ORIGINAL ARTICLE

Impact of unemployment on mental disorders, physical health and quality of life: Findings from the Singapore Mental Health Study

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ABSTRACT

Introduction: This study examines: (1) the employment rate among those with a mental disorder in the 12 months preceding the survey (referred henceforth as 12-month mental disorder); (2) the socio-demographic correlates of unemployment; and (3) the association of unemployment with 12-month mental disorders and chronic physical conditions in the adult resident population in Singapore.

Methods: Data are from the Singapore Mental Health Study 2016, a household survey of a nationally representative sample of 6,126 Singapore residents. The Composite International Diagnostic Interview (CIDI) was used to assess mental disorders and physical health conditions. Employment-related information was collected using a modified employment module of the CIDI.

Results: Of the 6,125 participants who took part in the study, 4,055 (72%) were employed, 1,716 (22.7%) were economically inactive, and 354 (5.3%) were unemployed. The unemployment rate was twice as high among those with a 12-month mental disorder (11.5%) than those without (4.8%). The proportion of unemployed individuals increased sharply with the increasing severity of mental disorders. Being married and higher household income were significantly associated with a higher likelihood of being employed than unemployed. In contrast, the presence of one 12-month mental disorder was significantly associated with a lower likelihood of being employed.

Conclusion: Our findings provide information on the significant association of mental disorders with unemployment. Clinicians should remain vigilant and consider the loss of employment a potential risk factor for adverse physical and mental health changes. Management of unemployed patients with a combination of pharmacotherapy and work-directed interventions can facilitate their re-entry into the workforce and improve health outcomes.

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INTRODUCTION

Several reviews and meta-analyses have established an association between unemployment and psychological distress.[1,2] This relationship between unemployment and mental health is complex and likely bidirectional. On the one hand, unemployment may lead to psychological distress and mental disorders (social causation), but on the other, those with poor mental health may struggle to find a foothold in the labour market (health selection). Jahoda's latent deprivation model[3] has been widely used to explain the relationship between unemployment and psychological distress. The author postulates that the latent functions of employment—such as providing structure to the day, enabling social contact, and contributing to collective purpose—satisfy individuals' important psychological needs. Unemployment deprives people of these benefits, leading to psychological distress. Fryer[4] alternatively emphasised the contribution of the manifest function of employment, namely, financial income to well-being; the loss of employment resulted in poverty, loss of agency, and subsequent psychological distress. The

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health selection or reverse causation theory suggests that unemployment is the consequence of mental health problems. This could be due to several factors, including the adverse impact of the mental disorder on job performance and productivity, which may increase the risk of dismissal. Stigma may affect the employer's hiring decision, resulting in poorer employability of those with mental disorders.[5] However, evidence supporting unemployment as the consequence of a mental disorder is surprisingly less robust. While qualitative studies have described the barriers faced by people with mental disorders to gain or maintain employment,[6] there is less evidence from quantitative studies. A study from Sweden found a gendered relationship between depression and unemployment; pre-existing major depression increased the risk of being laid off in women while this risk did not extend to men.[7]

Male gender, blue-collar jobs, longer unemployment duration, economically less developed countries, and countries with weak employment protection policies have been identified as significant moderators of the effect of unemployment on mental health.[1] Other studies suggest that culture may influence the perception of work relevance across societies.[8] Individualistic and collectivistic societies may differ in how they perceive the importance of work in providing social status, collective purpose and financial benefits. Thus, culture

may also act as a moderator of the effect of unemployment on mental health.

Singapore, a city state in Southeast Asia, has a highly developed global economy with a per capita gross domestic product higher than most developed countries and a low unemployment rate. The country's labour force participation has remained steady between 2015 and 2019, ranging from 67.7% to 68.3%. According to the Ministry of Manpower statistics, Singapore's unemployment rate from 2015 to 2020 varied between 1.9 and 2.3%.[9] Given the impact of mental disorders on labour force participation and workforce productivity, understanding the association between mental disorders and employment is crucial.[10] Specifically, awareness of this association can lead to better workplace mental health initiatives, including early recognition and treatment of mental disorders of those in the workforce, and implementation of programmes to ensure vocational support for those with mental disorders to gain or return to employment.

Few studies have examined the association between unemployment and mental disorders in Singapore. The national epidemiological Singapore Mental Health Study (SMHS) conducted in 2010 found that among the employed, 2.3% had a 12-month prevalence of at least one mental disorder, while 5.3% of the unemployed had at least one mental disorder (excludes those with mental illness and comorbid physical conditions).[11] The authors found significantly higher rates of major depressive disorder (MDD), dysthymia, generalised anxiety disorder (GAD), and obsessive-compulsive disorder (OCD) among those unemployed compared to the economically inactive and employed groups.

A second nationwide psychiatric epidemiological survey was initiated in 2016 (SMHS 2016). Using data from the SMHS 2016 study, the current research aims to examine (1) the employment rate in Singapore among those with and without a 12-month mental disorder, (2) the socio-demographic correlates of unemployment, and (3) the association of unemployment with 12-month mental disorders and chronic physical conditions.

METHODS

Sample

Singapore residents (citizens and permanent residents) aged 18 years and above were invited to participate in the study. A probability sample was randomly selected using a disproportionate stratified sampling.

The 3 main ethnic groups (Chinese, Malay and Indian) were sampled in an equivalent proportion of about 30% each. Residents who were incapable of doing an interview due to severe physical or mental health conditions, language barriers, living outside the country, institutionalisation or hospitalisation at the time of the survey, and those who were not contactable due to incomplete or incorrect address were excluded from the study. In all, 6,126 participants completed the survey, and the response rate among the eligible adults was 69.5%. The study has been described in greater detail in an earlier article.[12]

Measures

Employment status

Employment status was collected using structured questions. Participants were asked, "What is your current employment situation? Are you working now for pay, self-employed, looking for work, disabled, temporarily laid off, retired, a home-maker, a full-time or part-time student or, have never worked?". Based on the replies to this and subsequent questions, participants were classified as "employed" (including those working full or part-time, self-employed, and working for an organisation), "unemployed" (including those looking for work/unemployed, temporarily laid off, and never worked), and "economically inactive" (comprising home-makers, students and retirees).

World Health Organization Composite International Diagnostic Interview

Mental disorders were assessed by the Composite International Diagnostic Interview version 3.0 (CIDI 3.0),[13] which ascertains lifetime and 12-month prevalence of mental disorders through the measurement of symptoms and their impact on day-to-day activities. This instrument generates a diagnosis of mental disorders according to the criteria of the 10th Edition of the International Classification of Diseases (ICD-10),[14] and the 4th Edition of the Diagnostic and Statistical Manual (DSM-IV).[15] The mental disorders assessed in the SMHS 2016 were MDD, bipolar disorder, GAD, OCD, alcohol abuse and alcohol dependence. A modified version of the CIDI checklist of chronic medical disorders was used to check if participants had ever been diagnosed with any chronic physical conditions. Participants were asked to report if a doctor had ever diagnosed them with any of the 18 chronic diseases that are considered prevalent in Singapore's population. Those who responded positively were then asked if

they had received treatment for the condition in the past year. If they had received the treatment, they were classified as having a 12-month physical condition.

Severity of disorder

The Sheehan's Disability Scale (SDS)[16] administered in each diagnostic section of the CIDI was used to determine the severity of the mental disorder. The scale assesses the level of interference caused by the worst period of symptoms in the past 12 months in 4 life domains, namely, home management, ability to work, ability to form and maintain close relationships with other people, and social life. Respondents received an overall assessment of "severe" if they rated at least 3 domains as severe. Those who reported at least 2 domains as mild received an overall assessment of "mild". All others were classified as having a "moderate" disorder.[17]

SF-12

The SF-12 is a multidimensional, self-reported instrument that assesses the impact of health on an individual's everyday life. It is a shorter alternative to the 36-item Short-Form Health Survey (SF-36).[18] It covers the same eight domains of health outcomes as SF-36: physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional and mental health. The subscales physical functioning, role physical, bodily pain and general health form the physical component summary (PCS) score, while the subscales vitality, social functioning, role emotional and mental health comprise the mental component summary (MCS) score. The PCS and MCS were calculated using a scoring algorithm provided by its developers and were used to assess the health-related quality of life (HRQOL) in this study.

Socio-demographic and other information

Other socio-demographic factors such as age, gender, ethnicity, marital status, highest educational level achieved, monthly household income, body mass index (BMI) and smoking status were self-reported.

Ethical approval

The study was approved by the relevant institutional ethics committee (National Healthcare Group, Domain Specific Review Board). Written informed consent was obtained from all participants and parents/guardians of participants between 18 and 20 years of age prior to the survey.

Statistical analysis

All analyses were conducted with Stata version 15 (StataCorp LLC, College Station, US). Both frequency and survey-weighted percentages were provided for descriptive statistics. Logistic regression analyses were conducted (employed versus unemployed, and economically inactive versus unemployed) to determine significant socio-demographic correlates of employment. Finally, linear regression was conducted to examine the association of employment with the physical and mental component scores of the SF-12. All regression analyses were weighted using survey weights to account for complex survey design.

RESULTS

Employment rate of those with 12-month mental disorder and by disorder severity

Table 1 presents the nationally representative employment rate of working-age adults by mental health status and severity. Employment was 71.8% among people without a 12-month mental disorder versus 74.4% among people with a mental disorder. The unemployment rate was twice as high among those with a 12-month mental disorder (11.5%) than those without (4.8%). The proportion of employed individuals fell sharply, while that of unemployed increased in the more severe categories of mental disorders as assessed by SDS.

Socio-demographic characteristics, mental disorders and chronic physical conditions by employment status

Of the 6,125 participants in the study, 4,055 (72%) were employed, 1,716 (22.7%) were economically inactive, and 354 (5.3%) were unemployed (Table 2).

Among those who were employed, 93.3% did not have a 12-month mental disorder, while 5.3% had one mental disorder, and 1.4% had 2 or more mental disorders assessed in the 12-month period. Among those who were unemployed, 85.8% did not

have any 12-month mental disorder, while 11.8% had one mental disorder assessed in the study, and 2.4% had 2 or more mental disorders. Those who were unemployed had a higher prevalence of the 3 most prevalent chronic physical conditions (15.6%, 15.3% and 10.3% of hypertension, hyperlipidaemia and diabetes, respectively) as compared to those who were employed (14.5%, 11.3% and 5.7% of hypertension, hyperlipidaemia and diabetes, respectively). The unemployed group had a higher prevalence of MDD, bipolar disorder, GAD and alcohol abuse than the employed and economically inactive group (Table 3).

Associations of socio-demographic factors, mental disorders and chronic physical conditions with employment

Table 4 provides estimates from the logistic regression analyses that identified variables associated with employment status. Being married (versus unmarried) and a higher household income were significantly associated with a higher likelihood of being employed than unemployed, while the presence of one 12-month mental disorder was significantly associated with a lower likelihood of being employed.

Unemployment and health-related quality of life

Being unemployed was significantly associated with lower PCS and MCS as compared to those employed and economically inactive, even after controlling for confounders such as age, gender, ethnicity, marital status, household income, education, smoking status, BMI, and presence of 12-month mental disorder and chronic physical conditions (Table 5).

DISCUSSION

In a nationally representative sample of adults in Singapore, people with a 12-month mental disorder were more often unemployed than adults without a mental illness. Unemployment was associated with the

Table 1. Employment status of participants by presence and severity of 12-month mental disorder as assessed by the Sheehan's Disability Scale

Total particpants N=6126	No mental disorder in past 12-months (%)[a] n= 5723 (93.5)	Any 12-month mental disorder (%)[a] n=403 (6.5)	Mild mental disorder (%)[a] n=231 (63.2)	Moderate mental disorder (%)[a] n=128 (34.6)	Severe mental disorder (%)[a] n=9 (2.2)
Employment status			n (%)		
Employed	3766 (71.8)	289 (74.4)	164 (79.1)	93 (69.3)	4 (19.5)
Unemployed	309 (4.8)	45 (11.5)	24 (7.8)	14 (11.7)	2 (71.3)
Economically inactive	1647 (23.3)	69 (14.1)	43 (13.1)	21 (19.0)	3 (9.2)

[a] Weighted percentage

Table 2. Socio-demographic and clinical characteristics of respondents by employment status

Socio-demographic and clinical variables		Employed (n=4055)		Economically inactive (n=1716)		Unemployed (n=354)		P value
		n	Weighted percentage	n	Weighted percentage	n	Weighted percentage	
Age	18–34	1228	30.8%	370	28.7%	109	33.0%	<0.001
	35–49	1254	35.3%	177	12.4%	64	26.1%	
	50–64	1190	28.0%	323	22.5%	113	29.7%	
	65 and above	383	5.8%	846	36.5%	68	11.3%	
Sex	Male	2322	54.6%	557	32.9%	188	53.1%	<0.001
	Female	1733	45.4%	1159	67.1%	166	46.9%	
Ethnicity	Chinese	1226	75.9%	467	75.8%	89	72.6%	0.23
	Malay	1259	12.1%	600	12.8%	131	15.2%	
	Indian	1236	8.7%	497	8.6%	110	9.7%	
	Others	334	3.3%	152	2.8%	24	2.5%	
Marital status	Never married	1050	30.1%	349	29.3%	145	50.3%	<0.001
	Married	2647	62.3%	1061	58.4%	134	30.6%	
	Divorced/separated	256	5.7%	53	2.4%	34	9.9%	
	Widowed	102	1.8%	253	9.9%	41	9.2%	
Household income (SGD)	Below 2,000	527	10.0%	496	25.2%	124	36.2%	<0.001
	2,000–3,999	935	18.3%	314	17.4%	82	16.8%	
	4,000–5,999	851	21.1%	224	14.5%	38	14.2%	
	6,000–9,999	786	22.4%	185	13.1%	32	9.8%	
	10,000 and above	703	21.6%	144	10.5%	14	7.1%	
	Refused/Don't know	253	6.7%	353	19.3%	64	16.0%	
Education	Primary and below	514	12.0%	572	28.5%	101	22.3%	< 0.001
	Secondary	978	20.1%	571	31.8%	99	25.4%	

BMI: body mass index; BP: blood pressure; ITE: Institute of Technical Education; Pre-U: pre-university; SGD: Singapore Dollars

Table 2. Socio-demographic and clinical characteristics of respondents by employment status (Cont'd)

Socio-demographic and clinical variables		Employed (n=4055) n	Weighted percentage	Economically inactive (n=1716) n	Weighted percentage	Unemployed (n=354) n	Weighted percentage	P value
	Pre-U/Junior college	166	4.7%	129	10.6%	9	4.1%	
	Vocational institute/ITE	410	7.3%	68	3.0%	30	6.3%	
	Diploma	811	21.0%	158	13.1%	54	16.4%	
	University	1176	34.9%	218	13.0%	61	25.5%	
Smoking status	Current smoker	942	18.6%	143	6.5%	91	22.3%	<0.001
	Ex-smoker	503	10.7%	203	10.2%	44	9.0%	
	Never smoked	2604	70.5%	1361	83.2%	215	67.2%	
BMI International	Underweight <18.5	177	5.4%	105	8.5%	22	9.9%	0.01
	Normal ≥18.5 and <25	1794	53.0%	739	53.5%	146	48.8%	
	Overweight ≥25 and <27.5	1312	28.4%	508	25.7%	102	23.2%	
	Obese ≥30	707	11.5%	309	10.0%	61	12.7%	
	Missing	65	1.7%	55	2.3%	23	5.4%	
Chronic conditions in past 12 months	None	2709	71.6%	762	54.2%	200	64.6%	<0.001
	1 chronic condition	707	16.1%	334	18.2%	56	16.1%	
	2 or more chronic conditions	635	12.3%	615	27.5%	95	18.3%	
Mental illness	None	3766	93.3%	1647	96.0%	309	85.8%	<0.001
	1 mental illness	225	5.3%	58	3.4%	38	11.8%	
	2 or more mental illnesses	64	1.4%	11	0.6%	7	2.4%	
Physical conditions in past 12 months	Diabetes/High blood sugar	375	5.7%	354	14.7%	63	10.3%	<0.001
	High BP/hypertension	657	14.5%	613	29.9%	82	15.6%	<0.001
	Back problem	129	3.1%	63	2.9%	10	3.9%	0.81
	Migraine headaches	145	3.2%	29	1.7%	10	1.9%	0.05
	Hyperlipidaemia or high cholesterol	537	11.3%	521	25.2%	73	15.3%	<0.001

BMI: body mass index; BP: blood pressure; ITE: Institute of Technical Education; Pre-U: pre-university; SGD: Singapore Dollars

Table 3. Prevalence of 12-month mental disorders by employment status

	Employed n (%)	Unemployed n (%)	Economically Inactive n (%)	P value
MDD	104 (2.3)	16 (5.7)	21 (1.6)	0.01
Dysthymia	16 (0.2)	1 (0.2)	4 (0.2)	0.92
Bipolar disorder	51 (0.9)	7 (3.8)	6 (0.2)	<0.001
GAD	38 (0.9)	8 (2.4)	7 (0.3)	0.03
OCD	120 (3.2)	13 (3.1)	36 (2.0)	0.26
Alcohol abuse	24 (0.6)	5 (2.1)	4 (0.1)	0.004
Alcohol dependence	11 (0.2)	3 (0.3)	4 (0.3)	0.76

GAD: generalised anxiety disorder; MDD: major depressive disorder; OCD: obsessive-compulsive disorder

severity of the mental disorder as assessed by SDS. Our study demonstrated a negative association of unemployment with mental health and those who were unemployed, being 2.5 times more likely to have a past 12-month mental disorder than those employed. These results are similar to studies conducted elsewhere.[19-21] Using data from the Australian National Survey of mental health and well-being of adults, Comino et al. similarly found that unemployed adults were 2.5 times more likely to have anxiety and/or affective disorders.[19] Data from the Eurobarometer surveys of 2006 and 2010 found that unemployment rates were higher among people with mental health problems in both surveys.[21] These results suggest that employment is important and relevant to mental health across cultures. Industrialised societies are likely to gain several benefits from work, while specific benefits such as financial remuneration, social support and status may vary across cultures and needs further research.[8]

Comparing the data across the 2 nationwide mental health surveys in Singapore, the prevalence of unemployment increased from 4.5% in the earlier 2010 study[11] to 5.3% in the current study. While both studies employed the same methodology, the prevalence of 12-month mental disorders in the population increased from 4.4% to 6.5%. This is reflected in the increased prevalence of mental disorders in both the employed and unemployed groups in the present study (SMHS 2016) compared to the earlier study (SMHS 2010). In SMHS 2016, 6.7% of the employed group had at least one 12-month mental disorder, versus 4.7% (including those with comorbid medical conditions) in SMHS 2010, while among those who were unemployed, 14.2% had at least one mental disorder assessed in the current study compared to 10.4 % in SMHS 2010. However,

the increase seems to be larger in the unemployed group (3.8%) than in the employed (2.0%) in terms of absolute difference in prevalence.

Interestingly, MDD was the most prevalent 12-month mental disorder in the unemployed group, while OCD was most prevalent in the employed. Other studies have found a similar association between depression and employment. A study assessing the work outcomes of employees with depression found a higher prevalence of unemployment in people with MDD at 6 months than the control group and the group with rheumatoid arthritis.[22] Studies suggest that depression is associated with cognitive impairment and health problems, which in turn may adversely affect job performance, resulting in unemployment.[23,24] However, this being a cross-sectional study, it is difficult to draw conclusions about causality. Given that depression is the most prevalent mental disorder in Singapore, the association with unemployment is even more concerning.[11,13] The results provide further evidence for the need to promote workplace mental health, which encompasses screening for mental distress and initiation of early antidepressant treatment, reducing functional impairments, and supporting continual employment.[25] However, we are unable to explain the higher prevalence of OCD in the employed group.

The association between the severity of mental disorders and unemployment could be due to several reasons. People with more serious symptoms find that both the symptoms and the medications to treat the symptoms affect their ability to work.[6] Employers can perceive the impact of the severity in the form of relapse and decline in their performance and functioning.[26] Lastly, people with more severe mental illness may be unaware of or unable to access job-support schemes.

Table 4. Association between socio-demographic factors, mental disorders and chronic physical conditions with employment status

Sociodemographic and clinical variables	Employed vs Unemployed			Economically Inactive vs Unemployed		
	Odds Ratio[a]	95% CI	P value	Odds Ratio[a]	95% CI	P value
Age						
18–34	Ref			Ref		
35–49	0.80	0.45–1.43	0.45	0.06	0.02–0.17	<0.001
50–64	0.88	0.46–1.70	0.71	0.12	0.04–0.34	<0.001
65 and above	1.04	0.43–2.54	0.93	1.75	0.54–5.64	0.35
Sex						
Male	Ref			Ref		
Female	1.15	0.76–1.74	0.51	3.32	1.88–5.83	<0.001
Ethnic group						
Chinese	Ref			Ref		
Malay	0.97	0.62–1.51	0.89	1.09	0.67–1.77	0.73
Indian	0.76	0.51–1.11	0.15	0.93	0.58–1.49	0.77
Others	0.78	0.41–1.48	0.45	1.03	0.50–2.15	0.93
Marital status						
Never married	Ref			Ref		
Married	3.04	1.83–5.03	<0.001	9.64	3.64–25.55	<0.001
Divorced/separated	1.70	0.85–3.39	0.13	0.81	0.27–2.42	0.70
Widowed	0.52	0.24–1.16	0.11	0.56	0.19–1.71	0.31
Monthly household income (SGD)						
Below 2000	Ref			Ref		
2000–3999	3.58	2.09–6.11	<0.001	1.76	1.00–3.08	0.05
4000–5999	4.19	2.22–7.92	<0.001	1.25	0.61–2.55	0.54
6000–9999	7.97	3.52–18.03	<0.001	2.94	1.31–6.62	0.01
10,000 and above	9.93	4.11–24.01	<0.001	3.72	1.61–8.57	0.002
Education						

[a] Logistic regression
BMI: body mass index; CI: confidence interval; ITE: Institute of Technical Education; Pre-U: pre-university; SGD: Singapore Dollars; WHO: World Health Organization

Table 4. Association between socio-demographic factors, mental disorders and chronic physical conditions with employment status (Cont'd)

Sociodemographic and clinical variables	Employed vs Unemployed			Economically Inactive vs Unemployed		
	Odds Ratio[a]	95% CI	P value	Odds Ratio[a]	95% CI	P value
University	Ref			Ref		
Primary and below	1.25	0.51–3.04	0.62	2.02	0.89–4.58	0.09
Secondary	1.42	0.66–3.05	0.37	4.17	1.88–9.27	<0.001
Pre-U/Junior college	1.65	0.54–5.05	0.38	8.45	2.48–28.73	0.001
Vocational institute/ITE	1.80	0.78–4.15	0.17	2.85	1.10–7.38	0.03
Diploma	1.55	0.80–3.02	0.20	2.36	1.04–5.35	0.04
Smoking status						
Never smoked	Ref			Ref		
Current smoker	1.16	0.69–1.94	0.58	0.37	0.20–0.72	0.003
Ex-smoker	1.23	0.66–2.27	0.52	1.18	0.51–2.74	0.69
BMI (WHO guidelines)						
Normal Range ≥18.5 and <25	Ref			Ref		
Underweight <18.5	0.61	0.29–1.29	0.20	1.50	0.62–3.61	0.37
Overweight ≥25 and <30	1.08	0.68–1.72	0.73	1.33	0.77–2.29	0.31
Obese ≥30	1.02	0.56–1.84	0.95	0.95	0.53–1.73	0.88
Chronic physical conditions						
No chronic conditions	Ref			Ref		
1 chronic condition	0.92	0.53–1.60	0.77	1.07	0.58–1.97	0.84
2 or more chronic conditions	0.86	0.49–1.49	0.58	1.16	0.60–2.22	0.66
Mental illness						
No mental illness	Ref			Ref		
1 mental illness	0.40	0.22–0.75	0.004	0.25	0.10–0.58	0.001
Two or more mental illnesses	0.68	0.18–2.52	0.56	0.16	0.04–0.67	0.01

[a] Logistic regression
BMI: body mass index; CI: confidence interval; ITE: Institute of Technical Education; Pre-U: pre-university; SGD: Singapore Dollars; WHO: World Health Organization

Table 5. Associations of physical and mental component scores with employment status

Variable	Physical component score			Mental component score		
	B	95% CI	P value[a]	B	95% CI	P value[a]
Employment status						
Economically inactive vs Employed	-0.35	-0.91 to 0.20	0.22	0.21	-0.40 to 0.82	0.49
Unemployed vs Employed	-1.98	-3.33 to -0.64	0.004	-1.75	-3.21 to -0.28	0.02
Unemployed vs Economically inactive	-1.63	-3.06 to -0.20	0.03	-1.96	-3.50 to -0.41	0.01

B: unstandardised regression coefficient; CI: confidence interval
[a] Linear regression adjusted for age, sex, ethnicity, marital status, household income, education, smoking status, body mass index, and presence of 12-month mental and physical illnesses

Unemployment in the current study was associated with marital status and household income. Those who were never married and those with a household income of less than SGD2,000 were more likely to be unemployed. Unemployment restricts the ability to set up an independent household and results in uncertainty about financial resources in the future.[27] Thus, unemployment thwarts or delays couple formation. However, research also suggests that unemployment and resultant stresses lead to the breakdown of marriages,[28] which was not observed in our study. People who become unemployed would experience a decrease in their income due to the loss of wages. Thus, the lower household income is an inevitable and expected consequence of unemployment.

Among those who were unemployed, the prevalence of hypertension, hyperlipidaemia and diabetes was higher than those employed. Analyses of data from the US Health and Retirement Survey (HRS) found that workers who had involuntarily lost their job had a more than 2-fold increase in the risk of myocardial infarction and stroke compared to those who continued to work.[29] Using data from the HRS, Dupre et al. similarly found that the risk of myocardial infarction was most significant in the first year after job loss.[30] Increased myocardial infarction risk was also associated with a cumulative number of job losses and cumulative time unemployed. Data from the Northern Finland Birth Cohort found that high exposure to unemployment (defined as more than one year of exposure to unemployment in the past 3 years) may predispose middle-aged men to type 2 diabetes.[31] Several factors could explain this association between unemployment and poor physical health. Financial insecurity and other stressors following a job loss may lead to adverse health behaviours like consuming excessive alcohol and smoking.[32] The lack of access to workplace benefits such as workplace wellness programmes and health insurance,[33,34] and symptoms of depression and anxiety following job loss may affect the pursuit of healthy lifestyles and increase the risk of chronic conditions.[35] Despite the literature suggesting an association between job loss and physical ill health, it must be acknowledged that the causal relationship remains undetermined. The issue of selection bias, that is, whether job loss leads to ill health or whether individuals who have poor physical health are more likely to lose or retire from their jobs, cannot be determined from our study. On the other hand, the prevalence of the 3 most prevalent chronic physical conditions was lower among those unemployed than the economically inactive group. In this study, those who were aged 65 years and above comprised the majority of the economically inactive group and it is well established that the prevalence of hypertension, hyperlipidaemia and diabetes increases with age.[36,37]

Surprisingly few studies have examined the impact of unemployment on HRQOL. Our research found that unemployment was significantly associated with poorer physical and mental HRQOL even after adjusting for several possible confounders. A cross-sectional study in Sweden, using the EuroQol-5 Dimension (EQ-5D) questionnaire, similarly found that unemployment was strongly related to a poorer health-related quality of life.[38] A cross-sectional study from India using data from the Centre for Cardiometabolic Risk Reduction in South Asia also reported lower health status as determined by EQ-5D among the unemployed (vs employed) respondents.[39] The negative association persisted despite controlling for significant socio-demographic factors, physical and mental conditions. It is well established that work contributes to an individual's identity and social status.[40] It also gives an individual a sense of purpose and self-worth.[6] Unemployment leads to a loss of all these gains as well as

social support. Thus, unemployment would affect many of the domains of HRQOL that may not be completely accounted for by a physical condition or mental disorder.

Several limitations of the study must be taken into consideration. We did not collect any data on why participants became unemployed (e.g. voluntarily or through compulsory redundancies), and these different reasons could have different implications for mental health. The relatively low prevalence of 12-month mental disorders in our sample prevented us from examining the association of unemployment with individual disorders. The sample had few people who met the criteria for severe mental disorder as assessed by the SDS. While it is possible that the prevalence of severe impairment of functioning is low in a community sample, it is also possible that those with severe impairment were unable to participate in this study. This could have resulted in a lower prevalence of mental disorders in the population, especially among the unemployed. The study's cross-sectional nature does not permit causal interpretation of the association between mental illness and employment outcomes. Lastly, data on chronic physical conditions was based on self-report, and it may not be accurate.

The COVID-19 pandemic has resulted in economic activities plummeting across nations both due to lockdowns and changing consumer behaviour.[41] Economists have forecast a recession across many countries,[42] and the resulting unemployment can lead to significant harm to human health if not managed correctly. Clinicians should remain vigilant and consider the loss of employment a potential risk factor for adverse physical and mental health changes. A focus on holistic recovery that includes augmentation of medications with interventions like cognitive behavioural therapy, problem-solving therapy, and work-directed interventions can facilitate re-entry into the workforce[43] and improve health outcomes. Policymakers should be aware of the risks of job loss and consider economic reforms such as job guarantee and universal basic income schemes,[44,45] which can be adopted and implemented to ensure worker well-being.

REFERENCES

1. Paul KI, Moser K. Unemployment impairs mental health: meta-analyses. J Vocat Behav 2009;74:264-82.

2. McKee-Ryan FM, Song Z, Wanbeg CR, et al. Psychological and physical well-being during unemployment: A meta-analytic study. J Appl Psychol 2005;90:53-76.

3. Jahoda M. Work, employment, and unemployment: Values, theories, and approaches in social research. Am Psychol 1981;36:184-91.

4. Fryer DM. Employment deprivation and personal agency during unemployment: A critical discussion of Jahoda's explanation of the psychological effects of unemployment. Social Behaviour 1986;1:3-24.

5. Brouwers EPM. Social stigma is an underestimated contributing factor to unemployment in people with mental illness or mental health issues: Position paper and future directions. BMC Psychol 2020;8:1-7.

6. Subramaniam M, Zhang Y, Shahwan S, et al. Employment of of young people with mental health conditions: making it work. Disabil Rehabil 2020;29:1-11.

7. Andreeva E, Hanson L, Westerlund H, et al. Depressive symptoms as a cause and effect of job loss in men and women: evidence in the context of organisational downsizing from the Swedish longitudinal occupational survey of health. BMC Public Health 2015;15:1045.

8. Gnambs T, Stiglbauer B, Selenko E. Psychological effects of (non) employment: A cross-national comparison of the United States and Japan. Scand J Psychol 2015;56:659-69.

9. Ministry of Manpower. Labour market statistical information. Summary Table: Unemployment, 2020. Available at: https://stats.mom.gov.sg/Pages/Unemployment-Summary-Table.aspx. Accessed on 20 May 2021.

10. Ho RC, Mak KK, Chua AN, et al. The effect of severity of depressive disorder on economic burden in a university hospital in Singapore. Expert Rev Pharmacoecon Outcomes Res 2013;13:549-59.

11. Chong SA, Vaingankar JA, Abdin E, et al. Mental disorders: employment and work productivity in Singapore. Soc Psychiatry Psychiatr Epidemiol 2013;48:117-23.

12. Subramaniam M, Abdin E, Vaingankar JA, et al. Tracking the mental health of a nation: prevalence and correlates of mental disorders in the second Singapore mental health study. Epidemiol Psychiatr Sci 2020;29:e29.

13. Kessler RC, Ustün TB. The World Mental Health (WMH) survey initiative version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). Int J Methods Psychiatr Res 2004;13:93-121.

14. World Health Organization. ICD-10: International statistical classification of diseases and related health problems. 10th Revision, 4th Edition, 2010.

15. American Psychatric Association. Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). Washington DC, USA, 1994.

16. Sheehan DV, Harnett-Sheehan K, Raj BA. The measurement of disability. Int Clin Psychopharmacol 2006;11:89-95.

17. Australian Bureau of Statistics. National Survey of Mental Health and Well-Being: Users' Guide, 2017. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/Products/4327.0~2007~Main+Features~Other+scales+and+measures?OpenDocument#PARALINK14. Accessed on 21May 2021.

18. Brazier JE, Roberts J. The estimation of a preference-based measure of health from the SF-12. Med Care 2004;42:8510-9.

19. Comino EJ, Harris E, Chey T, et al. Relationship between mental health disorders and unemployment status in Australian adults. Aust N Z J Psychiatry 2003;37:230-5.

20. Ontario Human Rights Commission. By the numbers: A statistical profile of people with mental health and addiction disabilities in Ontario, 2015. Available at: http://www.ohrc.on.ca/en/numbers-statistical-profile-people-mental-health-and-addiction-disabilities-ontario. Accessed on 6 November 2020.

21. Evans-Lacko S, Knapp M, McCrone P, et al. The mental health consequences of the recession: economic hardship and employment of people with mental health problems in 27 European countries. PLoS One 2013;8:e69792.

22. Lerner D, Adler DA, Chang H, et al. Unemployment, job retention, and productivity loss among employees with depression. Psychiatr Serv 2004;55:1371-8.

23. Husain SF, Yu R, Tang TB, et al. Validating a functional near-infrared spectroscopy diagnostic paradigm for major depressive disorder. Sci Rep 2020;10:9740.

24. Tran BX, Vu GT, Pham KTH, et al. Depressive symptoms among industrial workers in Vietnam and correlated factors: A multi-site survey. Int J Environ Res Public Health 2019;16:1642.

25. Lee Y, Rosenblat JD, Lee J, et al. Efficacy of antidepressants on measures of workplace functioning in major depressive disorder: A systematic review. J Affect Disord 2018;227:406-15.

26. Biggs D, Hovey N, Tyson PJ, et al. Employer and employment agency attitudes towards employing individuals with mental health needs. J Ment Health 2010;19:505-16.

27. Kalmijn M. The influence of men's income and employment on marriage and cohabitation: Testing Oppenheimer's theory in Europe. Eur J Popul 2011;27:269-93.

28. Charles KK, Stephen M. Job displacement, disability, and divorce. J Labor Econ 2004;22:489-522.

29. Gallo WT, Teng HM, Falba TA, et al. The impact of late career job loss on myocardial infarction and stroke: a 10 year follow up using the health and retirement survey. Occup Environ Med 2006;63:683-7.

30. Dupre ME, George LK, Liu G, et al. The cumulative effect of unemployment on risks for acute myocardial infarction. Arch Intern Med 2012;172:1731-7.

31. Rautio N, Varanka-Ruuska T, Vaaramo E, et al. Accumulated exposure to unemployment is related to impaired glucose metabolism in middle-aged men: a follow-up of the Northern Finland birth cohort 1966. Prim Care Diabetes 2017;11:365-72.

32. Henkel D. Unemployment and substance use: a review of the literature (1990–2010). Curr Drug Abuse Rev 2011;4:4-27.

33. Song Z, Baicker K. Effect of a workplace wellness program on employee health and economic outcomes. JAMA 2019;321:1491-501.

34. Driscoll AK, Bernstein AB. Health and access to care among employed and unemployed adults: United States, 2009–2010. NCHS Data Brief 2012;83:1-8.

35. Burgard, SA, Brand JE, House JS. Toward a better estimation of the effect of job loss on health. J Health Soc Behav 2007;48:369-84.

36. Buford TW. Hypertension and aging. Ageing Res Rev 2016;26:96-111.

37. Kirkman MS, Briscoe VJ, Clark N, et al. Diabetes in older adults: a consensus report. J Am Geriatr Soc 2012;60:2342-56.

38. Norström F, Waenerlund AK, Lindholm L, et al. Does unemployment contribute to poorer health-related quality of life among Swedish adults? BMC Public Health 2019;19:457.

39. Singh K, Kondal D, Shivashankar R, et al. Health-related quality of life variations by socio-demographic factors and chronic conditions in three metropolitan cities of South Asia: the CARRS study. BMJ Open 2017;7:e018424.

40. Marks N, Shah H. A well-being manifesto for a flourishing society. In Huppert FA, Baylis N, Keverne B (Eds.), The science of well-being. Oxford: Oxford University Press, 2005.

41. Goolsbee A, Syverson C. Fear, lockdown, and diversion: comparing drivers of pandemic economic decline, 2020. National Bureau of Economic Research, June 2020. Available at: https://www.nber.org/papers/w27432. Accessed on 30 November 2020.

42. International Monetary Fund. World economic outlook update: a crisis like no other, an uncertain recovery, June 2020. Available at: https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/WEOUpdateJune2020. Accessed on 20 May 2021.

43. Sampson A. Interventions to improve return to work outcomes in individuals with mental health conditions. Melbourne: Institute for Safety, Compensation and Recovery Research, 2015.

44. Tcherneva P. The case for a job guarantee. Polity Press, 2020.

45. Ruckert A, Huynh C, Labonté R. Reducing health inequities: is universal basic income the way forward? J Public Health (Oxf) 2018;40:3-7.