The moderating effect of employment status on the relationship between lifetime major depressive disorder and positive mental health

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ABSTRACT

Introduction: This paper aims to examine the (1) level of positive mental health (PMH), (2) identify the socio-demographic correlates of the PMH domains in the general population, and (3) establish if employment status moderates the relationship between major depressive disorder (MDD) and PMH among those with a lifetime prevalence of MDD.

Methods: The Singapore Mental Health Study conducted between 2016 and 2018 included Singapore residents aged ≥ 18 years. The World Health Organization Composite International Diagnostic Interview version 3.0 was utilised to establish lifetime prevalence of MDD. Moderation analysis was conducted using SPSS PROCESS macro (Hayes, 2017) to assess if employment status moderated the relationship between MDD and PMH.

Results: Significantly lower PMH total and domain scores were reported by respondents ($n=2,270$) who endorsed lifetime MDD compared to those who did not. Moderation analysis demonstrated that the effect of MDD on PMH total and domain scores varied considerably across employment status. Based on the interaction plots, the effect of MDD on both PMH total and domain scores was minimal among those employed than unemployed.

Conclusion: Healthcare professionals should support the employment needs of those who report lifetime MDD to provide care for an individual's mental well-being in a holistic manner. Acquiring or remaining in employment would be a priority depending on the PMH of the individual. Reducing barriers to employment for those with health issues or creating employment opportunities for this group are concerns that need to be addressed at a societal level.

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INTRODUCTION

Studies across the world have reported a high prevalence of mental disorders,¹⁻³ highlighting that mental disorders remain one of the major causes of “non-fatal burden”.⁴ In particular, major depressive disorder (MDD) has been identified as a highly prevailing mental disorder and the leading cause of disability worldwide. More than 300 million people suffer from MDD globally, making mental illness a major contributor to the overall global burden of disease.⁵

Mental health is a state of physical, mental and social well-being, whereby the individual is capable of leading an economically and socially productive life.⁵ Keyes⁶ proposed a two continua model, which holds that

positive mental health (PMH) and mental illness are related but distinct dimensions: one continuum indicates the presence or absence of mental health, while the other indicates the presence or absence of mental illnesses.⁷ This model depicts 4 probable conditions that an individual might experience: flourishing with or without mental illness, languishing with or without mental illness.⁸ Therefore, this puts forth the notion that individuals with mental disorders are able to experience high life satisfaction and functioning. Huppert⁹ discussed that PMH incorporates a combination of subjective well-being and of being “fully functional”. This is in parallel to Keyes’ terminology, in that PMH encompasses positive emotions and functioning. This definition more

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CLINICAL IMPACT

What is New

- This study highlights the need to simultaneously focus on the vocation goals of people with lifetime depression while addressing their mental well-being needs.
- Findings emphasise that a holistic approach is vital for well-being, and integration of healthcare services should continue.

Clinical Implications

- The study supports the need to adopt a client-centred approach to care for a person's well-being in a holistic manner.
- The findings can direct healthcare professionals to concurrently address employment and mental health needs of individuals.

notably brings together 2 distinct approaches to defining well-being: the hedonic perspective that highlights feelings of pleasure attainment or happiness, and the eudaimonic perspective that emphasises psychological well-being with the focus on fulfilment, meaning in life and purposefulness.^{10,11} Research has consistently shown that individuals who maintain high levels of PMH are more likely to recover from an affective disorder than those with low PMH.¹²

Mental well-being is influenced by a number of socio-demographic factors such as age, sex, marital status, education, income, religion and physical health, among others.¹³ Most epidemiological studies worldwide generally indicate a close link between psychiatric symptomatology and socio-economic determinants, with the most vulnerable being individuals of low socio-economic status.¹⁴ Mental well-being and employment status have a bidirectional yet complicated relationship.¹⁵ Those who are mentally ill have higher unemployment rates or diminished work productivity.¹⁶ The effect of being employed may create a positive impact on one's well-being by providing a sense of personal identity and financial security. However, it may also encourage pressure due to the increasing demands of work life, which in turn causes distress to the physical and mental well-being of an individual.¹⁷ Evidence suggests a strong association between unemployment and a number of adverse health outcomes such as the incidence (and deterioration) of physical and mental well-being.^{18,19} A meta-analysis of 237 cross-sectional and 87 longitudinal studies found

those unemployed reported more distress than employed persons. The study also discussed the correlation between the lack of employment and poor mental health.²⁰

Singapore is a Southeast Asian country comprising a multiethnic population of 5.6 million including 74.3% Chinese, 13.4% Malay, 9% Indians and 3.2% other ethnic groups.²¹ The overall unemployment rate in Singapore was reportedly 2.3% in 2019.²² The first Singapore Mental Health Study conducted in 2010 (SMHS 2010) was the first comprehensive mental health survey of a representative sample of its adult resident population, and the lifetime prevalence of MDD was found to be 5.8%.²³ The second Singapore Mental Health Study carried out in 2016 (SMHS 2016) was initiated to obtain up-to-date information regarding the prevalence of select mental disorders, and the lifetime prevalence of MDD was reported as 6.3%.²⁴ The positive mental health instrument (PMHI) was developed as part of the SMHS 2010 study.²⁵ Several studies on PMH have been conducted in Singapore and provided information on the socio-demographic correlates in various populations, specifically the general community^{26,27} and in people seeking treatment for mental illness.^{28,29} Few studies, however, have looked at the moderating effect of employment status on the relationship between PMH and MDD. MDD is the most prevalent lifetime mental disorder in Singapore,²⁴ and comes with a significant cost to society. Mean annual total costs per patient with depressive disorder has been reported to be USD7,638, with indirect costs at 81% making up most of the total costs. Almost 50% of indirect costs were observed to be associated with unemployment and loss of productivity.³⁰ Moreover, with reports acknowledging that PMH is impacted in people with MDD,^{26,29} this study aimed to (1) examine the level of PMH, (2) identify the socio-demographic correlates of the PMH domains in the general population, and (3) ascertain if employment status moderates the relationship between MDD and PMH, among those with lifetime MDD.

METHODS

Survey population

The SMHS 2016 was a population-based, epidemiological study that included Singapore residents aged ≥ 18 years, conducted between 2016 and 2018. The study was approved by the National Healthcare Group Domain Specific Review Board. Participants were randomly selected from a national registry of citizens and permanent residents in Singapore using a disproportionate stratified sampling design due to the multiethnic nature of the Singapore population. Residents aged ≥ 65 , Malays and Indians were over-

sampled to ensure that sufficient samples sizes were achieved to improve the reliability of estimates for these groups. The dataset was later adjusted by survey weights that incorporated sampling weight, non-response weight and post-stratification weight by ethnicity and age according to the distribution of the Singapore population in 2014. An invitation letter was sent to each resident, and subsequently an interviewer visited the home of the resident to obtain his/her consent to participate in the study. Trained interviewers from a survey research firm conducted the face-to-face interviews with residents who agreed to participate. Residents, who were unable to participate in the interview due to severe physical or mental illness; those living outside of Singapore, institutionalised or hospitalised for the duration of the study; and those who were unable to communicate either in English, Mandarin or Malay were excluded from the study. Further methodological details can be found in an earlier paper.²⁴

The overall response rate for the survey was 69.5% and a total of 6,126 respondents participated in the study. Among these respondents, 4,916 who preferred to take the interview in English were provided with the PMHI (as the instrument was available only in English) and a postage-paid envelope. Respondents were informed by the trained interviewers to complete the PMHI, place it in the sealable envelope and mail it back to the study team. Given the multidimensional nature of the PMHI with 47 items and 6 subscales, and to avoid response bias, participants were given ample time and privacy to complete the self-administered PMHI. The PMHI was completed and returned by 2,337 respondents. Data from a total of 2,270 respondents were included in this analysis with the rest ($n=67$) excluded due to missing data or pattern answer³¹ (Fig. 1).

Survey interview

The fully-structured computer-assisted personal interview version of the World Health Organization Composite International Diagnostic Interview version 3.0 (WHO-CIDI 3.0) was the main questionnaire used in this study.³² The WHO-CIDI 3.0 gathers diagnostic information on a range of mental disorders. Only select diagnostic modules of the WHO-CIDI 3.0 were administered to the respondents to reduce respondent burden. Socio-demographic information on age, sex, ethnicity, marital status, education level and employment status was obtained from the respondents.

Diagnostic assessment

The WHO-CIDI 3.0 is designed to generate diagnostic information according to definitions and criteria of the

Fig. 1. Flow diagram to describe study procedure.

Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV) and the International Classification of Disease, 10th Revision (ICD-10) Classification of Mental and Behavioral Disorders.^{33,34} Five select disorders diagnosed according to the DSM-IV criteria: alcohol use disorder, generalised anxiety disorder, obsessive-compulsive disorder, MDD and bipolar disorder were assessed in SMHS 2016. Each of the diagnostic modules reported lifetime and 12-month prevalence of the mental disorders. Diagnoses reported here focused on lifetime diagnoses of MDD, and were made using organic exclusions and diagnostic hierarchy rules.

Positive Mental Health Instrument (PMHI)

The self-administered 47-item PMHI encompasses 6 subscales used to assess PMH: (1) general coping (GC) (9 items), e.g. “When I feel stressed, I do something to get my mind off the situation”; (2) emotional support (ES) (7 items), e.g. “I have people in my life who give me support”; (3) spirituality (7 items), e.g. “I find comfort in my religion or spiritual beliefs”; (4) interpersonal skills (IS) (9 items), e.g. “I make friends easily”; (5) personal growth and autonomy (PGA) (10 items), e.g. “I am focused on what I want to do in life”; and (6) global affect (GA) (5 items). The PMHI was developed and validated among a multi-ethnic adult population in Singapore.^{25,26} For the first 5 subscales, respondents were asked to indicate how much each item described them on a scale from 1 to 6 (1: Not at all like me to 6: Exactly like me). The GA subscale

requires respondents to indicate “how often over the past four weeks they felt – calm, happy, peaceful, relaxed and enthusiastic” using a 5-point response scale (1: Never or very rarely to 5: Very often or always). Domain-specific scores were calculated by summing the scores of the individual items and dividing by the number of items in each domain, likewise, for the total PMH score. Cronbach’s alpha (α) for the PMHI was 0.951 in the study sample ($\alpha=0.942$ and $\alpha=0.951$ among those with and without any lifetime mental disorders, respectively).³¹

Statistical analyses

IBM SPSS Statistics version 23 (IBM Corp, Armonk, US) was utilised to conduct the analyses. All estimates were weighted to adjust for oversampling, non-response weight and post-stratification for age and ethnicity distributions between the study sample and the Singapore resident population in 2014. Characteristics of the overall sample were obtained with descriptive analyses. Multiple logistic regression analyses were performed to look at the socio-demographic correlates of total PMH and its domains among those with lifetime MDD. Employment status was transformed into 3 dummy coded variables: employed, economically inactive (students, homemakers and retirees/pensioners) and unemployed, with the unemployed variable treated as the reference group. This was to observe how employed persons differed from the unemployed persons. Moderation effect was tested using the SPSS PROCESS module version 3.3 by Hayes.³⁵ To pursue the testing for the moderation effect, the following relationships have to be significant: (1) direct effect of predictor (lifetime MDD) on PMH, (2) direct effect of moderator (employment status) on PMH, and (3) direct interactions effect (lifetime MDD x employment status) on PMH. The interaction effect is auto-calculated in SPSS PROCESS, which also generates the proportion of the variance explained by the moderating effect of perceived social support (R^2 increase due to interaction). The effect of the socio-demographic correlates (age, sex, ethnicity, education, marital and employment status) was adjusted in the moderation model.

RESULTS

Socio-demographic characteristics

Table 1 displays the demographic distribution of the study population ($n=2,270$). The mean age of the respondents was 42.1 years. There were slightly more women (52.1%) than men (47.9 %), and majority were Chinese (77.5%), married (55.7%), university educated (39.7%) and employed (74.3%). The lifetime prevalence of MDD in this sample was 6.6% ($n=131$). Among the

131 individuals with MDD, 10 reported that they were unemployed at the time of the survey.

PMH total and domain scores and socio-demographic correlates

Individuals with lifetime MDD reported significantly lower PMH total and domain scores compared to those who did not have MDD (Table 2). The results of the socio-demographic correlates of those with lifetime MDD have been tabulated in Table 3. The employed group (versus unemployed) reported significantly higher scores in PMH total ($\beta=1.09$, $P<0.01$) and domains GC ($\beta=1.0$, $P=0.01$), ES ($\beta=1.68$, $P<0.001$), spirituality ($\beta=1.74$, $P=0.02$) and GA ($\beta=1.31$, $P<0.01$). Similarly, significantly higher scores were observed in PMH total ($\beta=1.24$, $P<0.01$) and domains GC ($\beta=1.10$, $P=0.012$), ES ($\beta=1.94$, $P<0.001$), spirituality ($\beta=1.83$, $P=0.04$) and GA ($\beta=1.51$, $P<0.01$) in the economically inactive group (vs unemployed). Those with secondary education and those with vocational/Institute of Technical Education (vs university) had significantly lower scores in spirituality ($\beta=-1.38$, $P=0.01$) and GC ($\beta=-0.85$, $P=0.01$), respectively. Those of Malay ethnicity (vs Chinese ethnicity) had significantly high scores in the spirituality ($\beta=2.09$, $P<0.001$) domain. Females (vs males) were observed to report significantly higher scores for the ES ($\beta=0.75$, $P<0.001$) and spirituality ($\beta=0.68$, $P=0.03$) domains. A positive linear relationship was observed between age and PMH total ($\beta=0.02$, $P<0.01$), GC ($\beta=0.03$, $P<0.01$) and spirituality ($\beta=0.04$, $P<0.01$) domains.

Moderation analysis

Employment status and lifetime MDD were included in the moderation analysis, and these variables accounted for a significant amount of variance in PMH and its domains as shown in Table 4.

The direct effect of lifetime MDD on PMH total ($\beta=-0.329$, 95% confidence interval [CI] -0.471, -0.188; $P<0.001$) and the domains GC ($\beta=-0.482$, 95% CI -0.668, -0.295; $P<0.001$), ES ($\beta=-0.382$, 95% CI -0.567, -0.196; $P<0.001$), IS ($\beta=-0.221$, 95% CI -0.374, -0.069; $P=0.01$), PGA ($\beta=-0.387$, 95% CI -0.550, -0.224; $P<0.001$) and GA ($\beta=-0.452$, 95% CI -0.630, -0.275; $P<0.001$) was observed to be significant. The direct effect of being economically inactive was noted to be significant on PMH total ($\beta=0.076$, 95% CI 0.009, 0.143; $P=0.03$) and the domains spirituality ($\beta=0.281$, 95% CI 0.131, 0.431; $P<0.001$), IS ($\beta=-0.074$, 95% CI 0.003, 0.146; $P=0.04$) and GA ($\beta=0.088$, 95% CI -0.630, -0.275; $P=0.04$). The interaction term

Table 1. Socio-demographic and mental health characteristics of participants who completed the Positive Mental Health Instrument

Socio-demographic and mental health characteristics		No. (n=2270)	Weighted %
Mean age, years	42.1		
Major depressive disorder	No	2139	93.4
	Yes	131	6.6
Sex	Female	1162	52.1
	Male	1108	47.9
Ethnicity	Chinese	701	77.5
	Malay	603	10.4
	Indian	693	8.1
	Others	273	4.0
Marital Status	Single	666	37.9
	Married	1419	55.7
	Divorced/separated/widowed	185	6.4
Highest education level	Primary and below	174	4.5
	Secondary	593	20.4
	Junior College/Diploma	613	29.8
	Vocational/ITE	162	5.6
	University	728	39.7
Employment	Employed	1571	74.3
	Economically inactive ^a	585	20.6
	Unemployed	114	5.1

ITE: Institute of Technical Education

^a Includes students, homemakers and retirees/pensioners

between unemployed and lifetime MDD accounted for a significant proportion of the variance in PMH total ($\beta=-0.741$, 95% CI -1.209, -0.274; $P<0.01$) and specific domains; ES ($\beta=-0.926$, 95% CI -1.540, -0.312; $P<0.01$), spirituality ($\beta=-1.170$, 95% CI -2.222, -0.119; $P=0.03$); PGA ($\beta=-0.668$, 95% CI -1.207, -0.128; $P=0.02$) and GA ($\beta=-1.060$, 95% CI -1.649 -0.472; $P<0.001$). Although the direct effect of those who were economically inactive on PMH was significant (i.e. those who were economically inactive had a better PMH), the interaction between this group and those with lifetime MDD was not significant. Examination of the interaction plots (Fig. 2) showed that the effect of lifetime MDD on PMH total was minimal among those who were employed (mean difference=0.33) compared to those who were unemployed (mean difference=1.06). The same was observed in the PMH domains, GC (mean difference=0.67). Respondents with lifetime MDD who were unemployed had poor PMH compared to those who were employed.

DISCUSSION

The intent of this paper was firstly to present the differences in PMH levels among those with and without lifetime MDD. Those with lifetime MDD had lower mean PMH scores across all domains and total scores indicating that the presence of MDD is associated with lower mental well-being. Growing evidence suggests high levels of PMH protect individuals from mental illness. Keyes et al.³⁶ conducted a longitudinal study with mentally healthy participants, and showed that those with high levels of PMH over a 10-year period had a decreased risk of developing a mental illness and that participants whose PMH declined had significantly increased odds of developing a mental illness. This points to the existence of a bidirectional relationship between PMH and mental disorders, which is supported by the findings of other studies. Grant et al.³⁷ found that reduced levels of PMH predicted risk of higher depressive symptoms within a year; a similar finding was reported by Lamers et al.³⁸ Mental health protection and

promotion is crucial to reduce the burden of mental illness, and it can be attained by building and maintaining high levels of PMH.

Socio-demographic correlates, notably, employment status (PMH total, GC, ES, spirituality and GA), ethnicity (Malay: spirituality) and sex (female: ES and spirituality) were more commonly associated with higher PMH total and domain scores in those with MDD. These findings are consistent with the findings of other studies, which have shown that females tend to report higher positive well-being and higher scores on psychological well-being scales compared to their male counterparts.^{39,40} A Singapore study among outpatients with schizophrenia⁴¹ also revealed that females had significantly higher total PMH and domain specific scores.

In the current dataset (SMHS 2016), among individuals with lifetime MDD, Malays reported significantly higher scores in the spirituality domain. Ethnic differences in mental health have been well documented.⁴²⁻⁴⁴ Singapore has long been a multireligious society in which religion and spirituality seem to have a close relationship.⁴⁵ Religious identity in Singapore is demonstrated to be the strongest among the Muslims, an ethnic group that is largely made up of Malays followed by Indians.⁴⁶ It has been reported that Malays tend to score high on religiosity and spirituality based on the frequency of prayers and attendance at religious services.⁴⁷⁻⁴⁹ Studies have also continued to show the positive effect of religiosity and spirituality on physical and mental health.⁴⁹⁻⁵¹ Religious or spiritual coping is seen as comforting during times of distress as individuals tend to seek religions or spirituality as a means of strength in difficult times. Deci and Ryan¹⁰ discussed that self-determination theory is closely connected to the issue of religiosity and mental health. The theory is based on the idea that the process of internalising values such as adopting beliefs or practices can have a significant impact on psychological wellbeing.⁵²

Our study revealed that compared to the unemployed, those who were economically inactive (students, homemakers and retirees/pensioners) and employed had a higher PMH. Mental and economic well-being are inherently related. Mental health is known to be a crucial factor of production—people with poor mental health have lower levels of economic activity, lower earnings, less stable employment and lower financial security.¹⁵ Poor mental health creates lower levels of economic activity, lower wages and less stable employment. On the other hand, mental health can be undermined by employment difficulties. Those who struggle to find meaningful work or lose their source of income experience poorer

Table 2. PMH total and domain scores for those with and without lifetime MDD (n=2270)

Lifetime MDD	PMH total			General coping			Emotional support			Spirituality		
	Mean	P	SD	Mean	P	SD	Mean	P	SD	Mean	P	SD
No	4.66	<0.001	0.689	4.6	<0.001	0.91	4.86	<0.001	0.89	4.25	0.036	1.544
Yes	4.23		0.707	4.08		0.901	4.36		1.123	3.96		1.656
Lifetime MDD	Interpersonal skills			Personal growth and autonomy			Global affect					
	Mean	P	SD	Mean	P	SD	Mean	P	SD	Mean	P	SD
No	4.76	<0.001	0.745	4.74	<0.001	0.789	4.73	<0.001	0.864	4.73	<0.001	0.864
Yes	4.5		0.713	4.25		0.903	4.16		0.949	4.16		0.949

MDD: major depressive disorder; PMH: positive mental health; SD: standard deviation
Significant (2-tailed) *P* values are in bold

Table 3. Socio-demographic correlates of overall PMH and domains among participants with lifetime MDD (n=131)

	PMH total				General coping				Emotional support				Spirituality			
	β	P	95% CI		β	P	95% CI		β	P	95% CI		β	P	95% CI	
			Lower	Upper			Lower	Upper			Lower	Upper			Lower	Upper
Age	0.017	0.014^a	0.004	0.031	0.025	0.003^a	0.009	0.041	0.020	0.055	0	0.040	0.039	0.023^a	0.006	0.072
Sex																
Female	0.196	0.116	-0.049	0.441	-0.173	0.253	-0.470	0.125	0.754	0^b	0.389	1.119	0.677	0.027^a	0.077	1.276
Male	Ref.				Ref.				Ref.							
Ethnicity																
Malay	0.243	0.257	-0.179	0.665	0.221	0.395	-0.291	0.734	-0.037	0.907	-0.666	0.592	2.088	<0.001^b	1.055	3.120
Indian	0.051	0.816	-0.382	0.484	-0.204	0.436	-0.721	0.313	-0.168	0.608	-0.813	0.478	1.039	0.055	-0.021	2.099
Others	-0.023	0.936	-0.598	0.552	-0.119	0.736	-0.817	0.579	-0.179	0.679	-1.036	0.677	0.194	0.785	-1.212	1.601
Chinese	Ref.				Ref.				Ref.							
Education																
Primary and below	-0.125	0.822	-1.222	0.971	-0.087	0.897	-0.165	0.198	-0.015	0.985	-1.648	1.618	-0.966	0.477	-3.648	1.716
Secondary	-0.222	0.259	-0.609	0.165	0.161	0.496	-0.081	0.125	-0.516	0.079	-1.093	0.061	-1.382	0.005^a	-2.330	-0.435
Junior College/ Diploma	-0.071	0.610	-0.348	0.205	0.167	0.326	0.001	0.173	-0.176	0.401	-0.588	0.237	-0.517	0.133	-1.194	0.160
Vocational/ITE	-0.203	0.429	-0.711	0.304	-0.846	0.007^a	-0.312	0.010	-0.105	0.783	-0.861	0.651	-0.658	0.296	-1.899	0.0584
University	Ref.				Ref.				Ref.							
Marital status																
Married	-0.017	0.922	-0.354	0.320	-0.234	0.255	-0.640	0.171	-0.037	0.884	-0.539	0.465	-0.054	0.897	-0.878	0.770
Divorced/ separated/ widowed	-0.108	0.659	-0.589	0.374	-0.059	0.842	-0.643	0.525	-0.586	0.109	-1.303	0.132	-0.729	0.223	-1.907	0.449
Single	Ref.				Ref.				Ref.							
Employment																
Employed	1.089	0.001^a	0.477	1.701	0.998	0.009^a	0.255	1.741	1.683	<0.001^b	0.772	2.595	1.737	0.023^a	0.240	3.234
Economically inactive ^c	1.235	0.001^a	0.535	1.934	1.097	0.012^a	0.250	1.944	1.938	<0.001^b	0.896	2.980	1.826	0.037^a	0.114	3.537
Unemployed	Ref.				Ref.				Ref.							

Table 3. Socio-demographic correlates of overall PMH and domains among participants with lifetime MDD (n=131) (Cont'd)

	Interpersonal skills				Personal growth and autonomy				Global affect			
	β	P	Lower	Upper	β	P	Lower	Upper	β	P	Lower	Upper
Age	0.010	0.204	-0.005	0.025	0.012	0.183	-0.006	0.030	-0.006	0.539	-0.025	0.013
Sex												
Female	0.186	0.175	-0.084	0.457	-0.118	0.468	-0.440	0.204	0.050	0.779	-0.300	0.399
Male	Ref.				Ref.				Ref.			
Ethnicity												
Malay	-0.227	0.336	-0.694	0.239	-0.070	0.804	-0.624	0.485	-0.448	0.143	-1.050	0.154
Indian	0.078	0.746	-0.400	0.557	-0.151	0.595	-0.711	0.409	-0.298	0.333	-0.905	0.309
Others	-0.174	0.588	-0.809	0.461	0.217	0.571	-0.539	0.973	-0.146	0.725	-0.966	0.674
Chinese	Ref.				Ref.				Ref.			
Education												
Primary and below	0.201	0.742	-1.010	1.412	-0.062	0.932	-1.503	1.378	0.139	0.860	-1.424	1.702
Secondary	0.059	0.784	-0.368	0.487	-0.006	0.982	-0.513	0.501	0.225	0.420	-0.325	0.775
Junior College/ Diploma	0.066	0.668	-0.239	0.372	-0.080	0.663	-0.444	0.283	0.031	0.875	-0.363	0.426
Vocational/ITE	0.188	0.508	-0.373	0.748	0.162	0.632	-0.504	0.828	0.044	0.903	-0.678	0.767
University	Ref.				Ref.				Ref.			
Marital status												
Married	-0.077	0.682	-0.449	0.295	0.177	0.425	-0.262	0.616	0.131	0.588	-0.346	0.607
Divorced/separated/ widowed	-0.063	0.814	-0.595	0.469	0.331	-0.302	-0.301	0.963	0.358	0.303	-0.328	1.043
Single	Ref.				Ref.				Ref.			
Employment												
Employed	0.519	0.131	-0.157	1.195	0.695	0.090	-0.110	1.499	1.314	0.003^a	0.442	2.187
Economically inactive ^c	0.706	0.073	-0.067	1.479	0.758	0.104	-0.158	1.675	1.512	0.003^a	0.518	2.506
Unemployed	Ref.				Ref.				Ref.			

CI: confidence interval; ITE: Institute of Technical Education; MDD: major depressive disorder; PMH: positive mental health; Ref.: reference category

^a $P < 0.05$ ^b $P < 0.001$ ^c Includes students, homemakers and retirees/pensioners

Table 4. Moderation analysis table with PMH predicted by MDD moderated by employment status (n=131)

	PMH total			General coping			Emotional support		
	β	<i>P</i>	95% CI	β	<i>P</i>	95% CI	β	<i>P</i>	95% CI
MDD	-0.329	<0.001^b	-0.471	-0.188	<0.001^b	-0.668	-0.295	<0.001^b	-0.567
Economically inactive ^c	0.076	0.026^a	0.009	0.143	0.589	-0.063	0.112	0.257	0.138
Unemployed	-0.155	0.025^a	-0.291	-0.019	0.008^a	-0.419	-0.064	0.078	0.018
MDD x economically inactive	-0.168	0.296	-0.482	0.147	0.804	-0.357	0.460	0.299	0.194
MDD x unemployed	-0.741	0.002^a	-1.209	-0.274	0.179	-1.040	0.194	0.003^a	-0.312
R ²	0.319			0.022				0.024	
R ² change	0.004			0.001				0.004	
<i>P</i>	<0.001^b			<0.001^b				<0.001^b	

	Spirituality			Interpersonal skills			Personal growth and autonomy			Global affect		
	β	<i>P</i>	95% CI	β	<i>P</i>	95% CI	β	<i>P</i>	95% CI	β	<i>P</i>	95% CI
MDD	-0.058	0.718	-0.376	0.259	0.221	-0.221	0.005^a	0.005^a	-0.069	-0.387	<0.001^b	-0.452
Economically inactive ^c	0.281	<0.001^b	0.131	0.431	0.074	0.074	0.043^a	0.403	0.146	-0.033	0.088	0.040^a
Unemployed	-0.124	0.427	-0.430	0.182	-0.115	-0.261	0.032	0.003^a	-0.389	-0.233	-0.124	0.153
MDD x economically inactive	-0.654	0.070	-1.360	0.053	0.026	-0.314	0.365	0.263	-0.204	-0.204	-0.157	-0.547
MDD x unemployed	-1.170	0.029^a	-2.222	-0.119	-0.393	-0.898	0.112	0.015^a	-1.207	-0.668	<0.001^b	-1.649
R ²	0.012			0.012				0.028			0.033	
R ² change	0.003			0.001				0.003			0.005	
<i>P</i>	<0.001^b			<0.001^b				<0.001^b			<0.001^b	

CI: confidence interval; MDD: major depressive disorder; PMH: positive mental health

^a *P*<0.05^b *P*<0.001^c Includes students, homemakers and retirees/pensioners

Fig. 2. Significant interaction of employment status and lifetime MDD on PMH.
MDD: major depressive disorder; PMH: positive mental health

mental well-being.⁵³ Given the extensive literature on the bilateral relationship of employment status and mental well-being, this study intended to examine the moderating effects that employment status has on the relationship between lifetime MDD and PMH.^{18,19} It was clearly depicted that presence of lifetime MDD with the concurrence of unemployment had a greater negative impact on PMH. Those who were unemployed had poor PMH. Exposure to unemployment brings about an increased vulnerability, and can affect the psychological

well-being of the individuals exposed to joblessness, including their outlook on life in general, their emotional status, cognitive efficiency and attitude towards work. Factors such as these may influence the possibility of them re-joining the workforce.⁵⁴ Extant literature has discussed that depression is associated with cognitive impairment, which in turn, may result in poor job performance, causing unemployment.⁵⁵ However, conclusions about causality cannot be drawn due to the cross-sectional nature of this study. Eisenberg

and Lazarsfeld⁵⁶ used a descriptive study to list the unpleasant and emotionally negative consequences of unemployment; since psychological well-being is a multidimensional concept, the impact of unemployment on mental health can manifest as depression, anxiety, low self-esteem and strained personal relations. The Korea Welfare Panel Study revealed that a negative change in employment status and remaining in unstable employment or unemployment are associated with having depression.⁵⁷ Paul and Moser²⁰ reported that a person who is unemployed does not have access to the 5 latent functions of employment: structured time, social contact, collective purpose, status and activity that were first identified by Jahoda.⁵⁸ Jahoda pointed out that unemployment is psychologically damaging because the individual is deprived of these latent functions. He asserted that even unsatisfactory employment is more desirable than the absence of work. Job loss also affects health, as stress is caused by the expectation of termination, the process of termination, unemployment and the job search.⁵⁹ It will be essential to monitor the health outcomes of those unemployed and having MDD. The results further reiterate the necessity to encourage workplace mental health, including screening for psychological distress and initiation of early antidepressant treatment, which that can in turn provide support for continual employment.⁶⁰

Those who were economically inactive (students, homemakers and retirees/pensioners) reported a significantly higher PMH compared to the unemployed. Interestingly, the interaction between the economically inactive and those with lifetime MDD was negative, indicating that this group (people who had lifetime MDD and were economically inactive) tended to have poorer PMH. However, the interaction was seen as insignificant, which could be due to the small sample size for this group, and therefore not large enough for a notable effect. Poorer PMH for the retirees/pensioners, however, could be explained by poor self-reported health and functional status that are observed among the elderly with depressive symptoms associated with specific chronic illnesses.⁶¹

There are several limitations of the current study. The cross-sectional survey design does not permit any causal inferences. Only English-speaking adults were included in the current study. This study relied on self-report for the diagnosis of mental illness, which could lead to some bias in the findings. There is a likelihood of participants over-reporting PMH due to social desirability bias. To reduce this bias and allow for adequate time to complete the questionnaire, participants were required to place the completed questionnaire in a postage-paid, sealable

envelope and mail it back to the study team at a later date. Not all respondents (n=2,579) who were invited to complete the self-administered PMHI returned the forms, and this can contribute to limiting the representation of the sample to a certain degree. Participants could be unemployed on their own accord or due to compulsory redundancies, and these could contribute to different implications for mental health—however, reasons for unemployment were not collected. Notwithstanding these limitations, the strength of the study lies in the use of validated PMHI in Singapore, which encompasses important domains that were similarly identified in other models of PMH.^{62,63} The study is also strengthened with data collected from a representative sample, increasing the generalisability of the findings to the Singapore population.

CONCLUSION

In order to care for a person's mental well-being in a holistic manner, clinicians and allied health professionals should systematically support the employment needs of those who report lifetime MDD by adopting a client-centered approach, and work towards the vocational goals of their clients while facilitating the sustainability of employment. On a societal level we will have to ensure that earlier access to specialist services is provided to such individuals, look into addressing both employment and mental health needs of the individuals, and reducing the barriers to employment for those with mental health issues, so that the PMH of the person can be improved. The comprehensive effects of employment status—including differences in types of employment and reasons for unemployment—on health outcomes and self-rated PMH should be investigated in further studies. Such research will introduce more integration between current healthcare services or propose innovative applications of current evidence-based models.

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