ORIGINAL

Factors associated with anxiety and depression among caregivers of patients receiving medical home visits

Yoshihiro Okura MD[1], Chisato Takeuchi MS[2], Harutaka Yamaguchi MD, PhD[2], and Kenji Tani MD, PhD[1]

[1]Department of General Medicine and Primary Care, Tokushima University Hospital, Tokushima, Japan, [2]Department of General Medicine, University of Tokushima Graduate School of Biomedical Sciences, Tokushima, Japan

Abstract : In recent years, Japan has promoted home visits to support older adults, with caregivers playing an important role. However, caregivers generally experience a high frequency of anxiety and depression, and the factors associated with these conditions among home visit caregivers remain unknown. To identify the associated factors, we conducted a questionnaire-based cross-sectional study of home visit caregivers in Tokushima Prefecture, Japan. The survey included caregivers' Hospital Anxiety and Depression Scale ; sociodemographic items of patients and caregivers ; and caregivers' perceptions of the home care environment, patients, and themselves. The questionnaires were sent to 379 caregivers ; 203 responded (53.6% response rate), of which 173 were valid (85.2% valid response rate). The prevalence of anxiety and depression was 43.9% and 69.4%, respectively. Multiple logistic regression analysis of factors associated with anxiety and depression showed that stable family finances (OR : 0.69, 95% CI : 0.48-1.00, p=0.049) and stable caregiver health (OR : 0.45, 95% CI : 0.30-0.68, p<0.001) were associated with anxiety. Further, stable family finances (OR : 0.60, 95% CI : 0.38-0.93, p=0.022), stable caregiver health (OR : 0.49, 95% CI : 0.30-0.81, p=0.005), and stable patient condition (OR : 0.51, 95% CI : 0.29-0.92, p=0.025) were associated with depression. These findings demonstrate that caregiver wellbeing is essential in home care settings. J. Med. Invest. 70 : 443-449, August, 2023

Keywords : anxiety, caregivers, depression, house calls

INTRODUCTION

In recent years, owing to Japan's aging population, there has been a rise in the number of older adults and couples who live alone (1) ; moreover, an increasing number of family caregivers are either residing with or living separately from older adults. Hence, the need for a system to support older adults is growing. Since 2000, the Japanese government has strongly reinforced the coverage of home medical and long-term care services through the insurance system. Japan's long-term care insurance system covers a wide range of services, such as those provided by home helpers (who provide housework and personal care), and visiting nurses ; home modifications ; the provision of assistive devices for in-home services ; day care (including rehabilitation and short stay respite care outside the home) ; and nursing homes, residences with medical services, and dementia group homes for institutional care.

In Japan's long-term care insurance system, one care manager is responsible for the person requiring care. The care manager liaises with the patient and family caregivers and plans the services they need (2, 3). Additionally, as part of the medical insurance plan, doctors provide home visits to patients who are unable to visit hospitals for physical or social reasons. The number of patients receiving home medical care is estimated to increase from approximately 700,000 in 2015 to around 1,000,000 by 2025 (4).

In a 2017 survey, many hospitalised patients reported family cooperation as an important factor in enabling home care and care services (5). However, caregivers generally reported experiencing a higher frequency of anxiety and depression. In a survey of a non-patient population in Japan (female students and female administrative staff), 23.8% of participants reported both anxiety and depression (6). A systematic review reported a high prevalence of depression and anxiety among caregivers of cancer patients (42.3% and 46.5%, respectively) (7). A similar trend has been observed among caregivers of non-cancer disease patients, such as stroke patients (anxiety 43.9%, depression 53.9%) (8) and dialysis patients (anxiety 52%, depression 30.2%) (9). Reducing their anxiety and depression is necessary for quality home care ; thus, identifying the factors associated with these disorders is helpful.

Factors related to anxiety and depression have been widely investigated and reported for caregivers of patients with cancer (7, 10, 11), stroke (8), and dementia (12). Age, sex, health status, financial factors, and social support have been reported to be related to caregiver depression (7, 12), and sex, health status, and financial factors have been reported to be related to caregiver anxiety (8, 10, 11). However, few studies have examined factors in the home visit setting. This study aimed to assess caregiver anxiety and depression and identify the associated factors through a survey of family caregivers of patients receiving medical home visits.

PATIENTS AND METHODS

Study design

This cross-sectional study administered a questionnaire survey to caregivers of patients receiving home visits. In April 2019, we referred to the Tokushima Prefecture website and local medical associations for a list of medical institutions that provided home medical care ; 239 medical institutions were listed. We requested cooperation from all of these medical institutions.

In May 2019, we mailed the study description and the

questionnaire for caregivers (supplemental file 1) to the medical institutions that agreed to cooperate with us. Physicians or nurses from the collaborating medical institutions used the study description document to explain the study to family caregivers and patients at regular visits and distributed the questionnaires to them.

The questionnaires were returned using the enclosed return envelope for collection. Data were collected for a period of six weeks, from 1 June to 12 July 2019. The investigation was conducted in accordance with the Declaration of Helsinki of 1975. Written informed consent was obtained from all participants and they answered the questionnaire anonymously.

Participants

Caregivers who regularly attended patients' doctor visits, resided with the patient, lived separately but on the same premises as the patient, or those who—though they lived independently—visited the patient's home at least once a week and were involved in the patient's care, were included in the study.

Data collection and measurement

This study assessed anxiety and depression using the 14-item Hospital Anxiety and Depression Scale (HADS), a self-administered general outpatient anxiety and depression test (13). Requiring about five minutes for completion, it is suitable for utilisation in outpatient clinics and health check-ups where time is limited. Furthermore, it has been validated for use in settings outside hospital populations (6) and for caregivers of home healthcare patients (14). It has been translated into many languages, and we employed the Japanese version developed by Kitamura (15).

Several evaluation models have been proposed for HADS, including the one- (16), two- (13, 17), and three-dimensional models (18, 19) ; most studies support the original two-dimensional model. Because it has been validated for visiting caregivers of patients (14), we assessed participants in this study using the original method. The questions were categorised into seven anxiety and depression items each and the responses were scored on a four-point Likert scale from 0–3, with the response options differing from item to item. For example, for one item they ranged from '0=always' to '3=never', whereas for another they ranged from '0=occasionally' to '3=always'. Each response was summed and scored on the HADS anxiety (HADS-A) and depression (HADS-D) subscales. In accordance with the original article (13) and previous studies (10, 11), we categorised the participants who had HADS-A and HADS-D scores of 8 or higher into groups with anxiety and depression, respectively.

We examined caregivers' sociodemographic data comprising sex, age, and employment status. For patients, we assessed sex, age, their relationship with caregivers, the level of care required from the long-term care insurance, the number and type of diseases they had, and their region of residence.

The items related to caregivers' perceptions of the home care environment, their patients, and themselves were 'Stable family finances', 'Stable health of caregiver', 'Stable condition of patient', 'Confidence in emergency doctor visits', 'Confidence in emergency nurse visits', 'Confirmation of a hospital to be admitted to in case of emergency', 'Sufficient care services', 'Availability of reliable advisors', 'Availability of other alternative caregivers', and 'Sufficient explanation and knowledge about home care'. We scored how the caregivers felt using a five-point Likert scale (1=totally disagree to 5=very much agree).

Statistical methods

The sociodemographic characteristics of the patients and caregivers and the distribution of HADS were represented by the number of people. Their ages and the caregiver perception scores were expressed as means and standard deviations.

As noted, we categorised those with HADS-A and HADS-D scores of 8 or higher into groups with anxiety and depression, respectively, and intergroup comparisons were made for both.

For univariate analysis, the chi-squared test or Mann–Whitney U test was conducted as appropriate for categorical variables such as patients' and caregivers' sociodemographic factors and caregivers' perceptions.

For multivariate analysis, a multiple logistic regression analysis with forward stepwise selection (entry level 0.05, removal level 0.10) was conducted to examine the factors associated with anxiety and depression. The outcome variable was the presence of anxiety or depression. The explanatory variables were sociodemographic factors and caregivers' perceptions of factors for which associations were noted in previous studies, or for which p<0.1 was found in univariate analysis. The Hosmer–Lemeshow test was used to determine the suitability of fit. The significance level was set at p=0.05.

The effect size r was calculated using the test statistic Z and the sample size N, through the following formula (20) :

$$r = \frac{Z}{\sqrt{N}}$$

A priori power analysis was conducted based on a predicted effect size d of 0.5, an alpha value of 0.05, a power (1-β) of 0.8, and an allocation ratio of 2.33, calculated by referring to previous studies and assuming a prevalence rate of 30% for anxiety and depression. The target total sample size was set to 160 participants.

A priori power analysis was performed using G*POWER (ver. 3.1.9.4) (21). All other statistical analyses were performed using the Statistical Package for the Social Sciences version 24 (IBM Corp., Armonk, NY, USA).

Ethical approval

This study was approved by the Tokushima University Ethical Review Board for Medical Research (No. 3440).

RESULTS

In total, 105 medical institutions replied, of which 52 had no home patients or refused to participate in the study. The remaining 53 medical institutions cooperated. Each of the collaborating medical institutions selected family caregivers who met the eligibility criteria for participation, which together totalled 379 participants.

The questionnaire for family caregivers was distributed to the 379 participants, of which 203 responded (response rate 53.6%). Thirty of these responses contained blank spaces ; thus, they were excluded. The final number of valid responses was 173 (valid response rate : 85.2% ; 48 male and 125 female). The mean age of the family caregivers was 66.2 ± 10.7 years, with a range of 33 to 90 years (Table 1).

Distribution of the HADS subscales

Regarding HADS-A, 97 (56.1%) and 76 (43.9%) participants were in the non-anxiety (HADS-A≤7) and anxiety groups, respectively. Concerning the HADS-D, 53 (30.6%) and 120 (69.4%) participants were in the non-depression (HADS-D≤7) and depression groups, respectively. Only 47 (27.2% of the total) caregivers had neither anxiety nor depression (both HADS-A and HADS-D≤7). Of the anxiety group's participants, 92.1% also had depression (Table 2).

Table 1.   Comparison between 173 patients' and 173 caregivers' sociodemographic characteristics and the Hospital Anxiety and Depression Scale

		ALL	Non-Anxiety group (HADS-A≤7)	Anxiety group (HADS-A≥8)	p-Value	Non-Depression group (HADS-D≤7)	Depression group (HADS-D≥8)	p-Value
Area		Depopulated area : 38	23	15	0.53	12	26	0.89
		others : 135	74	61		41	94	
Caregiver	Age : mean ± SD	66.2 ± 10.7	66.7 ± 10.7	65.6 ± 10.8	0.56	68.0 ± 9.8	65.4 ± 11.0	0.09
	Sex : n	Male : 48	30	18	0.29	15	33	0.91
		Female : 125	67	58		38	87	
	Job : n	Employed : 61	31	30	0.31	18	43	0.81
		Unemployed : 112	66	46		35	77	
	Relationship with Patients : n	Spouse : 53	29	24	0.81	15	38	0.66
		Other : 120	68	52		38	82	
Patient	Age : mean ± SD	81.8 ± 15.3	81.5 ± 17.0	82.1 ± 13.1	0.59	84.0 ± 13.0	80.8 ± 16.2	0.19
	Sex : n	Male : 67	35	32	0.42	19	48	0.61
		Female : 106	62	44		34	72	
	Number of Diseases : n	0/1 : 68	42	26	0.045	20	48	0.81
		2 : 39	24	15		12	27	
		3 : 39	21	17		14	25	
		4≤ : 27	10	17		7	20	
	Home Doctor : n	Clinic : 131	74	57	0.84	42	89	0.47
		Hospital : 42	23	19		11	31	
	Level of Care Required in LTCI : n	Unfilled : 8	4	4	0.43	2	6	0.12
		Unapplied : 11	8	3		5	6	
		RS 1 : 4	3	1		0	4	
		RS 2 : 8	4	4		2	6	
		RLTC 1 : 9	8	1		8	1	
		RLTC 2 : 24	12	12		7	17	
		RLTC 3 : 35	18	17		10	25	
		RLTC 4 : 32	15	17		8	24	
		RLTC 5 : 42	25	17		11	31	

Note : The *p*-values were calculated using the Mann–Whitney U test for the caregivers' and patients' ages, number of diseases, and level of care ; the chi-squared test was employed for the others.
Abbreviations : HADS-A : Hospital Anxiety and Depression Scale-Anxiety ; HADS-D : Hospital Anxiety and Depression Scale-Depression ; LTCI : Long-Term Care Insurance ; RLTC : Requiring Long-Term Care ; RS : Requiring Support ; SD : Standard Deviation.

Table 2.   Results of cross-tabulation of anxiety/depression subscales of 173 caregivers in Japan (2019)

	Non-Depression group : n(%) (HADS-D≤7)	Depression group : n(%) (HADS-A 8)	Total : n (%)
Non- Anxiety group : n(%) (HADS-A≤7)	47 (27.2%)	50 (28.9%)	97 (56.1%)
Anxiety group : n(%) (HADS-A≥8)	6 (3.5%)	70 (40.5%)	76 (43.9%)
Total : n n(%)	53 (30.6%)	120 (69.4%)	173 (100%)

Abbreviations : HADS-A : Hospital Anxiety and Depression Scale-Anxiety ; HADS-D : Hospital Anxiety and Depression Scale-Depression.

Univariate analysis

The sociodemographic characteristics of the patients and caregivers were examined for associations with anxiety and depression in the univariate analysis (chi-square test or the Mann–Whitney U test). The results showed that the number of illnesses in patients was significantly associated with anxiety ; however, no items were related to depression (Table 1). The patients' disease types are shown in Figure 1. The relation between the presence of diseases and anxiety/depression was analysed using the chi-square test for each disease ; however, no significant differences were found for any of the diseases in either subscale.

Regarding caregivers' perceptions, five items were associated with anxiety : stable family finances, stable caregiver health, stable patient condition, sufficient care services, and sufficient explanation and knowledge about home care. Eight items were associated with depression : stable family finances, stable caregiver health, stable patient condition, confidence in emergency doctor visits, confidence in emergency nurse visits, sufficient care services, availability of reliable advisors, and sufficient explanation and knowledge about home care. No association was observed between HADS and the confirmation of a hospital to be admitted to in case of emergency, or availability of other alternative caregivers (Table 3).
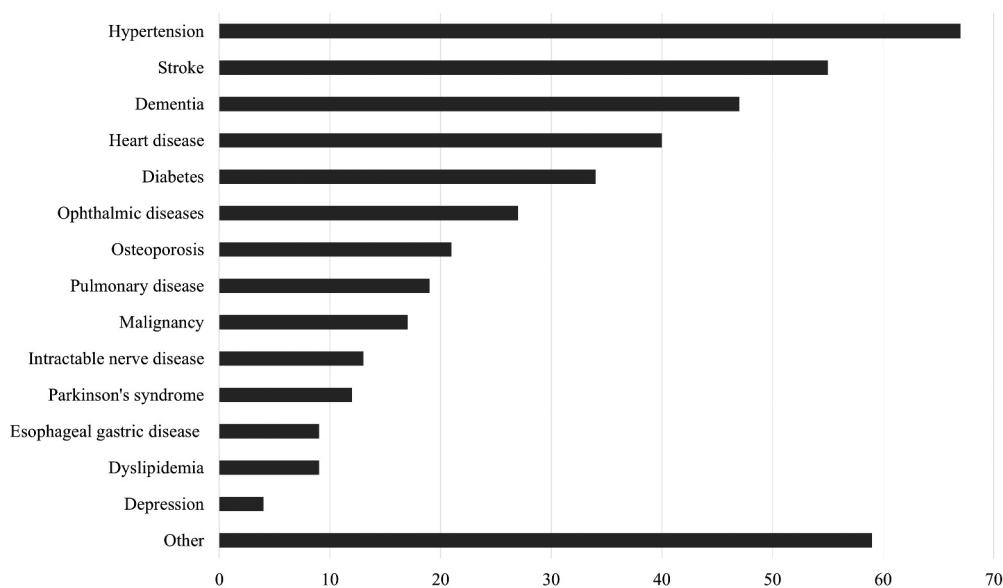

Figure 1．Type of diseases of 173 Japanese patients receiving home visits

Table 3.　Univariate analysis between 173 Japanese caregivers' perceptions of the home health care situation and anxiety/depression

Questionnaire items	Non-Anxiety group (HADS-A≤7)	vs	Anxiety group (HADS-A≥8)	p-Value	Non-Depression group (HADS-D≤7)	vs	Depression group (HADS-D≥8)	p-Value
Stable family finances	3.7 ± 1.0	vs	2.8 ± 1.1	<0.001	3.9 ± 0.9	vs	3.1 ± 1.1	<0.001
Stable caregiver health	3.7 ± 0.8	vs	2.8 ± 1.1	<0.001	3.8 ± 0.8	vs	3.1 ± 1.1	<0.001
Stable patient condition	3.9 ± 0.7	vs	3.4 ± 1.0	<0.001	4.0 ± 0.8	vs	3.5 ± 0.9	<0.001
Confidence in emergency doctor visits	3.9 ± 1.1	vs	3.7 ± 1.1	0.144	4.1 ± 0.9	vs	3.7 ± 1.1	0.012
Confidence in emergency nurse visits	3.9 ± 1.0	vs	3.6 ± 1.1	0.082	4.0 ± 1.1	vs	3.6 ± 1.1	0.041
Confirmation of a hospital to be admitted in case of emergency	3.4 ± 1.1	vs	3.6 ± 1.1	0.154	3.4 ± 1.2	vs	3.6 ± 1.1	0.404
Sufficient care services	4.0 ± 0.8	vs	3.6 ± 0.9	0.002	4.1 ± 0.8	vs	3.7 ± 0.9	0.019
Availability of reliable advisors	3.9 ± 1.0	vs	3.7 ± 0.9	0.094	4.2 ± 0.8	vs	3.7 ± 1.0	<0.001
Availability of other alternative caregivers	3.4 ± 1.2	vs	3.3 ± 1.4	0.627	3.6 ± 1.3	vs	3.3 ± 1.3	0.089
Sufficient explanation and knowledge about home care	3.8 ± 0.8	vs	3.4 ± 1.0	0.004	3.9 ± 0.9	vs	3.5 ± 0.9	0.012

Note : The table includes the mean ± standard deviation of each group and *p*-values were calculated using the Mann–Whitney U test.
Abbreviations : HADS-A : Hospital Anxiety and Depression Scale-Anxiety ; HADS-D : Hospital Anxiety and Depression Scale-Depression.

Multiple logistic regression analysis

We performed a multiple logistic regression analysis to adjust for potential confounders. The outcome variable was the presence of anxiety or depression. The explanatory variables for anxiety were two sociodemographic factors (sex of caregivers and number of patients' diseases) and seven caregiver perceptions (stable family finances, stable caregiver health, stable patient condition, confidence in emergency nurse visits, sufficient care services, availability of reliable advisors, and sufficient explanation and knowledge about home care). The explanatory variables for depression were two sociodemographic factors (age of caregivers and sex of caregivers) and nine caregiver perceptions (stable family finances, stable caregiver health, stable patient condition, confidence in emergency doctor visits, confidence in emergency nurse visits, sufficient care services, availability of reliable advisors, availability of other alternative caregivers, and sufficient explanation and knowledge about home care). The results are listed in Table 4. Effect sizes were calculated for the items that demonstrated significant associations.

We found that two items were associated with anxiety : stable family finances (effect size 0.38, moderate effect) and stable health of caregivers (effect size 0.42, moderate effect). Three items were associated with depression : stable family finances (effect size 0.33, moderate effect), stable health of caregivers (effect size 0.38, moderate effect), and stable condition of patients (effect size 0.26, slight effect).

DISCUSSION

In this study, 43.9% and 69.4% of caregivers providing home visits were found to have anxiety and depression, respectively. Similar to caregivers of cancer patients and stroke patients, the results of this study suggest that caregivers providing home visits have a high prevalence of and are at risk for both anxiety and depression. Past studies have found differences in the prevalence of anxiety and depression. In this study, depression was more prevalent than anxiety, which may reflect its prevalence in the general population. According to the 2017 Japanese Patient Survey (22), the number of patients with mood disorders (including depression) was higher than that of patients with neurotic disorders such as anxiety. This is especially true among older adults. Because the participants in this study were older caregivers averaging over 66 years of age, this may explain why the prevalence of depression was higher than that of anxiety.

In this study, the factors associated with anxiety were : 1) stable family finances and 2) stable caregiver health, while the factors associated with depression were : 1) stable family finances, 2) stable caregiver health, and 3) stable patient condition. The association between these factors and anxiety/depression has been reported in previous studies. A study in France reported that caregivers' financial difficulties were negatively correlated with depression (11) ; however, many studies have shown a positive relationship between the two variables (10, 23, 24). Long-term medical care requires money, and when caregivers are placed under an additional financial burden, it may result in increased depression owing to psychological stress (8). Good health is important for caregivers, and this study suggests that the same is true in the home health care setting. Some studies suggest that poor health reduces physical and mental resources and affects susceptibility to depression and anxiety (23, 25), while others suggest that depression contributes to poor physical functioning (26). The association of depression and anxiety with patients' poor health has been reported in several studies (24, 27). Studies on caregivers of terminal cancer patients have shown that, as the patient's illness worsens, the emotional burden of caregiving increases and depression worsens. However, providing education about the patient's deterioration and death can improve anxiety, depression, and sleep quality (28). Thus, support for caregivers is especially important if the patient's condition is unstable.

The results of this study offer the following suggestions for home health care providers to reduce caregiver anxiety and depression. First, it is important to try to lower medical and long-term care costs to ensure stable family finances. Reducing medical costs by eliminating unnecessary tests and treatments may reduce the cost burden on patients and lower anxiety and depression among caregivers. Additionally, active inter-professional work with medical social workers or government agencies may be effective in helping patients and caregivers access public social support services that can lower various financial burdens. Second, paying attention to the caregiver's health and providing comprehensive care will improve the caregiver's physical and mental health, which will in turn be beneficial for the patient as well.

Many studies have also cited age as a factor related to anxiety and depression ; however, no such association was found in this study. The reason for this remains unclear. Moreover, no significant sex difference was observed ; however, this may be a characteristic of the Japanese population. Although several previous studies have reported that female caregivers have higher anxiety and depression (8, 10, 12, 24, 26), a survey of Japanese caregivers found no differences based on sex (29, 30). Although the incidence of depression is generally greater in females (31), no difference was observed between male and female caregivers in Japan, suggesting that Japanese men may be relatively more sensitive to the burdens of caregiving and thus be at an increased risk of experiencing higher anxiety and depression (30).

Regarding the association between age and anxiety/depression, previous studies reported conflicting results. Multiple studies of cancer patients' caregivers have consistently indicated negative associations (10, 11, 23, 32), while those involving

Table 4. Multiple logistic regression analysis of factors associated with anxiety and depression among 173 caregivers in home visits in Japan

	Anxiety				Depression			
	OR	95% CI	p-Value	Effect size	OR	95% CI	p-Value	Effect size
Stable family finances	0.57	0.41 - 0.81	0.002	0.38	0.57	0.37 - 0.88	0.011	0.33
Stable caregiver health	0.47	0.32 - 0.67	0.001	0.42	0.44	0.26 - 0.73	0.001	0.38
Stable patient condition					0.53	0.29 - 0.95	0.035	0.26
Hosmer–Lemeshow test	$\chi^2 = 4.25 ; df = 3 ; P = 0.24$				$\chi^2 = 5.97 ; df = 6 ; P = 0.43$			
	Predictive accuracy 76.8%				Predictive accuracy 75.6%			

Abbreviations : 95% CI : 95% Confidence Interval ; OR : Odds Ratio.

chronically ill patients' caregivers have found positive associations (26). This discrepancy may be due to differences in patients' illness characteristics. Specifically, cancer patients' caregivers are exposed to the stress of possibly losing the patient owing to the serious nature of the illness ; nevertheless, younger caregivers are more depressed than older ones because attachment anxiety is stronger in younger generations (32). Alternatively, chronically ill patients' caregivers are reported to have increased depression due to the stress of declining physical functions and an increasing care burden as they age (26). In our study, patients receiving home visits had a wide variety of diseases, including cancer and chronic illnesses ; the variety of diseases may have confounded the results, resulting in no significant difference.

Furthermore, it has been shown that social support is related to lower depression (7, 27, 29, 33), and the role of medical institutions as part of the support system is significant. This study, although limited to univariate analysis, suggested that the on-call system of doctors or nurses in emergencies might reduce depression among caregivers. This is an important result regarding the kind of services that should be provided by medical institutions. Further research is required in this area.

Our study has several limitations. First, it was a cross-sectional study ; thus, the causal relationship between the related items and anxiety/depression is unclear. Second, because the questionnaires were returned by the caregivers themselves, data were only collected from cooperative participants. It is possible that those with high anxiety or depression could not or may not have completed the questionnaire. Third, the number of years of care may be an important factor, but we did not examine it in this survey. We will look into this in a future survey. Furthermore, this study only included caregivers from one city in Japan. Therefore, the results cannot be generalised to all caregivers of patients at home, and the data should be interpreted with caution. Furthermore, because we did not investigate the caregivers' detailed medical history, we cannot ignore the likelihood that the caregivers' mental illness and treatment may have affected the present results.

Despite these limitations, this is the first study to investigate the factors associated with anxiety and depression among caregivers of patients receiving home visits from a number of medical institutions, and it provides important findings for home visit medical care.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

ACKNOWLEDGEMENTS

REFERENCES

1. Annual Report on the Aging Society 2018-Cabinet Office, Government of Japan [Internet]. [cited 2021 Apr 25]. Available from : https://www8.cao.go.jp/kourei/whitepaper/w-2018/html/zenbun/index.html

2. Akiyama A, Hanabusa H, Mikami H : Characteristics of home care supporting clinics providing home care for frail elderly persons living alone in Japan. Arch Gerontol Geriatr 52 : e85-e88, 2011

3. Tamiya N, Noguchi H, Nishi A, Reich MR, Ikegami N, Hashimoto H, Shibuya K, Kawachi I, Campbell JC : Population ageing and wellbeing : Lessons from Japan's long-term care insurance policy. Lancet 378 : 1183-1192, 2011

4. Ministry of Health Labor and Welfare, Ministry of Health Labour and Welfare. The 9th Working Group on Home Health Care and Medical and Nursing Care Cooperation Document 1 : Consideration for the Mid-Term Review of Home Health Care [Internet]. 2019 [cited 2021 Apr 25]. Available from : https://www.mhlw.go.jp/content/10802000/000545064.pdf

5. Ministry of Health Labour and Welfare. 2017 Survey of Receiving Behavior (Japan) [Internet]. 2019 [cited 2021 Apr 25]. Available from : https://www.mhlw.go.jp/toukei/saikin/hw/jyuryo/17/dl/kakutei-gaikyo-all.pdf

6. Hatta H, Higashi A, Yashiro H, Ozasa K, Hayashi K, Kiyota K, Inokuchi H, Ikeda J, Fujita K, Watanabe Y, Kawai K : A validation of the Hospital Anxiety and Depression Scale. Jpn J Psychosom Med 38 : 309-315, 1998

7. Geng HM, Chuang DM, Yang F, Yang Y, Liu WM, Liu LH, Tian HM : Prevalence and determinants of depression in caregivers of cancer patients : A systematic review and meta-analysis. Medicine 97 : e11863, 2018

8. Hu P, Yang Q, Kong L, Hu L, Zeng L : Relationship between the anxiety/depression and care burden of the major caregiver of stroke patients. Medicine 97 : e12638, 2018

9. Gerogianni G, Polikandrioti M, Babatsikou F, Zyga S, Alikari V, Vasilopoulos G, Gerogianni S, Grapsa E : Anxiety–depression of dialysis patients and their caregivers. Medicina 55 : 168, 2019

10. Park B, Kim SY, Shin JY, Sanson-Fisher RW, Shin DW, Cho J, Park JH : Suicidal ideation and suicide attempts in anxious or depressed family caregivers of patients with cancer : A nationwide survey in Korea. PLoS One 8 : e60230, 2013

11. Leroy T, Fournier E, Penel N, Christophe V : Crossed views of burden and emotional distress of cancer patients and family caregivers during palliative care. Psychooncology 25 : 1278-1285, 2015

12. Watson B, Tatangelo G, McCabe M : Depression and anxiety among partner and offspring carers of people with dementia : A systematic review. Gerontologist 59 : e597-e610, 2019

13. Zigmond AS, Snaith RP : The Hospital Anxiety and Depression Scale. Acta Psychiatr Scand 67 : 361-370, 1983

14. Sánchez-López MP, Limiñana-Gras RM, Colodro-Conde L, Cuéllar-Flores I : Use of the Hospital Anxiety and Depression Scale in Spanish caregivers. Scand J Caring Sci 29 : 751-759, 2015

15. Toshinori K : Hospital Anxiety and Depression Scale. Seisinka Sindangaku 4 : 371-372, 1993

16. Razavi D, Delvaux N, Farvacques C, Robaye E : Screening for adjustment disorders and major depressive disorders in cancer in-patients. Br J Psychiatry 156 : 79-83, 1990

17. Moorey S, Greer S, Watson M, Gorman C, Rowden L, Tunmore R, Robertson B, Bliss J : The factor structure and factor stability of the hospital anxiety and depression scale in patients with cancer. Br J Psychiatry 158 : 255-259, 1991

18. Dunbar M, Ford G, Hunt K, Der G : A confirmatory factor analysis of the Hospital Anxiety and Depression Scale : Comparing empirically and theoretically derived structures. Br J Clin Psychol 39 : 79-94, 2000

19. Caci H, Baylé FJ, Mattei V, Dossios C, Robert P, Boyer P : How does the Hospital and Anxiety and Depression Scale measure anxiety and depression in healthy subjects? Psychiatry Res 118 : 89-99, 2003

20. Mizumoto A, Takeuchi O : Basics and considerations for reporting effect sizes in research papers. Studies in English Language Teaching 31 : 57-66, 2008

21. Faul F, Erdfelder E, Lang AG, Buchner A : G*Power 3 : A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behav Res Methods 39 : 175-191, 2007

22. Patient Survey 2017 [In Japanese] e-Stat Portal site of official Statistics of Japan [Internet]. 2017 [cited 2021 Apr 25]. Available from : https://www.e-stat.go.jp/dbview?sid=0003293660

23. Tang ST, Li CY, Liao YC : Factors associated with depressive distress among Taiwanese family caregivers of cancer patients at the end of life. Palliat Med 21 : 249-257, 2007

24. Rhee YS, Yun YH, Park S, Shin DO, Lee KM, Yoo HJ, Kim JH, Kim SO, Lee R, Lee YO, Kim NS : Depression in family caregivers of cancer patients : The feeling of burden as a predictor of depression. J Clin Oncol 26 : 5890-5895, 2008

25. Doorenbos AZ, Given B, Given CW, Wyatt G, Gift A, Rahbar M, Jeon S : The influence of end-of-life cancer care on caregivers. Res Nurs Health 30 : 270-281, 2007

26. Tsai PF, Jirovec MM : The relationships between depression and other outcomes of chronic illness caregiving. BMC Nurs 4 : 3, 2005

27. Tang ST, Chang WC, Chen JS, Wang HM, Shen WC, Li CY, Liao YC : Course and predictors of depressive symptoms among family caregivers of terminally ill cancer patients until their death. Psychooncology 22 : 1312-1318, 2013

28. Xu M, Zhou W, Yang L, Liu G, Chen L : Effect of palliative care on the anxiety, depression and sleep quality in primary caregivers of elderly patients with terminal cancer. Am J Transl Res 13 : 3738-3744, 2021

29. Matsumura K, Okada S, Yamaguchi A, Yoneha I : Structural analysis of factors that affect depression in primary caregivers. Japanese Journal of Geriatric Psychiatry 24 : 1295-1307, 2013

30. Katsura S, Hgagihara J : Factor and sex differences affecting depression in long-term elderly caregivers of elderly individuals. Journal of North Japan Academy of Nursing Science 21 : 13-23, 2018

31. Malhi GS, Mann JJ : Depression. Lancet 392 : 2299-2312, 2018

32. Kim Y, Kashy DA, Evans TV : Age and attachment style impact stress and depressive symptoms among caregivers : A prospective investigation. J Cancer Surviv 1 : 35-43, 2007

33. Lambert SD, Hulbert-Williams N, Belzile E, Ciampi A, Girgis A : Beyond using composite measures to analyze the effect of unmet supportive care needs on caregivers' anxiety and depression. Psychooncology 27 : 1572-1579, 2018