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Determinants of depressive symptoms in Filipino senior citizens of the community-based ENGAGE study

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ABSTRACT

Objective: This study investigated the factors associated with depressive symptoms among community-dwelling Filipino senior citizens.
Methods: We conducted a cross-sectional study among 1021 Filipino senior citizens aged 60–91 years. We used multiple linear regression analysis to identify the factors independently associated with levels of depressive symptoms. We predicted the model using hierarchical regression analysis.
Results: Both men and women who had higher subjective psychological well-being showed a lower level of depressive symptoms while those who had negative self-rated health and reported to be lonely showed a contrasting result. Among women, those who reported positive self-rated health, and had higher psychological resilience and social interaction, showed a lower level of depressive symptoms. Moreover, among women, those who had chronic diseases showed a higher level of depressive symptoms. Hierarchical regression analysis revealed that loneliness was the most powerful predictor of depressive symptoms among Filipino senior citizens.
Discussion: Loneliness and chronic diseases are the major risk factors for depressive symptoms while a higher level of subjective psychological well-being is the primary protective factor against it among Filipino senior citizens. To be free from depression, their psychological well-being should be strengthened through active social engagement and healthcare service improvement.

1. Introduction

Population aging is brought about by advances in medicine and improvement of living standards (United Nations, 2015). According to the World Health Organization (WHO), between 2015 and 2050, the proportion of the world's population over 60 years will nearly double from 12% to 22% (WHO, 2017). While population aging began in wealthy nations in Europe, North America and Japan, the most dramatic change are now occurring fastest in low- and middle-income countries (WHO, 2012). By 2050, 80% of senior citizens will live in these countries; for instance, Chile, China, and Iran will have a higher proportion of senior citizens than that of the United States of America (WHO, 2012). Such demographic shifts have presented significant challenges for society and health services.

In line with this, mental disorders are getting a major public health threat in the world. Particularly, dementia and depression affect over 20% of adults aged 60 and above and account for 6.6% of all disability in this age group (WHO, 2017). Mental disorders can affect the quality of life of senior citizens and have a significant impact on the use of health and social services (Dening & Barapatre, 2004). Though mental disorders are common in the older population, they remain undetected and untreated especially in low resource settings (Jacob, 2017; Rathod et al., 2017). Mostly, mental disorders are under-identified by health care providers and senior citizens themselves (WHO, 2017), and there is a stigma surrounding these conditions that make people reluctant to seek help (Conner et al., 2010).

Recently, Filipinos' mental disorder has been increasing, and it affects around 10–15% of children and 17–20% of adults (Department of

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Health, 2012). Their significant symptoms include excessive sadness, delusion, confusion, and forgetfulness. Additionally, more Filipino senior citizens are committing suicide due to depression. This event is associated with their inability to adapt to the rapid social and economic developments. To date, there is no current national data regarding the prevalence of depression in the Philippines; even more so is geriatric depression since the prioritization of the issues of the senior citizens is low, and the extent of discussion on aging issues and concerns is minimal at best (De Leon, 2014). Thus, more studies have been awaited to investigate the depressive symptoms of this growing segment of the population.

So far, no studies have yet explored the factors associated with depressive symptoms among community-dwelling senior citizens in the Philippines. Furthermore, little has been investigated about sex differences in depressive symptoms with a particular focus on psychosocial factors (Areán & Reynolds, 2005; Bruce, 2002; Li, Theng, & Foo, 2015). Therefore, the current study aimed to examine the factors that are associated with depressive symptoms between men and women in an elderly community-dwelling population.

2. Methods

2.1. Project overview and study setting

The Project ENGAGE (Embracing and Nurturing Global Ageing) is a community-based action research conducted in the City of Muntinlupa from 2017 to 2018. The project had three phases. Phase 1 aimed to measure the depressive symptoms of community-dwelling senior citizens and examine the factors associated with it. The identified factors were utilized for designing the intervention study (Phase 3). Phase 2 trained senior volunteers for leadership and peer counseling. Phase 3 aimed to measure the efficacy of peer counseling, social engagement, and its combination in improving the well-being of senior citizens with depression. In this paper, we report on the results of Phase 1 of the study.

Muntinlupa is the southernmost city in the National Capital Region, the most populated region in the Philippines. It had nine barangays (it refers to communities in the Philippines) and was classified as a highly urbanized city with a poverty incidence of 1.9% in 2012 (Philippine Statistics Authority, 2016). The city also has one of the highest records of senior citizens, which account for 5.63% of its population.

2.2. Study participants

We conducted a cross-sectional survey of 1021 senior citizens aged 60 years old and above from October to December 2017. We excluded senior citizens in long-term care, with life-threatening diseases, or with moderate/ severe cognitive impairment and currently suffering from deafness, aphasia, or other communication disorders.

2.3. Data collection

Fifteen trained barangay health workers (BHWs) and two experienced researchers performed the face-to-face survey interviews using a structured questionnaire. We conducted a pre-test to assess senior citizens' understanding of the questions and corrected accordingly before the actual survey. We obtained the list of senior citizens per barangay and used that to recruit the senior citizens purposively through home visits. To secure representativeness, we based the sampling procedure on the proportion of senior citizens per barangay. A total of 1021 senior citizens participated in the survey, and each interview lasted for about 30 min.

3. Variables and measurements

3.1. Outcome: depressive symptoms

We measured the depressive symptoms of the senior citizens by the 15-item Geriatric Depression Scale (GDS-15). This scale is specially developed for use in geriatric patients and contains fewer somatic items (Sharp & Lipsky, 2002; Yesavage et al., 1982). The response options for all the items were 'yes' or 'no' and possible scores range from 0 to 15. A score of 5 or more indicates a tendency towards depression. The validity and reliability of GDS-15 have been supported through both clinical practice and community-based research (Pocklington, Gilbody, Manea, & McMillan, 2016; Wancata, Alexandrowicz, Marquart, Weiss, & Friedrich, 2006). The Cronbach's α for this study was 0.84.

3.2. Exposure: socio-demographic characteristics

Socio-demographic variables in this study included age, marital status, level of education, monthly income, pension, self-rated health, the presence of chronic diseases, living arrangement, and lifestyle factors such as smoking and drinking. For age, we categorized senior citizens into two groups: young-old (aged 60–79) and old-old (aged 80+). For marital status, we grouped them into four categories: married/remarried, never married, separated, and widowed. Regarding the level of education, we grouped them into no education, had primary education, and had a secondary/ tertiary education. Concerning monthly income, we grouped them into no income, poor income, and average/ good income. As for pension and chronic diseases, we asked the senior citizens whether they have or don't have. We categorized their general health status into three groups: good/ very good, fair, bad/ very bad. Living arrangement was assessed by asking the senior citizens whether they lived alone or lived with others. For lifestyle factors, we classified smoking as either never smoker or ex-/ current smokers while drinking was classified as either non-drinker or occasional/ daily drinkers.

3.3. Exposure: psychosocial risk factors

3.3.1. Subjective psychological well-being

We assessed subjective psychological well-being using the 5-item WHO well-being index (WHO-5). The WHO-5 is short scale for the measurement of positive psychological well-being (Topp, Østergaard, Søndergaard, & Bech, 2015). It consists of five positively phrased items which measure the participant's well-being over the last two weeks. This scale provides six-point Likert response options ranging from 0 (at no time) to 5 (all of the time). The total score is the sum of the five items ranging from 0 to 25, where 0 represents the worst possible quality of life and 25 represents the best possible quality of life. A score below 13 indicates poor well-being and is an indication for further evaluation. The Cronbach's α for this study was 0.88.

3.3.2. Psychological resilience

We measured senior citizens' psychological resilience using the 12-item Resilience Appraisal Scale (RAS-12). The scale consists of three parts of coping skills which evaluate perceived abilities in social support seeking, emotional regulation and problem-solving (Johnson, Gooding, Wood, & Tarrier, 2010). Senior citizens indicate the degree of applicability of each statement to them using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The total RAS-12 score ranges from 12 to 60, with a higher score indicating higher perceived psychological resilience. The Cronbach's α for this study was 0.93.

3.3.3. Perceived social support

We assessed the senior citizens' perceived social support using the 10-item Duke Social Support Index (DSSI-10), which was developed to

measure two important constructs related to social support such as social support satisfaction and social interaction (Wardian, Robbins, Wolfersteig, Johnson, & Dustman, 2012). The possible score ranges from 10 to 30. Higher scores indicate a higher level of perceived social support among senior citizens. The Cronbach's α for this study was 0.82.

3.3.4. Loneliness

We measured senior citizens' loneliness using the 8-item UCLA Loneliness Scale (ULS-8). The scale employs a four-point Likert scale with values ranging from 0 (never) to 3 (often), and the total score ranges from 8 to 32 (Hays & DiMatteo, 1987). The response to 'I am an outgoing person' and 'I can find companionship when I want it' were reverse coded before obtaining the total score for all eight items. There was no cut-off score identified to define loneliness. However, a higher score on this scale indicates more intense feelings of loneliness. The Cronbach's α for this study was 0.82.

4. Data analysis

We used descriptive statistics to summarize the basic characteristics of the senior citizens and cross tabulation to identify their distribution. We calculated the total scores for the GDS-15, WHO-5, RAS-12, DSSI-10, and ULS-8. We conducted our analyses separately for men and women to address gender differences. For bivariate analyses, we used one-way analysis of variance (ANOVA) or *t*-test.

We performed multiple linear regression to identify factors associated with depressive symptoms. We included all the exposure variables and found that multicollinearity was not a concern because all variables showed variance inflation factor values less than 2.0 after running the regression. Subsequently, we performed hierarchical regression analysis to ascertain the predictors of depressive symptoms among Filipino senior citizens. Model 1 was adjusted for demographic variables (age, sex, marital status, education, and living with others). Model 2 was adjusted for both demographic and economic variables (income adequacy and pension). Model 3 included health-related variables (poor self-rated health, chronic diseases, smoking, and drinking). Models 4 and 5 were adjusted to see the independent association of social support and loneliness with depressive symptoms whereas model 6 (full model) was additionally adjusted for all psychosocial variables (WHO-5, RAS-12, DSSI-10, and ULS-8). We set the level of significance to 0.05 (two-tailed) and performed statistical analyses using Stata 13.1 (StataCorp, College Station, TX, USA).

5. Ethical considerations

The Project ENGAGE was approved by the University of Tokyo Research Ethics Committee (SN 11641) and the University of the Philippines-Manila Research Ethics Board (UPMREB 2017-312-01). We ensured the confidentiality of the senior citizens' responses and their privacy was strictly protected as no personally identifiable information was used in this study. Also, we secured written informed consents before the survey, and all participation was voluntary.

6. Results

6.1. General characteristics of participants

Table 1 shows the socio-demographic characteristics of all the senior citizens. Of 1,021 senior citizens, 699 (68.5%) were women, and their mean age was 67.9 years [standard deviation (SD) 6.2], and the mean age of men was 67.3 (SD 5.9). Most senior citizens were young-old (aged 60–79), and only 5.3% of them belong to the old-old category (aged 80+). Among 1,021, 570 (55.8%) reported as being married/ remarried, with the remainder reporting as widowed (342, 33.5%), never married (81, 7.9%) and separated (28, 2.8%). Regarding educational status, 525 (51.4%) of them reported having a secondary/ tertiary education, while 481 (47.1%) reported having primary education. In total, 785 (69.1%) of them did not have a source of income, and only half of them (52.1%) had a pension. Concerning their general health status, almost half of them (49.4%) reported having a 'fair' health condition, and most of them (82.3%) already had at least one chronic disease. For their living arrangement, 940 (92.1%) of them lived with others. The majority of them were non-smokers (776, 76.0%) and non-drinkers (824, 80.7%).

Table 1
Socio-demographic characteristics of community-dwelling senior citizens.

Characteristics	Total (N = 1021)		Men (n = 322)		Women (n = 699)		*p*-value
	n	%	n	%	n	%	
Age[a]							0.362
Young-old (aged 60–79)	967	94.7	308	95.6	659	94.3	
Old-old (aged 80+)	54	5.3	14	4.4	40	5.7	
Marital status							< 0.001
Married/ Remarried	570	55.8	248	77.0	322	46.1	
Never married	81	7.9	28	8.7	53	7.6	
Separated	28	2.8	9	2.8	19	2.7	
Widowed	342	33.5	37	11.5	305	43.6	
Education							0.010
No education	15	1.5	4	1.2	11	1.6	
Primary	481	47.1	130	40.4	351	50.2	
Secondary/Tertiary	525	51.4	188	58.4	337	48.2	
Monthly income							0.001
No income	705	69.1	198	61.5	507	72.5	
Poor income	209	20.4	76	23.6	133	19.0	
Average/Good income	107	10.5	48	14.9	59	8.4	
Pension							0.268
Have	489	47.9	146	45.3	343	49.1	
Don't have	532	52.1	176	54.7	356	50.9	
Self-rated health							0.199
Good/Very good	313	30.6	95	29.5	218	31.2	
Fair	504	49.4	152	47.2	352	50.4	
Bad/Very bad	204	20.0	75	23.3	129	18.4	
Chronic diseases							0.002
Have	840	82.3	247	76.7	593	84.8	
Don't have	181	17.7	75	23.3	106	15.2	
Living arrangement							0.017
Alone	81	7.9	16	5.0	65	9.3	
Living with others	940	92.1	306	95.0	634	90.7	
Smoking							< 0.001
Never-smoker	776	76.0	129	40.1	647	92.6	
Ex-/ Current-smoker	245	24.0	193	59.9	52	7.4	
Drinking alcohol							< 0.001
Non-drinker	824	80.7	169	52.5	655	93.7	
Occasional/ Daily drinker	197	19.3	153	47.5	44	6.3	

[a] Mean age 67.3 years (standard deviation, SD 5.9) for men and 67.9 years (SD 6.2) for women.

6.2. Factors associated with Filipino senior citizens' depressive symptoms

Table 2 shows the factors associated with depressive symptoms among community-dwelling senior citizens stratified by gender. Both men and women who had higher subjective psychological well-being were negatively associated with higher level of depressive symptoms (men: β = −0.20; 95% CI = −0.2, −0.1; women: β = −0.17; 95% CI = −0.2, −0.1). On the other hand, those who had 'bad/ very bad' self-rated health (men: β = 0.15; 95% CI = 0.4, 2.0; women: β = 0.12; 95% CI = 0.3, 1.4) and reported to be lonely (men: β = 0.31; 95% CI = 0.2, 0.3; women: β = 0.28; 95% CI = 0.2, 0.3) were positively associated with a higher level of depressive symptoms.

Among women, those who reported 'good/very good' self-rated health (β = −0.15; 95% CI = −1.3, −0.5) and had higher psychological resilience (β = −0.12; 95% CI = −0.1, −0.0) were negatively associated with a higher level of depressive symptoms. Also, among

Table 2
Factors associated with depressive symptoms among community-dwelling senior citizens in the Philippines stratified by gender.

	Men (n = 322)			Women (n = 699)		
	β	*p*-value	95% CI	β	*p*-value	95% CI
Age (*vs.* Young-old, 60–79)						
Old-old (aged 80 +)	0.03	0.481	(−0.9, 2.0)	0.01	0.747	(−0.7, 0.9)
Marital status (*vs.* Married/ Remarried)						
Never married	0.00	0.920	(−1.0, 1.1)	0.00	0.990	(−0.7, 0.7)
Separated	−0.00	0.928	(−2.2, 2.0)	0.05	0.178	(−0.4, 2.1)
Widowed	0.02	0.680	(−0.8, 1.2)	0.01	0.784	(−0.3, 0.5)
Education (*vs.* Secondary/ Tertiary)						
No education	−0.01	0.782	(−3.1, 2.3)	−0.02	0.734	(−2.5, 1.8)
Primary School	0.01	0.868	(−0.5, 0.6)	0.00	0.934	(−0.4, 0.4)
Monthly income (*vs.* No income)						
Poor income	−0.07	0.156	(−1.2, 0.2)	0.03	0.319	(−0.2, 0.7)
Average/ Good income	−0.08	0.080	(−1.5, 0.1)	−0.03	0.324	(−1.0, 0.3)
Pension	−0.01	0.906	(−0.6, 0.6)	−0.00	0.939	(−0.4, 0.4)
Self-rated health (*vs.* Fair)						
Good/ Very good	−0.06	0.265	(−1.2, 0.3)	−0.15	< 0.001	(−1.3, −0.5)
Bad/ Very bad	0.15	0.005	(0.4, 2.0)	0.12	0.002	(0.3, 1.4)
Chronic diseases	0.04	0.399	(−0.4, 1.1)	0.11	< 0.001	(0.4, 1.4)
Living alone	0.01	0.774	(−1.2, 1.6)	−0.02	0.619	(−0.9, 0.5)
Smoking	−0.03	0.480	(−0.8, 0.4)	0.05	0.085	(−0.1, 1.1)
Drinking alcohol	−0.02	0.663	(−0.7, 0.5)	−0.03	0.277	(−0.9, 0.3)
Subjective psychological wellbeing	−0.20	0.001	(−0.2, −0.1)	−0.17	< 0.001	(−0.2, −0.1)
Psychological resilience	−0.12	0.063	(−0.1, 0.0)	−0.12	0.001	(−0.1, −0.0)
Perceived social support	−0.04	0.536	(−0.1, 0.1)	−0.03	0.394	(−0.1, 0.0)
Social support satisfaction	−0.01	0.850	(−0.2, 0.1)	0.06	0.133	(−0.0, 0.1)
Social interaction	−0.04	0.470	(−0.3, 0.1)	−0.12	0.001	(−0.3, −0.1)
Loneliness	0.31	< 0.001	(0.2, 0.3)	0.28	< 0.001	(0.2, 0.3)

women, those who had chronic diseases (β = 0.11; 95% CI = 0.4, 1.4) were positively associated with a higher level of depressive symptoms whereas those who had higher social interaction (β = −0.12; 95% CI = −0.3, −0.1) were found to be negatively associated with a higher level of depressive symptoms.

A hierarchical regression model was run to examine the degree to which these risk factors were truly associated with depressive symptoms. Table 3 summarizes the results of this hierarchical regression analysis. Models 4 and 5 showed that perceived social support (β = −0.12, $p < 0.001$) and loneliness (β = 0.28, $p < 0.001$) were independently associated with depressive symptoms. However, the association of perceived social support (β = −0.03, $p = 0.326$) became insignificant in the final regression model (model 6) which indicated that perceived social support was greatly influenced by mood which in this case was loneliness. Model 6 explained a total of 32.4% of the variance of depressive symptoms. Among the three main psychosocial factors, loneliness had the strongest association with depressive symptoms (β = 0.28, $p < 0.001$).

Then, an additional regression model was run to evaluate the individual impacts of two types of social support, *e.g.*, social support satisfaction and social interaction. From Table 4, social interaction had a significant negative association with depressive symptoms in both modified model 4 (β = −0.10, $p = 0.001$) and modified model 6 (β = −0.09, $p = 0.001$) while social support satisfaction did not have. These additional regression models account for a slightly higher total variance of depressive symptoms, 26.6% and 33.1% respectively, than the original models (model 4 and 6) described above.

Table 3
Regression analysis predicting depressive symptoms among senior citizens (N = 1,021).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age	−0.05	−0.03	−0.03	−0.03	−0.02	−0.02
Sex	−0.05	−0.07*	−0.07	−0.04	−0.05	−0.05
Marital status	0.02	0.02	0.01	0.01	−0.00	−0.00
Education	−0.08*	−0.07*	−0.06	0.00	0.00	0.01
Living with others	−0.01	−0.02	−0.02	−0.01	−0.00	−0.00
Income adequacy		−0.15***	−0.12***	−0.07*	−0.05	−0.05
Pension		0.00	0.00	0.03	0.02	0.02
Poor self-rated health			0.10**	0.07*	0.07**	0.07**
Chronic diseases			0.21***	0.15***	0.12***	0.13***
Smoking			−0.07	−0.04	−0.02	−0.02
Drinking			0.06	0.05	0.04	0.04
WHO-5				−0.25***	−0.24***	−0.24***
RAS-12				−0.17***	−0.15***	−0.14***
DSSI-10				−0.12***	–	−0.03
ULS-8				–	0.28***	0.28***
R^2 (%)	1.1	3.4	9.4	26.4	32.3	32.4
ΔR^2 (%)	1.1*	2.3***	6.0***	17.1***	23.0***	23.0***

WHO-5 5-item WHO Wellbeing Index; *RAS-12* 12-item Resilience Appraisal Scale; *DSSI-10* 10-item Duke Social Support Index; *ULS-8* 8-item UCLA Loneliness Scale. Statistical significance indicated by *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Table 4
Additional regression analysis with two separated subscales of DSSI-10 predicting depressive symptoms among senior citizens (N = 1,021).

	Modified Model 4	Modified Model 6
Age	−0.03	−0.02
Sex	−0.04	−0.04
Marital status	0.01	−0.00
Education	0.00	0.02
Living with others	−0.02	−0.00
Income adequacy	−0.06*	−0.05
Pension	0.03	0.02
Poor self-rated health	0.07*	0.07**
Chronic diseases	0.15***	0.13***
Smoking	−0.04	−0.02
Drinking	0.05	0.04
WHO-5	−0.24***	−0.22***
RAS-12	−0.18***	−0.14***
Social support satisfaction	−0.06	0.04
Social interaction	−0.10**	−0.09**
ULS-8	–	0.29***
R^2 (%)	26.6	33.1
ΔR^2 (%)	17.3***	23.7***

WHO-5 5-item WHO Wellbeing Index; *RAS-12* 12-item Resilience Appraisal Scale. *DSSI-10* 10-item Duke Social Support Index; *ULS-8* 8-item UCLA Loneliness Scale. Statistical significance indicated by *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

7. Discussion

In this study, loneliness, psychological resilience, chronic diseases, negative self-rated health, and low subjective psychological well-being were associated with Filipino senior citizens' depressive symptoms. Among them, loneliness was the most powerful predictor of depressive symptoms.

As shown in the results, both men and women who had a higher level of subjective psychological well-being exhibited a low level of depressive symptoms. A ten-year cohort study also revealed that the absence of positive psychological well-being was a risk factor for depression among senior citizens (Wood & Joseph, 2010). Thus, our finding demonstrates the significance of a higher level of subjective psychological well-being in improving depressive symptoms.

Moreover, perceived health status was associated with the level of depression in this study. Senior citizens who reported their general health status as 'bad/very bad' exhibited a higher level of depressive symptoms whereas those who had 'good/very good' self-rated health presented a lower level of depressive symptoms, especially among women. Kim, Choe, and Chae, (2009) have previously emphasized that perceived health status was the most powerful predictor of depression among community-dwelling senior citizens in Korea. Our findings were similar to theirs, but loneliness was the most powerful predictor of depression among Filipino senior citizens. As Kim et al. (2009) did not include loneliness in their analysis, this might account for the difference in the results of two studies.

Women who were resilient showed a lower level of depressive symptoms. Therefore, being resilient in the face of adversity can be a countermeasure to prevent depression among women. MacLeod, Musich, Hawkins, Alsgaard, and Wicker, (2016) and Gerino, Rollè, Sechi, and Brustia, (2017) previously reported that higher resilience was significantly associated with positive outcomes, including successful aging, lower depression, and longevity. Also, among women, those who had chronic diseases showed a higher level of depressive symptoms. Older women are more likely than older men to have functional limitations (Gatz & Fiske, 2003) that is why they could be more at risk for depression.

Furthermore, women who showed higher social interaction had a lower level of depressive symptoms. This is because women may put more value on social contacts than men which help them reduce the risk of having depression. Kubicek, Korunka, Raymo, and Hoonakker, (2011) also confirmed that depressive symptoms were more strongly associated with social contacts among women than those among men. According to a study in Taiwan, decreased social support network was a risk factor for depression among community-dwelling senior citizens (Tsai, Yeh, & Tsai, 2005). Our finding implies the importance of social contacts and active engagement in the community to prevent the onset of geriatric depression.

Finally, hierarchical regression analysis revealed that loneliness was the most powerful predictor of depressive symptoms among Filipino senior citizens followed by subjective psychological well-being. Cacioppo, Hughes, Waite, Hawkley, and Thisted, (2006) and Aylaz, Aktürk, Erci, Öztürk, and Aslan, (2012) have also confirmed the strong association between loneliness and depressive symptoms among the aging population. In this study, loneliness and chronic diseases were found as the major risk factors for depressive symptoms while a higher level of subjective psychological well-being was the primary protective factor against it among Filipino senior citizens. Moreover, perceived social support was negatively associated with depressive symptoms and its association was greatly influenced by mood which in this case was loneliness. This result is new and warrants further investigation as we could not rule out a reverse causal direction between perceived social support and loneliness. Among two types of social support, social interaction was associated with lesser depressive symptoms after controlling for all psychosocial factors measured in this study. Thus, it could be interpreted that social interaction was directly associated with lesser depressive symptoms. Social support satisfaction, however, was not associated with it.

8. Strengths and limitations

This study provided several significant findings and insights. However, some limitations should be noted. First, we used purposive sampling to recruit study participants because we could not obtain the complete list of senior citizens dwelling in the city. To secure representativeness, we based the sampling procedure on the proportion of senior citizens per barangay. Second, we conducted the study in one urban city located in the National Capital Region of the Philippines. Data collection from other subgroups located in the provinces will provide more information for the study. Third, some of the measures such as RAS-12, DSSI-10, and ULS-8 were adapted from previous studies (Areán & Reynolds, 2005; Bruce, 2002; Li et al., 2015), and have not been validated in the Philippine context. However, we translated them carefully, pretested, confirmed their reliability, and performed face validity by asking a group of mental health experts before the actual survey. Finally, although the mediating effect of depressive symptoms between social support and loneliness could possibly exist, it was beyond the scope of this research. Regardless of the limitations, our findings have strengths and implications for policy development and future research. This study is the first step in highlighting the depressive symptoms of community-dwelling senior citizens in the Philippines.

9. Conclusions

This study highlighted the essential factors associated with depressive symptoms among community-dwelling senior citizens in the Philippines. As loneliness is the most powerful predictor of depressive symptoms among men and women, we need to encourage Filipino senior citizens to be resilient and be actively involved in their communities. The local government units and Office for Senior Citizens Affairs must integrate community-based mental health programs into their yearly plans for helping those who are suffering from depressive symptoms. As for physical well-being, more comprehensive and age-friendly health care services should be made easily accessible for senior citizens. Urgent action should be taken to promote active social engagement and healthcare service improvement in the community. This

way, Filipino senior citizens can free themselves from depression.

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Conflict of interest

The authors declared that they have no competing interests.

Author statement

RRC, MJ, JK, EA, and AS participated in the design of the study. RRC, AS and HM conducted the statistical analysis and interpreted the results. RRC drafted the manuscript. RRC, EA, DCC, and MM oversaw the implementation of the study. MJ supervised the study and the revisions of the manuscript. All authors contributed to the writing of the manuscript and approved the final draft.

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