bipolar Disorder, Generalised Anxiety Disorder (GAD), Obsessive Compulsive Disorder (OCD) and alcohol use disorders (including alcohol abuse and alcohol dependence).

2.2.2. Chronic medical conditions checklist

A modified version of the CIDI 3.0 chronic medical conditions checklist was used and respondents were asked to report any of the disorders listed in the checklist. Respondents were read the following statement: '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 conditions that were considered prevalent in Singapore's population, including diabetes, cancer and hypertension etc. More specifically respondents were asked whether a doctor had diagnosed them with "a heart attack, coronary heart disease, angina, congestive heart failure or other heart disease". For the purposes of this paper, HD' refers to any heart condition, however unlike CVD, it excludes stroke or any other cerebrovascular conditions.

2.2.3. Euro-Quality of Life Scale (EQ-5D)

The Euro-Quality of Life Scale (EQ-5D) is a standardised measure of health-related quality of life developed by the EuroQol Group which provides a simple, generic measure of health for clinical and economic appraisal (EuroQol Group, 1990). It comprises a descriptive system which includes five dimensions (mobility, self-care, usual activities, pain/discomfort and anxiety/depression). In this study, we used the UK time trade-off values (Kind et al., 1999) to convert the states to health utility scores, where respondents were asked to imagine 10 years of life in the health state under valuation, relative to a shorter duration in the best state, followed by 'immediate death'. The scores range from −0.59 to 1.00, with negative values representing health states worse than being dead, 0 representing being dead and 1.00 representing the state of full health. A conventional approach was taken to valuing states considered to be worse than dead which indicate that they would rather die immediately than live in the imperfect health state for any number of years (Longworth et al., 2014).

2.3. Statistical 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-stratification by age and ethnic distributions between the survey sample and the Singapore resident population in 2007. Sampling weight was calculated using inverse probability weighting. Descriptive analyses were performed to establish the prevalence of HD, other chronic medical conditions and mental disorders based on weighted data. Logistic regression analysis was used to examine the associations between HD and socio-demographic variables.

In order to elucidate the relationship between HD and mental disorders and other chronic medical conditions accounting for other variables that may have independent effects on psychopathology, we performed three series of logistic regression models. In the first series of logistic modelling, odds ratios (OR) for the association between HD and mental disorders and other chronic medical conditions were adjusted for demographic variables such as age, gender, ethnicity, marital status, employment, income and education. The second logistic regression models were adjusted for demographic variables and comorbid mental disorders (if the main predictor is a mental disorder) or comorbid chronic medical conditions (if the main predictor) is chronic medical condition variable. The last series of logistic regression models were adjusted for all demographic variables, chronic medical conditions and mental disorders.

In addition, we used an adjusted mean difference to indicate a reduction in the EQ-5D index among those with comorbid HD and mental disorders, HD only, mental disorder only and chronic medical conditions compared to the controls. The adjusted mean differences were assessed using multiple linear regression models after adjusting for socio-demographic variables. Standard errors (SE) and significance tests were estimated using the Taylor series' linearization method to adjust for the weighting. Multivariate