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Original Study

The Effect of Depressive Symptoms and Antidepressant Use on Subsequent Physical Decline and Number of Hospitalizations in Nursing Home Residents: A 9-Year Longitudinal Study



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A B S T R A C T

Keywords:

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Objective: To investigate whether depressive symptoms and antidepressant use at baseline predict the subsequent decline in physical functioning and number of hospitalizations in nursing home residents.

Design: Observational study based on Minimum Data Set (MDS) 2.0.

Setting: Six nursing homes in Hong Kong.

Participants: All nursing home residents (n = 1076) assessed with the MDS 2.0 in 2005 followed until 2013.

Measurements: Outcome variables included annual performance in activities of daily living (ADLs) and number of hospitalizations within 90 days before each assessment. The presence of depressive symptoms at baseline was measured by the Resident Assessment Protocol triggered from the MDS 2.0 assessment. Records of antidepressant use and other control variables were exacted directly from the MDS 2.0 assessment.

Results: The presence of baseline depressive symptoms did not have significant association with baseline ADLs and number of hospitalizations according to the multilevel mixed-effect model. However, it was associated with a faster deterioration of physical functioning (coefficient 0.03; 95% confidence interval [CI] 0.00–0.07) and an increase in the number of hospitalizations (coefficient 0.05; 95% CI 0.03–0.07). No significant difference between elders using antidepressants and elders who were free from depressive symptoms was observed. If depressive symptoms were presented but antidepressants were not used, a much sharper decline was evident (coefficient 0.06; 95% CI 0.02–0.09).

Conclusions: This study provided evidence that the presence of depressive symptoms is associated with more utilization of health care services. However, the use of antidepressants may play a significant role in altering the trajectory. The presence of depressive symptoms is a worrisome but treatable condition. Effective intervention/treatment should be called on.

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Depression is a disabling psychiatric disorder among the aged population.^{1–4} A bulk of studies have shown that symptoms of depressive disorder in late life was significantly associated with poor

adherence to medication,^{5–7} pain severity,⁸ weight loss,⁹ and mortality.¹⁰ Some physical complaints from patients with depressive symptoms are medically unexplained¹¹ and correspondingly boosted the cost due to high utilization of health services.¹² It has been reported that after adjusting for long-term medical diseases, the ambulatory and hospitalization costs among seniors with depressive symptoms were 47% to 51% higher than their nondepressed counterparts.¹³ Other studies have explored the effect of depression on physical functioning,^{14–16} which demonstrated that depression amplifies physical disability in late life by increasing risks for incident physical illness and negative health behaviors.¹⁷ Although the efficacy

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of treatment of late-life depression has been firmly established,¹⁸ depression (especially subsyndromal depression) is often underdiagnosed and undertreated.¹⁹

Among the older population, long-term care (LTC) residents were found to be 3 to 4 times more vulnerable to depression compared with their community-dwelling peers.²⁰ However, existing studies focusing on the consequences of depressive symptoms are mostly either based on community-dwelling elderly or rely solely on cross-sectional data. Reliable information of the long-term impact of depressive symptoms on functional status and use of health care services is still lacking. Given the situation that treatment of depressive symptoms is still poor in nursing home settings,²¹ it is necessary to gather an adequate estimate on the long-term impact of depressive symptoms (especially untreated depressive symptoms) so that both policy makers and nursing home staff can be convinced to promote better detection and treatment.²²

Using longitudinal data collected through the Minimum Data Set for Resident Assessment Instrument (MDS-RAI) version 2.0 from 2005 to 2013, this study investigates the long-term effect of depressive symptoms on the subsequent physical decline of residents and utilization of health services within the nursing home setting by addressing the following questions: (1) What is the effect of depressive symptoms on subsequent physical decline and number of hospitalizations within a period of 9 years? (2) What role does antidepressant use play in altering the trajectories of physical function and number of hospitalizations?

Method

Setting and Participants

Data of 1076 nursing home residents having MDS-RAI assessment records since 2005 from 6 government-subsidized LTC facilities in Hong Kong were included in this study. The 6 facilities are managed by a nongovernmental organization (NGO) that participated in the Hong Kong Longitudinal Study on Long-Term Care Facility Residents Project. All the residents in these facilities were assessed annually by using the MDS-RAI, a comprehensive assessment that provides information from multiple key domains of function, health, activity, and service use. Details of the MDS-RAI 2.0 are published elsewhere.²³ The Chinese version of the MDS-RAI for nursing homes was validated in 2001.²⁴ Residents were assessed by trained professionals (nurses, physical therapist, occupational therapist, or social workers) from 2005 to 2013. During this study period, 75.2% of elders died ($n = 733$, 68.1%) or moved out of the facilities ($n = 75$, 7.0%), whereas 24.8% remained in the study until 2013.

Measures

The presence of depressive symptoms at baseline (2005) was measured by the Resident Assessment Protocol (RAP) triggered from the MDS-RAI 2.0 assessment. According to the Revised Long-Term Care Resident Assessment Instrument User's Manual (Version 2.0),²⁵ a mood problem was deemed present if 1 or more of the following 17 symptoms was observed: (1) resident made negative statement; (2) repetitive questions; (3) repetitive verbalizations; (4) persistent anger with self or others; (5) self-depreciation; (6) expressions of what appear to be unrealistic fears; (7) recurrent statements that something terrible is about to happen; (8) repetitive health complaints; (9) repetitive anxious complaints/concerns; (10) unpleasant mood in morning; (11) insomnia/change in usual sleep pattern; (12) sad, pained, worried facial expressions; (13) crying, tearfulness; (14) repetitive physical movements; (15)

withdrawal from activities of interest; (16) reduced social interaction; and (17) mood persistence. This Mood Symptoms RAP was shown to have acceptable test-retest reliability, interrater reliability, and concurrent validity from a previous Hong Kong study.²⁴ In this current study, the presence of depressive symptoms in 2005 was defined as having at least 1 of these 17 symptoms. The Activities of Daily Living (ADL) Self-Performance Hierarchy Scale was computed by using 4 items: personal hygiene, toilet use, locomotion, and eating.²⁶ The combined ADL scale reflects the disablement process by grouping ADL performance level into discrete stages of loss (early loss: personal hygiene; middle loss: toileting and locomotion; late loss: eating). The total score ranges from 0 to 6, with higher scores indicating greater decline in ADL performance. The number of hospitalizations within 90 days before the assessment was recorded. Antidepressant use was recorded by number of days within 7 days before the assessment a resident took antidepressants. It is recoded into a binary variable with values 0 (without antidepressant) and 1 (with antidepressant).

Control variables included demographic characteristics, clinical characteristics, and cognitive performance at baseline. Demographic variables were the resident's gender (male = 0, female = 1), age in years, marital status, education, and welfare dependence. Marital status was classified as single (0), married (1), and other (2). They were recoded as dummy variables in the regression analysis. Educational level was divided into 9 categories ranging from 1 (no formal education) to 9 (college and above) and then treated as a continuous variable. Welfare dependence was measured by a binary variable showing whether the resident received means-tested welfare benefits (Comprehensive Social Security Assistance [CSSA]). The standard welfare payment for a single elder was HK\$3055 (US\$391.7) per month in 2014. Clinical characteristics included body mass index (BMI) measures and chronic disease information in 2005. The chronic conditions included were hypertension, diabetes, arthritis, stroke, Alzheimer disease (AD), and dementia other than AD. Cognitive functioning was measured by RAI-MDS Cognitive Performance Scale (CPS) with scores ranging from 0 (intact, equivalent to a Mini-Mental State Examination [MMSE] average score 25) to 6 (very severe impairment, MMSE 1).²⁷

Statistical Analysis

Descriptive statistics were calculated for the prevalence of depressive symptoms and other baseline characteristics. ADL performances and the number of hospitalizations were reported consecutively over the years. Because a considerable proportion of residents gradually left the study due to death or moving out of the facilities, multilevel mixed-effects models, which cope automatically with missing data due to panel dropout, were fitted to model changes of ADL performances and number of hospitalizations. More specifically, multilevel mixed-effects linear regression was used to model the linear changes of ADL performance and number of hospitalizations, controlling for demographic and clinical characteristics. The group of elders with depressive symptoms was then divided into 2 groups according to whether antidepressants were used at baseline. Two additional models were fitted to assess the differences of physical decline and number of hospitalization among 3 groups: (1) residents without depressive symptoms (group 1), (2) residents with depressive symptoms and used antidepressants at baseline (group 2), and (3) residents with depressive symptoms but did not use antidepressants at baseline (group 3). Missing cases accounted for only 4% of the total sample. Listwise deletion technique was adopted to deal with missing values. The sample size used in regression analysis was $n = 1033$. Stata 13.1 (Stata Corp, College Station, TX) was used to conduct the data analysis.

Table 1
Demographic and Clinical Characteristics in a Sample of Nursing Home Residents in Hong Kong (n = 1076)

Demographics	n	%	Clinical Characteristics	n	%
Age, y, mean (SD)	83.19	(7.99)	BMI, mean (SD)	21.32	(4.32)
Gender, women	740	68.77	CPS, mean (SD)	2.22	(2.10)
Education			Depressive symptoms	259	24.07
No formal education	530	49.26	Chronic conditions		
Less than primary school	274	25.46	Hypertension	588	54.65
Primary school	137	12.73	Diabetes	244	22.68
Middle school or above	135	12.55	Arthritis	95	8.83
Marital status			AD	151	14.03
Single	125	11.62	Dementia	168	15.61
Married	216	20.07	Stroke	296	27.51
Widowed	690	64.13			
Other	45	4.18			
Income					
CSSA	721	67.01			
Older age allowance	140	13.01			
Disability allowance	129	22.12			

Results

Sample Characteristics

The demographic characteristics of the studied sample are summarized in Table 1. In 2005, the average age of the residents was 83.19 years (SD 7.99) with the youngest being 55 and the oldest 112. Older women (68.77%) and widowed residents (64.13%) dominated the sample. The educational level of the residents was very low. Approximately half of the elders (49.26%) had not received any formal education. This is typical among older people in Hong Kong, as they were born and grew up during the civil war and the Sino-Japanese war and had little opportunity to receive formal education. In terms of welfare dependence, 67.01% of the elders were receiving means-tested welfare payment. It is seen that the studied sample was a relatively vulnerable population with advanced age and relatively low social economic status.

At baseline, 259 elders who contributed to 24.07% of the total sample showed at least 1 depressive symptom. The baseline CPS score was 2.22 (SD 2.10), which corresponded to a cognitive performance between mild impairment and moderate impairment. A significant proportion of elders suffered from chronic diseases. The percentages of hypertension, diabetes, and arthritis were as high as 54.65%, 22.68%, and 8.83%, respectively. The percentages of AD and dementia other than AD were 14.03% and 15.61%, respectively. In addition, more than one-fourth (27.51%) of the elders were suffering from stroke in 2005.

Empirical ADL Performance and Number of Hospitalizations Over the Year

The empirical trajectories of ADL decline and number of hospitalizations, for both the total sample each year and 2013 survivors only, are shown in Figures 1 and 2. When all the available observations at each year were considered, no clear decline of ADL performance can be observed. Considering only the survivors, a linear trend of decline can be observed for elders with or without depressive symptoms. The differences in levels of ADL performance between residents with and without depressive symptoms ranged from 0.66 at baseline to 1.21 in 2012. The number of hospitalizations increased as residents aged. The increase was much more obvious for elders with depressive symptoms.

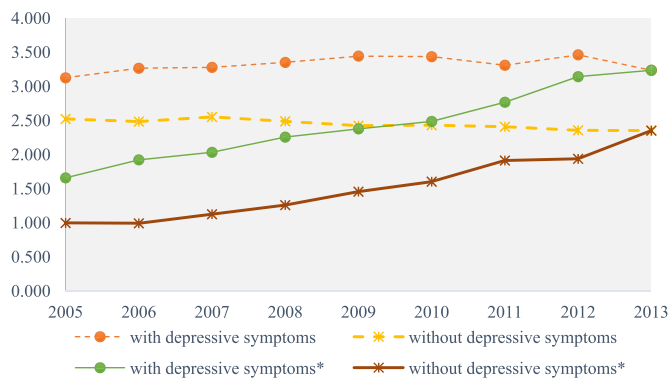


Fig. 1. Empirical trend of changes in ADL performances 2005 to 2013 for the total sample at each year and 2013 survivors only, with and without depressive symptoms. *2013 survivors only.

The Effect of Depressive Symptoms on Subsequent ADL Performance

The decline in ADL performance, adjusted for demographic characteristics and clinical conditions, was significantly faster ($\beta = 0.03$, confidence interval [CI] 0.00–0.07) for elders with depressive symptoms presented at baseline (Table 2, Model 1); however, no significant association was directly observed between depressive symptoms and ADL performance at baseline. Poorer performance was associated with advanced age, being married, receiving welfare payment, lower BMI, and poorer cognitive performance (higher CPS score). With respect to clinical conditions, such as hypertension, diabetes, and arthritis, no significant relationship was observed; however, for more severe chronic diseases typically represented by AD, dementia other than AD, and stroke, significant association between stroke and ADL at baseline was observed. Stroke also had a negative effect on the rate of the decline, which is legitimate because patients with stroke started from a much worse functioning level at baseline. AD, although not significant at baseline, was found to be significantly associated with greater decline at later years with a coefficient of 0.09 (CI 0.04–0.13).

The Effect of Depressive Symptoms on Subsequent Hospitalizations

Similar to Model 1 (Table 2), although no significant relationship between baseline hospitalizations and depressive symptoms was observed, the interaction term between depressive symptoms and

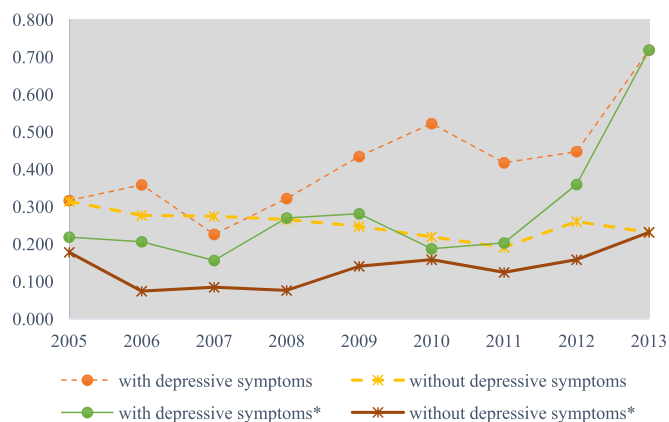


Fig. 2. Empirical trend of changes in the number of hospitalizations 2005 to 2013 for the total sample at each year and 2013 survivors only, with and without depressive symptoms. *2013 survivors only.

Table 2
Results From Multilevel Mixed–Effects Linear Regression Examining the Effect of the Presence of Depressive Symptoms on ADL (Model 1) and Number of Hospitalizations (Model 2)

	Model 1. ADL (n = 1033)			Model 2. Hospitalization (n = 1032)		
	Coefficient	(95% CI)	P	Coefficient	(95% CI)	P
Fixed effects						
Depressive symptom	0.12	(–0.11–0.35)	.325	–0.03	(–0.12–0.06)	.561
Depressive symptom × time	0.03	(0.00–0.07)	.047	0.05	(0.03–0.07)	.000
Time	0.19	(0.17–0.21)	.000	0.01	(0.00–0.02)	.047
Female	–0.10	(–0.34–0.14)	.408	–0.13	(–0.21 to –0.05)	.001
Age	0.03	(0.02–0.05)	.000	0.01	(0.01–0.02)	.000
Marital status						
Married	0.52	(0.17–0.87)	.004	0.01	(–0.11–0.13)	.826
Widowed of others	–0.01	(–0.31–0.30)	.961	0.01	(–0.09–0.12)	.779
CSSA	0.30	(0.09–0.50)	.005	0.02	(–0.05–0.09)	.510
Education	0.01	(–0.06–0.08)	.736	0.00	(–0.02–0.03)	.771
BMI	–0.06	(–0.08 to –0.03)	.000	–0.00	(–0.01–0.00)	.327
CPS	0.66	(0.60–0.72)	.000	0.02	(–0.00–0.04)	.079
Hypertension	–0.08	(–0.28–0.11)	.411	0.05	(0.02–0.11)	.327
Diabetes	0.11	(–0.13–0.34)	.369	0.03	(–0.05–0.11)	.398
Arthritis	0.15	(–0.19–0.48)	.391	0.09	(–0.03–0.20)	.131
AD	0.11	(–0.20–0.43)	.486	–0.01	(–0.05–0.11)	.398
AD × time	0.09	(0.04–0.13)	.000	–0.03	(–0.05–0.00)	.079
Dementia	0.06	(–0.24–0.37)	.673	–0.03	(–0.15–0.09)	.609
Dementia × time	–0.02	(–0.06–0.03)	.434	–0.00	(–0.03–0.02)	.812
Stroke	1.04	(0.81–1.27)	.000	–0.02	(–0.11–0.06)	.597
Stroke × time	–0.04	(–0.07 to –0.00)	.027	0.00	(–0.02–0.02)	.880
Constant	–0.86	(–2.10–0.38)	.174	–0.58	(–1.00 to –0.16)	.007
Random effects (intercept only)						
Between individual variance	1.38	(1.32–1.46)		0.35	(0.32–0.39)	
Intraclass correlation coefficient	1.04	(1.02–1.07)		0.71	(0.70–0.73)	
Log likelihood	–8407.00			–5781.57		
Wald χ^2 (20)	2073.99			86.88		

time was highly significant ($\beta = 0.05$, CI 0.03–0.07). The presence of depressive symptoms at baseline was associated with a sharper increase of number of hospitalizations in later years. Except for the robust effects of gender and age, no other baseline characteristic was found to be significantly related to the number of hospitalizations either at baseline or over the years.

The Effect of Antidepressants

Among the 259 residents who showed at least 1 depressive symptom at baseline, only 53 elders (20.46%) received antidepressant treatment, including 34 residents (13.13%) who had antidepressants daily, 2 (0.77%) who had antidepressants 2 days a week, and 17 (6.56%) who had antidepressants 1 day a week. To investigate the effect of antidepressants, we fitted 2 additional models to examine the trajectories of ADL decline and number of hospitalizations for the 3 groups: no depressive symptoms (group 1), with symptoms and received antidepressants (group 2), and with symptoms but no antidepressant use (group 3). It is seen from Model 3 in Table 3 that only group 3 had a more severe decline in ADLs. No significant difference was observed between group 1 and group 2, which means that although the presence of depressive symptoms can lead to faster subsequent physical decline, residents who were treated with antidepressants did not necessarily follow this trend (Figure 3). The use of antidepressants prevented further ADL decline. However, antidepressant use did not seem to have the same effect on the number of hospitalizations, as shown in Model 4, where comparing with group 1, both groups 2 and 3 were associated with sharper increase of hospitalizations.

Discussion

This study set out to assess the impact of depressive symptoms on subsequent physical decline and hospitalizations among nursing

home residents in Hong Kong. The secondary purpose was to understand the role of antidepressant use in preventing ADL decline and reducing use of medical services. The findings confirmed the negative impact of depressive symptoms and suggested a significant role of antidepressant use in altering the trajectory of physical decline.

No significant association of depressive symptoms and ADL was observed at baseline. This finding is in line with another study of nursing home residents from the Netherlands,²² in which failing in observing a significant association of depression and/or anxiety with disability was attributed to the nursing home admission criteria. In Hong Kong, the MDS-RAI is adopted by the Social Welfare Department to ascertain the care needs of elders. Under the guidance of the aging-in-place policy initiative and with the implementation of the Central Waiting List for the subsidized LTC system, elders eligible for subvented residential care services generally have relatively poor functional status.²⁸ In our study, the average ADL score at baseline was 2.67 (SD 2.41), corresponding to an ADL performance level between limited impairment and extensive assistance required.

Moving beyond the cross-sectional design, our findings contributed to the existing knowledge by showing that the presence of any depressive symptom was associated with a faster subsequent physical decline in later years even when no significant association was observed at baseline. Previous studies have argued that depression may be associated with a failure to improve or even a faster decline in physical functioning after catastrophic illness.^{16,29,30} In turn, others argue that functional impairment can heighten the risk of depression.³¹ The relationship between depressive symptoms and physical functioning is complicated because the specific causal direction is difficult to conclude from cross-sectional designs. The causal relationship is even more difficult to establish when self-reported health or disability is used because elders with depressed mood may report a too pessimistic rating of their functioning.¹⁶ By analyzing the MDS data from a longitudinal perspective and introducing adequate competing health risks represented by major chronic diseases and

Table 3
Results From Multilevel Mixed-Effects Linear Regression Examining the Effect of the Presence of Depressive Symptoms With and Without Using Antidepressant on ADL (Model 3) and Number of Hospitalizations (Model 4)

	Model 3. ADL (n = 1033)			Model 4. Hospitalization (n = 1032)		
	Coefficient	(95% CI)	P	Coefficient	(95% CI)	P
Fixed effects						
Group 2[†] (reference: Group 1[*])	0.13	(−0.32–0.59)	.560	0.06	(−0.12–0.23)	.534
Group 2 × time	−0.05	(−0.11–0.01)	.129	0.12	(0.08–0.16)	.000
Group 3[‡] (reference: Group 1)	0.11	(−0.14–0.36)	.399	−0.05	(−0.14–0.05)	.363
Group 3 × time	0.06	(0.02–0.09)	.002	0.03	(0.00–0.05)	.025
Time	0.19	(0.17–0.21)	.000	0.01	(0.00–0.02)	.048
Female	−0.09	(−0.33–0.15)	.463	−0.15	(−0.23 to −0.07)	.000
Age	0.03	(0.02–0.05)	.000	0.01	(0.01–0.02)	.000
Marital status						
Married	0.52	(0.17–0.88)	.004	0.01	(−0.10–0.13)	.850
Widowed of others	−0.01	(−0.31–0.29)	.947	0.02	(−0.08–0.12)	.706
CSSA	0.29	(0.09–0.50)	.005	0.03	(−0.04–0.09)	.445
Education	0.01	(−0.06–0.08)	.717	0.00	(−0.02–0.02)	.867
BMI	−0.06	(−0.08 to −0.03)	.000	0.00	(−0.01–0.00)	.328
CPS	0.66	(0.60–0.72)	.000	0.02	(−0.00–0.04)	.079
Hypertension	−0.08	(−0.28–0.11)	.399	0.05	(−0.02–0.11)	.137
Diabetes	0.11	(−0.12–0.35)	.355	0.03	(−0.05–0.11)	.480
Arthritis	0.15	(−0.19–0.48)	.394	0.09	(−0.02–0.20)	.118
AD	0.11	(−0.21–0.43)	.493	0.00	(−0.12–0.12)	.964
AD × time	0.09	(0.04–0.13)	.000	−0.03	(−0.05–0.00)	.073
Dementia	0.07	(−0.23–0.37)	.663	−0.04	(−0.15–0.08)	.537
Dementia × time	−0.02	(−0.06–0.03)	.465	0.00	(−0.03–0.02)	.776
Stroke	1.04	(0.81–1.23)	.000	−0.02	(−0.11–0.06)	.582
Stroke × time	−0.04	(−0.07 to −0.00)	.028	0.00	(−0.02–0.02)	.914
Constant	−0.87	(−2.12–0.37)	.168	−0.55	(−0.96 to −0.14)	.009
Random effects (intercept only)						
Between individual variance	1.38	(1.32–1.46)		0.34	(0.31–0.37)	
Intraclass correlation coefficient	1.04	(1.02–1.07)		0.71	(0.70–0.73)	
Log likelihood	−8402.04			−5763.12		
Wald χ^2 (20)	2087.52			125.08		

*Group 1: Residents without depressive symptoms.

†Group 2: Residents with depressive symptoms and use antidepressant.

‡Group 3: Residents with depressive symptoms but without using antidepressant at baseline.

cognitive performance, the methodological limitations associated with cross-sectional designs and self-reported disability have been addressed. To avoid a biased subjective rating of functioning status, measures of depressive symptoms and functioning were recorded according to evaluations from trained care providers rather than residents' self-appraisals. In addition, relatively rich information was collected in terms of the competing health risk factors, which allowed sufficient control for confounding factors. In sum, it has been successfully shown that, although significant relationship cannot be

directly observed between depressive symptoms and ADL performance, a faster physical decline is observed among elders with depressive symptoms, especially when left untreated.

This study used number of hospitalizations as a proxy indicator of health care expenditure. Similar to physical decline, although no significant association was evident at baseline, a faster increase was observed for elders with any depressive symptom at baseline, both with and without antidepressant use. Several studies examined the effect of later-life depression on medical cost.^{32,33} However, little is known about the medical cost among nursing home residents. A recently published study examined mental health disorders (MHDs) and their associated health care expenditures for the dual-eligible elders across LTC settings from 7 states in the United States and concluded that mild depression and anxiety were the 2 most expensive MHDs in LTC settings.³⁴ In our study, information in terms of the exact health care expenditure was not available. However, the faster increase of number of hospitalizations, which likely will cause more cost in primary care, supported the conclusion from earlier studies that seniors with depressive symptoms are associated with higher medical cost.^{13,34}

With respect to antidepressant use, we have shown that antidepressant use played a significant role in slowing down subsequent physical decline. However, whether antidepressants should be widely recommended to nursing home residents with depressive symptoms deserves a more thorough investigation, potentially by similar studies with larger sample sizes or specifically designed randomized controlled trials. In our studied sample, only a very small proportion of residents with depressive symptoms received antidepressant treatments (n = 53). Hence, any conclusions based on this small sample size should be drawn with caution. Although the use of antidepressants can

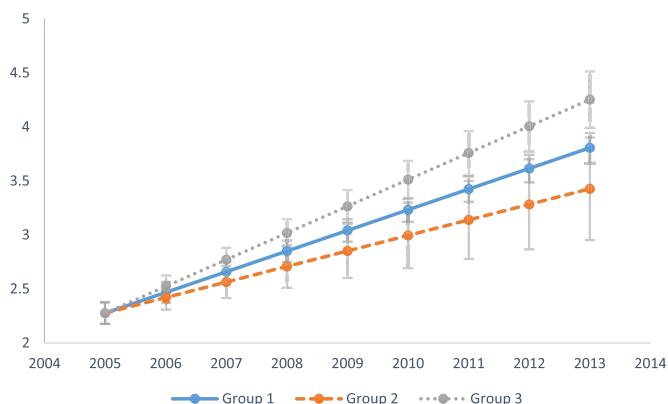


Fig. 3. Model implied trend of the trajectories of ADL decline between 2005 and 2013 for residents without depressive symptoms and with depressive symptoms with/without antidepressant use at baseline. Group 1: Residents without depressive symptoms at baseline. Group 2: Residents with depressive symptoms and use antidepressants at baseline. Group 3: Residents with depressive symptoms but without using antidepressants at baseline.

be beneficial in terms of preventing further physical decline, as suggested by our study, relying only on antidepressants can be dangerous.³⁵ Our findings suggest that antidepressant use was not associated with changes in number of hospitalizations. Elders who used antidepressants even showed a sharper increase in the number of hospitalizations compared with those who showed depressive symptoms but did not use antidepressants.

We estimated the prevalence of interventions targeting mood, behavioral, or cognition problems using the same data set. The results showed prevalence rates of approximately 0 across 9 years. Similar to many Asian societies, the treatment of depression is largely pharmacological in Hong Kong because of the severe shortage of mental health professionals.³⁶ Although many modes of treatment, such as formal psychotherapy, have been shown to be effective, the mainstay treatment is antidepressant therapy, especially within a nursing home setting. It is therefore important to develop a systematic intervention protocol for older people with depression in residential care facilities. This systematic protocol should consider combining pharmacological treatment with stimulation and support of patients to participate in recreational activities, as shown to be successful in residential care settings from a previous study.³⁷ Antidepressants alone, although proven to be useful in some domains, cannot be the ultimate solution.

The present study has several limitations. First, the prevalence of any depressive symptoms in our study (24.07%) is based on the MDS Mood Assessment. Therefore, it is different from previous studies that examined the prevalence of depressive symptoms using the Geriatric Depression Scale (GDS) among different populations or types of nursing homes.³⁸ A previous study has documented the low level of agreement between MDS Mood Assessment and GDS in measuring depression.³⁹ As a result, no attempt should be made to generalize this prevalence rate to wider populations. Another concern is the ability of practitioners to recognize the mood statement. As stated earlier, Chinese elders tend to underreport their emotional problems but be more open on somatic symptoms.⁴⁰ The timely recognition of depressive symptoms is then largely reliant on the professionalism of the MDS assessors. In addition, records on the number of hospitalizations were limited to a 90-day period instead of 1 year. The measurement error inherent in this outcome variable can be a potential source of imprecision in investigating the effect of depressive symptoms on the number of hospitalizations; caution is merited in interpreting the corresponding results. Finally, our data came from 6 LTC facilities under one of the largest NGOs in Hong Kong that are subvented by the government. Characteristics such as welfare dependence, ADL performance level, and general clinical conditions may follow certain patterns and cannot be directly generalized to all LTC facilities in Hong Kong.

Conclusion

The issue of elderly depression has raised concern in Hong Kong, where nursing home residents contributed to a substantial 6.8% of all elderly people aged 65 years or older.⁴¹ Although the extent of depression in nursing home residents remains unclear, a substantial proportion of elders have demonstrated evidence of depressive symptoms. Due to the negative effect of the presence of depressive symptoms on the use of medical services and the treatable nature of depression demonstrated in this study, better management of depression in nursing home settings is needed.

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