Journal of Psychiatric Research 47 (2013) 796–801

Contents lists available at SciVerse ScienceDirect

Journal of Psychiatric Research

journal homepage: www.elsevier.com/locate/psychires

The indirect economic impacts of co-morbidities on people with depression

Deborah J. Schofield [a,b], Emily J. Callander [a,b,*], Rupendra N. Shrestha [a], Megan E. Passey [c], Richard Percival [d], Simon J. Kelly [d]

[a] NHMRC Clinical Trials Centre, University of Sydney, Australia
[b] School of Public Health, University of Sydney, Australia
[c] University Centre for Rural Health – North Coast, University of Sydney, Australia
[d] National Centre for Social and Economic Modelling, University of Canberra, Australia

ARTICLE INFO

Article history:
Received 2 October 2012
Received in revised form
20 February 2013
Accepted 27 February 2013

Keywords:
Depression
Co-morbidities
Labour force participation
Income

ABSTRACT

It is known that people with depression often have other co-morbid conditions; however this is rarely acknowledged in studies that access the economic impacts of depression. This paper aims to quantify the association between co-morbid health conditions and labour force status and economic circumstances of people with depression. This study undertakes cross-sectional analysis using a dataset that is representative of the 45–64 year old Australian population with depression. The probability of being out of the labour force increases with increasing number of co-morbidities, and the amount of weekly income received by people with depression decreased with increasing numbers of co-morbidities. Those with depression and three or more co-morbidities were 4.31 times more likely to be out of the labour force (95% CI: 1.74–10.68), and received a weekly private income 88% lower (95% CI: −94%, −75%) than people with depression alone. It is important to consider the co-morbid conditions an individual has when assessing the impact of depression on labour force participation and economic circumstances.

1. Objectives of the study

Depression has been identified as having a detrimental impact on the labour force participation of sufferers (Kessler and Frank, 1997; Kessler et al., 2001). Within the United States, more sick days are attributed to depression than any other health condition (Conti and Burton, 1994; Claxton et al., 1999); and within Australia, 57% of people aged 45–64 years with depression are out of the labour force (Schofield et al., 2008). Suffering from a mental illness may increase the likelihood of an individual retiring early from the workforce due to the limitations caused by the condition (Waghorn and Lloyd, 2005).

The workforce absence that results from having depression has significant economic costs on the individuals who already bear the considerable health burden of the disease.[1] Within Australia, people who are out of the labour force due to depression have lower income, lower wealth and lower savings than their counterparts, without depression who remained in the workforce (Schofield et al., 2011a,b,c). These studies, and others that have identified the link between depression and the loss of personal income associated with workforce absence (Smith et al., 1995; Patel and Knapp, 1998; Brazenor, 2002; Goetzel et al., 2003; Thomas and Morris, 2003; Department of Health and Ageing, 2007) do not take into consideration the impact of co-morbidities.

Depression often occurs simultaneously with other conditions, and it is recognised that the occurrence of co-morbidities reduces the chances of workforce participation amongst

[1] There is a considerable body of research looking at the costs of depression. Most of these studies look at the direct medical (outpatient, inpatient and pharmaceutical costs), with few studies investigating the indirect costs of depression – costs such as lost workforce participation. In a systematic review of cost of illness studies conducted by Luppa et al. (2007), of the 24 papers included in the study, only four looked at the cost of lost productivity. However, despite the scant literature, it is acknowledged that the indirect costs of depression are likely higher than the direct costs (Luppa et al., 2007). Due to this gap in the literature and the importance of indirect costs, this paper focuses on the indirect costs associated with lost labour force participation and depression.

* Corresponding author. NHMRC Clinical Trials Centre, University of Sydney, Locked Bag 77, Camperdown, NSW 1450, Australia. Tel.: +61 2 9563 5068; fax: +61 2 9565 1863.
E-mail addresses: emily.callander@ctc.usyd.edu.au, emily.callander@sydney.edu.au (E.J. Callander).

0022-3956/$ – see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.jpsychires.2013.02.014

individuals with depression (Löwe et al., 2004; Buist-Bouwman et al., 2005; Waghorn and Chant, 2005; Stang et al., 2006; Waghorn et al., 2006, 2008; Merikangas et al., 2007; Braden et al., 2008; Kessler et al., 2008). However, it is not known what the economic implications of having co-morbidities are amongst people with depression. This paper will look at the 45–64 year old Australian population, a group identified as being susceptible to early exit from the labour force due to ill health (Schofield et al., 2008), and will analyse the relationship between co-morbidities and economic circumstances of people with depression.

2. Materials and methods

This study was conducted using Health&WealthMOD, a microsimulation model of the 45–64 year old Australian population. The model contains detailed information, at the individual level, of health, labour force participation, and economic status. It has been successfully used in the past to document the economic impacts of various individual health conditions (Schofield et al., 2010a,b, 2012b). Health&WealthMOD was built upon individual record data from the 2003 Survey of Disability, Ageing and Carers (SDAC), a nationally representative survey of health and disability conducted by the Australian Bureau of Statistics (Australian Bureau of Statistics, 2004), and STINMOD, a microsimulation model of income tax and government support payments (Lambert et al., 1994; Percival et al., 2007) which is maintained and developed for the Australian Government by the National Centre for Social and Economic Modelling at the University of Canberra.

The base population of Health&WealthMOD was unit record data extracted from the SDAC. From this dataset, individual records were extracted for those aged 45–64 years. The details extracted for each individual in the base population included demographic variables (for example, age, sex, family type, and state of residence), socioeconomic variables (level and field of education, income, benefits received), labour force variables (labour force participation, employment restrictions, retirement), and health and disability variables (main chronic conditions, number of chronic health conditions, general health status, type and extent of disability, support and care required).

Using STINMOD, additional economic information such as individual income, government support payments and tax liability were imputed onto the base data. This imputation was done by identifying persons with similar characteristics on STINMOD and "donating" their income and wealth information onto Health&WealthMOD using a process commonly used in microsimulation models called synthetic matching (Rässler, 2002). Nine variables: sex (2 groups), income unit type (4 groups), type of government pension/support (3 groups), income quintile (5 groups), age group (4 groups), labour force status (4 groups), hours worked per week (5 groups), highest educational qualification (2 groups) and home ownership (2 groups), that were common to both datasets and strongly related to income were chosen as matching variables for synthetic matching.

The data were then aged to reflect the 2009 Australian 45–64 year old population. The ageing was used to account for the disability and illness, demographic, labour force, earnings growth and other changes that had occurred between 2003 and 2009. Full details of Health&WealthMOD are available in Schofield et al. (2011a,b,c,d).

Respondents' self-reported health conditions were classified in the SDAC 2003 by the Australian Bureau of Statistics using ICD10 codes. People who reported their main long term health condition as depression/mood affective disorders (excluding postnatal depression) (ICD code F30–39) were considered to have 'depression'.[2]

The conditions high cholesterol, hypertension, deafness and noise induced hearing loss, and diseases of the ear and mastoid process were excluded from the analysis due to the limited impact they have on the labour force participation of individuals (Schofield et al., 2008).

The variables used for private income, taxation payments, and transfer payments came from STINMOD. Private income is the sum of a person's income derived from employment and any income generated from investments such as cash deposits, shares or property, but excludes any government benefits payments.

2.1. Statistical analysis

Initial descriptive analysis was undertaken to estimate the number and proportion of individuals with no chronic health condition, depression only, depression and one co-morbidity, depression and two co-morbidities, and depression and three or more co-morbidities.

The odds ratio of being 'not in the labour force' was then calculated for those with depression and one co-morbidity, depression and two co-morbidities, and depression and three or more co-morbidities. Those with depression only were used as the reference group and the results were adjusted for age, sex and highest level of education.

The conditions that were co-morbid with depression were then examined and the odds ratio of being 'not in the labour force' was then calculated for those with depression and various co-morbidities to determine what co-morbid conditions were significantly related to workforce absence. People with depression only were used as the reference group and the results were adjusted for age, sex and highest level of education.

Due to low record numbers in the survey for conditions co-morbid with depression, the following conditions were not analysed separately: certain infectious and parasitic diseases, neoplasms, diseases of the blood and blood forming organs, Alzheimer's disease, diseases of the skin and subcutaneous tissue, diseases of the eye and adnexa, diseases of the respiratory system, certain conditions originating in the perinatal period, diseases of the genitourinary system, congenital malformations, deformations and chromosomal abnormalities, other endocrine/nutritional and metabolic disorders, other injury/poisoning, and a group that the ABS originally called 'other conditions'.

Descriptive analysis was undertaken to estimate the mean and median weekly private income, taxation payments, and transfer income attributable to individuals with no chronic health condition, depression only, depression and one co-morbidity, depression and two co-morbidities, and depression and three or more co-morbidities.

A multiple linear regression model of the log of weekly income was used to analyse the differences between weekly private incomes of these groups. Analyses were repeated for weekly transfer income and weekly tax liability. Those with depression only were used as the reference group. The co-variates age group, sex and highest level of education were adjusted for in the regression models. Regression analysis was undertaken on log-transformed data in order to satisfy the assumptions of linear regression analysis, and regression diagnostics confirmed that the assumptions

[2] People who listed depression as their main health condition were the subject of this study, as such those who have depression but listed other conditions, for example cardiovascular disease or diabetes, as their main health condition were not included.