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Caregiver burden and depression among caregivers of patients with chronic disease

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ABSTRACT

Introduction: Caring for people with chronic diseases is physically and emotionally demanding. It can also have adverse effects on the caregiver, such as depression. Caregiver burden describes the psychological and financial strains of providing care. Depression in caregivers manifests as concern, indecision, and an inability to feel the future. Chronic disease is a condition that takes a long time to treat and may progressively worsen over time. This study aimed to identify the level of caregiver burden and depression and the correlation between burden and depression among caregivers of patients with chronic diseases.

Methods: A cross-sectional study using a self-administered questionnaire containing the Caregiver Burden Inventory and Beck Depression Inventory was used to measure caregiver burden and depression. The study involved 217 caregivers of patients with chronic diseases who were selected through a purposive sampling in a teaching hospital in Selangor, Malaysia.

Results: The findings showed that the majority of caregivers experienced a mild burden (n = 168, 77.4%), a moderate burden (n = 43, 19.8%), and severe burden (n = 6, 2.8%). Following mild depression (n = 17, 7.8%), moderate depression (n = 15, 6.9%), and severe depression (n = 4, 1.8%), some caregivers experienced minimal depression (n = 181, 83.4%). According to Pearson's analysis, the correlation between caregiver burden and depression was statistically significant (p<0.000) and with a positive correlation (r = 0.408).

Conclusions: In this study, caregivers experienced burdens and depression due to providing care. Future studies should incorporate support and resources for caregivers, including respite care and counseling that can promote overall well-being.

Keywords: caregivers, caregiver burden, chronic disease, depression

Introduction

In Malaysia, around 2.3 million people will experience depression at some point that remains underdiagnosed (Collaborators, 2018). In 2015, the latest National Health Morbidity Survey (NHMS) statistic found a 29.2% prevalence of mental health problems among Malaysians aged 16 and older (Institute for Public Health, 2015). Whereas in 2011, 1.7% reported generalized anxiety disorders, 1.8% reported current depression, 1.7% reported suicidal ideation, and 1.1% reported having attempted suicide in the past (Institute for Public Health (IPH), 2012). Such data show a marked increase in mental health issues in Malaysia, thereby exposing a threat to the Malaysian mental health system. As we concerned about the increasing level of depression among Malaysians, the researchers would like to determine the impact of caregiver burden on mental health.

Caregiver burden is the perception of hardship in physiological and psychological well-being, socialization, and economic status resulting from caring for people that they look after (Kellner *et al.*, 2017). Meanwhile, caregiver depression, which is a failure to feel the future, anxiety, and indecision can affect both formal and informal caregivers as a result of caregiving (Strang *et al.*, 2019). Caregivers will directly or indirectly experience significant burdens and depression due to the patient's daily activities, appointments, and treatments based on the patient's diagnosis. As caregivers often take on burdens they are not expected to confront, they become unprepared to handle them. This responsibility or duty becomes more difficult when they have no professional training from the beginning and are typically less experienced in the care of specific illnesses (Olagundoye and Alugo, 2018). Therefore, this situation makes the caregiver think that caregiving is a complex burden and that they must meet the patient's needs until the end of their life.

Chronic diseases are ailments that last a year or longer, necessitating continuing medical care or impeding everyday activities (National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), 2019a). In this research, the level of caregiver burden and depression among patients with diabetes mellitus, cardiovascular disease, chronic obstructive pulmonary disease, arthritis, hypertension, stroke, renal disorder, cancer, asthma, eyes, and ear disease will be identified. Chronic disease patients, especially those with heart failure, suffer functional limitations and experience polypharmacy, which causes caregiving to become more burdensome. Ninety percent of the $3.5 trillion in yearly healthcare spending in the United States is used to treat people with chronic illnesses and mental problems (National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), 2019b). Chronic diseases can affect health deterioration and burden financial expenses. People with chronic conditions are spending more on healthcare, but these expenses can be reduced by preventing chronic diseases or managing symptoms. Changes in lifestyle and diet can avoid chronic diseases, thus decreasing the need for costly treatments.

Providing care among patients with chronic diseases is long-term care, which is why caregivers need to adapt to physical and mental pressure. Caregivers are required to provide high-quality care to patients with chronic illnesses and functional impairments. However, the caregiver usually gives insufficient personal care to the thought that there was insufficient time to form such

arrangements or that the guardian was too exhausted to renew the appointment because the caregiver was sick of medical visits. Both caregivers and patients' health mostly impact the caregiver burden. The functional status of the patient, the caregiver's depressive symptoms, and social support were revealed to be the main predictors of the caregiver burden in research involving stroke patient carers (Othman *et al.*, 2014).

A cross-sectional study revealed that about one in four caregivers of patients who received oncologic treatment in Kuala Lumpur Hospital were stressed (Chai *et al.*, 2018). The caregivers have to conduct various caregiving duties, such as handling the patient's symptoms of illness, coping with the side effects of treatment, attending hospital appointments, and assisting in household chores (Chai *et al.*, 2018). Another study showed that the progression of chronic disease and physical disabilities could cause stress to both patient and caregivers (Etemadifar *et al.*, 2018). Thus, it is essential to understand the main factor influencing the caregiver's burden as both the caregiver and patient's health outcomes depend on the caregiver's experience (Lum *et al.*, 2014).

Therefore, the results of this study can be utilized to holistically discuss the levels of burden and depression experienced by caregivers of patients with chronic diseases. Thus, existing, or newly created support systems should be strengthened and made easier to use by nurses and other healthcare providers to lessen caregivers' emotional stress. This research will recognize strategies that can help establish programs that minimize the burden on caregivers, increase the quality of caregivers' lives, and be an informational resource for nurses and other medical practitioners. Early detection by having the right tools to evaluate caregiver burden and depression is beneficial to caregivers and patients. However, studies which have identified the effect of caregiver burden on depression levels are scarce. Thus, this study aims to determine the level and correlation between burden and depression among those who care for patients with chronic diseases.

Materials and Methods

Design and Settings

A cross-sectional study using a self-administered questionnaire was employed. A caregiver of patients with chronic diseases who met the inclusion and exclusion criteria at a teaching hospital, Universiti Teknologi MARA Medical Specialist Centre (UiTMMSC), Selangor, Malaysia. UiTMMSC provides primary and secondary prevention treatments, assessments,

investigations, diagnosis, and information for patients with or who have a risk factor of chronic disease, thus providing information on their caregivers.

Samples

A purposive sampling was used in this study, which was done among 217 caregivers of patients with chronic diseases who met the inclusion and exclusion criteria at a teaching hospital in Selangor, Malaysia. The inclusion criteria included caregivers over 18 years old who could read, speak, or understand Malay and English. The respondents should be caregivers of patients with communicable and non-communicable diseases, and care for patients most of the time. Meanwhile, caregivers who have a psychiatric history or physical deformities are excluded.

Research Instruments

This study used a self-administered questionnaire consisted of closed-ended questions divided into three sections: Sections A, B, and C. The demographic data for Section A consisted of the caregiver's details, such as age, gender, marital status, relationship with the patient, employment status, academic background, level of revenue, and total hours of daily care.

Thereby, to identify the level of caregiver burden in Section B, the caregiver burden inventory (CBI) developed by Novak and Guest (1989) and translated into the Malay version by Mulud, McCarthy and Mohamad (2018) was used. This questionnaire is made up of 24 items and has a 4-point Likert scale with a total score of 96, ranging between 0 and 32 (mild burden), 33 to 64 (moderate burden), and 65 to 96 (severe burden). of the higher the scores indicates an intense level of the burden faced by the caregiver (Zhu and Jiang, 2018).

To evaluate the symptoms and severity of depression in section C, the 20-item self-report multiple-choice inventory of the Beck depression inventory (BDI) in the Malay edition by Mukhtar and Oei (2011) was used. Meanwhile, the English BDI edition was adapted by Beck et al. (Beck, 1961). Every single item was scored on a four-point Likert scale ranging from without symptom (0) to existing symptoms ranged 1 to 3, with an overall score reached between 0 and 63. Minimal depression score was 0-13, mild depression (14-19), moderate depression (20-28), and severe depression (29-63) (Beck, Steer and Brown, 1996). The higher the score reflected more severe depressive symptoms among respondents. The questionnaire was proven with a high level of reliability with Cronbach's alpha coefficients of 0.86 and 0.87 for the BDI and CBI, respectively (Lahlou-Laforêt et al., 2015; Pucciarelli et al., 2018)

Data Collection

The respondents' eligibility in accordance with the inclusion and exclusion criteria was verified before the data were gathered. The aims of the study were explained to the respondents. The printed questionnaires (BDI and CBI) had to be completed by the respondents. Researchers were available throughout the session to guide the respondents who needed clarification about the study. The time duration for each of the respondents to answer the questionnaire was approximately 15 – 20 minutes. The completed surveys were returned. The data were collected for three months from January to March 2022.

Ethical Consideration

Ethical approval to conduct the study was obtained from Universiti Teknologi MARA (UiTM) Research Ethics Committee in UiTM Shah Alam with referral number REC/336/19 and the permission from UiTMMSC with referral number 500-FPR (PT.14/5). The data were collected after obtaining the research permit. The respondents' eligibility in accordance with the inclusion and exclusion criteria was verified before the data were gathered.

Data analysis

Data were analyzed using Statistical Programme Package for Social Sciences (SPSS) version 25.0. The statistical analyses included descriptive statistics to identify the level of burden and level of depression among caregivers of patients with chronic illness. The researchers used Pearson's correlation coefficient to determine the correlation between the level of burden and depression among caregivers and parametric test of one-way ANOVA to determine the relationship between the level of burden and demographic data among caregivers. Data were analyzed using Statistical Programme Package for Social Sciences (SPSS) version 25.0. The statistical analyses included descriptive statistics to identify the level of burden and level of depression among caregivers of patients with chronic illness. The researchers used Pearson's correlation coefficient to determine the correlation between the level of burden and depression among caregivers and parametric test of one-way ANOVA to determine the relationship between the level of burden and demographic data among caregivers.

Table 1. Demographic Data among Caregivers of Patients with Chronic Disease

Variables	Frequency (n)	Percentage (%)
Age		
18 to 24	31	14.3
25 to 54	143	65.9
55 to 64	28	12.9
65 and above	15	6.9
Gender		
Man	75	34.6
Woman	142	65.4
Caregiver's marital status		
Single	61	28.1
Married	151	69.6
Divorced	3	1.4
Widow	2	0.9
Caregiver's relationship with a patient		
Spouse	68	31.3
Other family members	124	57.1
Paid caregiver	25	11.5
Caregiver's employment status		
Employed	139	64.1
Retired	35	16.1
Unemployed	43	19.8
Caregiver's educational background		
No education	1	0.5
Primary school	5	2.3
Secondary school	58	26.7
College/University	153	70.5
Caregiver's income per month		
≤ USD200	52	24
USD200 – USD600	72	33.2
USD600 – USD1000	60	27.6
≥ USD1000	33	15.2
Total hours of caregiving per day		
3 – 13 hours	123	56.7
12 - 24 hours	94	43.3

Results

Demographic Data

The demographic characteristics included the caregiver's age, gender, marital status, relationship with the patient, employment status, educational background, income per month, and total hours of caregiving per day, as shown in Table 1. The mean (SD) age of caregivers was 40.73 (14.50). More than half of the caregivers were women (65.4%) and married (69.6%). Caregiving roles are dominated by the patient's other family members (57.1%), employed caregivers (64.1%), and with education from college or university level (70.5%). Most caregivers generated monthly income within USD200 – USD600 (33.2%) and carried out caregiving tasks between 3 to 13 hours per day (56.7%).

Level of Caregiver Burden

This study found a range of scores for the level of burden among caregivers, with an average overall score representing a mild burden of 168 (77.4%). Besides that, 6 out of 217 total caregivers experience a severe burden of 2.8%, while for moderate burden, this accounted for 43 (19.8%) of caregivers. The mean total caregiver burden score in this study was = 21.92 (SD=17.21).

Table 2. Correlation between the Level of Burden and Depression among Caregivers of Patients with Chronic Disease

Variables	Level of Depression	
	Correlation Coefficient	p-level
Level of Burden	0.408**	0.000

Bold indicates a relationship significant at p<0.05.
**Correlation is significant at the 0.01 level (2-tailed)

Level of Caregiver Depression

The BDI questionnaire inquired about the caregiver's level of depression. The descriptive analysis shows 83.4% or 181 out of 217 caregivers of patients with chronic disease experienced minimal depression, followed by mild depression, which is 7.8%, equivalent to 17 caregivers. Fifteen caregivers, representing 6.9%, encountered moderate depression, and only four (1.8%) caregivers showed symptoms of severe depression.

Correlation between the Level of Burden and Depression

Table 2 illustrates that the correlation between the level of burden and depression among caregivers of chronic disease patients was calculated using Pearson's correlation coefficient. Results indicated that the two variables were significant (p=.000) and positively correlated (r=0.408).

Relationship between the Level of Burden and Demographic Data

Based on the one-way ANOVA test, the relationship between the level of caregiver burden with age, gender, and employment status is not significant (p>0.05), as shown in Table 3. Kolmogorov-Smirnov and Shapiro-Wilk Normality tests presented a significance value <0.001, meaning the data were not normally distributed. Non-parametric Kruskal Wallis test was used to measure the relationship between the level of caregiver burden with marital status, income per month, educational background, and total hours of caregiving per day, with p-value 0.643, 0.192, 0.529, and 0.194, respectively. The test result for the relationship between the caregiver burden level and the patient's relationship showed a statistically significant difference with p=0.000. The Kruskal Wallis test also found the mean rank of paid caregiver (155.94) was higher compared to the spouse (114.34) and other family members (96.61). Post hoc test (Dunnett T3 procedure) was tested. The result suggested that the relationship with the patient was significantly different between the caregiver's relationships "spouse and other family members," "spouse and paid caregiver," and "other

Table 3. Relationship between the Level of Burden and Demographic Data among Caregivers of Patients with Chronic Disease

Variables	n	Mean (SD)/ Median (IQR)	F-stats (pdf)/ H-stats (pdf)	p-value
Age			0.218 (3;213)	0.884
18-24	31	1.23 (0.425)		
25-54	143	1.27 (0.533)		
55-64	28	1.21 (0.418)		
65 and above	15	1.20 (0.414)		
Gender			0.750 (1;215)	0.387
Man	75	1.21 (0.444)		
Woman	142	1.27 (0.521)		
Marital status			1.673 (3)	0.643*
Single	61	1.00 (0)		
Married	151	1.00 (0)		
Divorced	3	1.00 (0)		
Widow	2	1.00 (0)		
Relationship with patient			36.530 (2)	0.000*
Spouse	68	1.00 (1)		
Other family members	124	1.00 (0)		
Paid caregiver	25	2.00 (1)		
Employment status			0.112 (2;214)	0.894
Employed	139	1.25 (0.512)		
Retired	35	1.29 (0.519)		
Unemployed	43	1.23 (0.427)		
Educational background			2.215 (3)	0.529*
No education	1	a		
Primary school	5	1.00 (0)		
Secondary school	58	1.00 (0)		
College/University	153	1.00 (0)		
Income per month			4.743 (3)	0.192*
≤ USD200	52	1.00 (0)		
USD200-USD600	72	1.00 (0)		
USD600-USD1000	60	1.00 (1)		
≥ USD1000	33	1.00 (0)		
Total hours of caregiving per day			1.686 (1)	0.194*
3 – 13 hours	123	1.00 (0)		
12 - 24 hours	94	1.00 (1)		

Bold indicates a relationship significant at p<0.05.
a. Interval Burden is constant when the caregiver's educational background = No education. It has been omitted.
*Kruskal Wallis test used with values expressed in terms of medians and IQR.
Pairwise, posthoc Kruskal Wallis expressed the caregiver's relationship with the patient "spouse and other family members," "spouse and paid caregiver," and "other family members and paid caregiver" significant difference at p<0.05.

family members and paid caregiver," with p-value 0.034, 0.007, and 0.000, respectively.

Relationship between the Level of Depression and Demographic Data

Table 4 represents the caregiver's demographic data analyzed by using the Fisher's exact test to determine the relationship between the level of caregiver depression with age, gender, marital status, association with a patient, employment status, educational background, income per month, and total hours of caregiving per day. From the result obtained, the relationship between the level of caregiver depression with age, association with a patient, employment status, educational background, income per month, and total hours of caregiving per day among caregivers of patients with chronic disease showed no statistically significant differences (p > 0.05). There is only a significant difference between the level of caregiver depression and gender and marital status, with a p-value of 0.04 and 0.01, respectively.

Discussions

The study aimed to determine the level and correlation between burden and depression among caregivers of patients with chronic disease. According to the study's findings, about three-quarters of caregivers scored mild burden. The prevalence of mild burden among caregivers implies that a substantial proportion of this caregiving population is grappling with challenges. This finding aligns with the understanding that caring for individuals with chronic diseases is inherently demanding, both physically and emotionally. The caregivers' experiences, as reflected by the mild burden scores, indicate a discernible yet manageable level of strain in fulfilling their caregiving responsibilities. This result matches those observed in earlier research that stated that 72% of caregivers reported mild burden (Gbiri, Olawale and Isaac, 2015).

The majority of caregivers in this study providing care for patients with chronic diseases had minimal depression, suggesting a noteworthy resilience or coping capacity within this caregiving population,

Table 4. Relationship between the Level of Depression and Demographic Data among Caregivers of Patients with Chronic Disease

Variables	Minimal Depression n (%)	Mild Depression n (%)	Moderate Depression n (%)	Severe Depression n (%)	Value	Exact Sig. (2-sided)
Age					10.68	0.19
18 to 24	23(74.2)	3(9.7)	2(6.5)	3(9.7)		
25 to 54	117(81.8)	13(9.1)	12(8.4)	1(0.7)		
55 to 64	26(92.9)	1(3.6)	1(3.6)	0(0)		
65 and above	15(100)	0(0)	0(0)	0(0)		
Gender					7.98	0.04
Man	68(90.7)	6(8)	1(1.3)	0(0)		
Woman	113(79.6)	11(7.7)	14(9.9)	4(2.8)		
Marital status					23.16	0.01
Single	45(73.8)	8(13.1)	5(8.2)	3(4.9)		
Married	134(88.7)	7(4.6)	9(6)	1(0.7)		
Divorced	1(33.3)	1(33.3)	1(33.3)	0(0)		
Widow	1(50)	1(50)	0(0)	0(0)		
Relationship with patient					7.99	0.18
Spouse	61(89.7)	2(2.9)	5(7.4)	0(0)		
Other family members	99(79.8)	14(11.3)	7(5.6)	4(3.2)		
Paid caregiver	21(84)	1(4)	3(12)	0(0)		
Employment status					6.20	0.35
Employed	115(82.7)	14(10.1)	8(5.8)	2(1.4)		
Retired	32(91.4)	1(2.9)	2(5.7)	0(0)		
Unemployed	34(79.1)	2(4.7)	5(11.6)	2(4.7)		
Educational background					8.30	0.71
No education	1(100)	0(0)	0(0)	0(0)		
Primary school	4(80)	1(20)	0(0)	0(0)		
Secondary school	49(84.5)	4(6.9)	3(5.2)	2(3.4)		
College/University	127(83)	12(7.8)	12(7.8)	2(1.3)		
Income per month					7.14	0.60
≤ USD200	41(78.8)	4(7.7)	5(9.6)	2(3.8)		
USD200-USD600	57(79.2)	8(11.1)	5(6.9)	2(2.8)		
USD600-USD1000	54(90)	2(3.3)	4(6.7)	0(0)		
≥ USD1000	29(87.9)	3(9.1)	1(3)	0(0)		
Total hours of caregiving per day					0.96	0.84
3 – 13 hours	104(84.6)	10(8.1)	7(5.7)	2(1.6)		
12 - 24 hours	77(81.9)	7(7.4)	8(8.5)	2(2.1)		

Bold indicates a relationship significant at p<0.05.
Fisher's Exact test results expressed in value and exact significance two-sided

despite the inherent challenges associated with caring for individuals with chronic illnesses. Understanding the prevalence of minimal depression is crucial in recognizing the diverse array of responses and coping strategies employed by caregivers in the face of the demanding nature of chronic disease caregiving. Another study found that 28% of carers had mild signs of depression, with a rating of BDI-II ≥14 (Chung *et al.*, 2010). This finding contrasts with a previous study in Chengdu, China, in which the result may be due to some of the respondents caring for the dependent patients (Liang *et al.*, 2017). Hence, the level of dependence and hardship was higher compared to the sensation of the burden felt by the caregivers in the present study (Liang *et al.*, 2017). However, it is essential to interpret the prevalence of minimal depression with caution. While it indicates a positive aspect of caregivers' mental health, it does not negate the potential existence of more subtle emotional distress or the need for ongoing support. Furthermore, individual experiences of minimal depression may fluctuate over time, necessitating continuous attention to caregivers' well-being.

The current study sheds light on a significant association between the level of caregiver burden and the level of depression among individuals providing care to patients with chronic diseases. The observed connection underscores the intricate interplay between the challenges inherent in caregiving for individuals with chronic illnesses and the psychological well-being of the caregivers. The burden perceived by the caregivers is seen to be rising, and the depressive symptom is also increasing (Lin, Chen and Li, 2013). Similarly, another study also clarified that caregivers with a much greater burden score had higher depression scores (Zincir *et al.*, 2014), and caregiver burden is very probable given that caregivers may experience anxiety and depression (Denno *et al.*, 2013). As a result, the researchers conclude that a higher burden can contribute to a greater level of depression experienced by the caregiver.

In this study, more than half of the caregivers were identified as the patient's close family members. This finding holds significance as it underscores the prevalent role assumed by close family members in the caregiving

responsibilities for individuals with chronic diseases. The caregivers had to suffer from caregiver burden because of the lack of other family members to share caregiving responsibilities (Park *et al.*, 2012). However, in the Iranian culture, family members and relatives try to help the patient because they are highly committed to the patient (Vahidi *et al.*, 2016). The current study's findings are consistent with another study, which stated that the patient's other family members, such as daughters (45.8%), were the ones that spent most of their time in caregiving (Ghazali *et al.*, 2015). The prominence of close family members as caregivers in this study aligns with broader trends documented in caregiving literature, where familial bonds often play a central role in assuming caregiving responsibilities. The family unit, being a primary source of social support, tends to be a natural and accessible resource for patients requiring care, especially in the context of chronic illnesses.

This study shows there is no relationship between the level of caregiver burden with educational background. The influence of caregivers' educational background on the level of burden has been a subject of considerable interest in caregiving research. The existing literature presents varying perspectives on the association between education and caregiver burden. Notably, Vahidi et al. (2016) found a significant correlation, suggesting that low educational status was linked to higher caregiver burden. This finding corroborates an earlier study by Akgul and Ozdemir (2014), which specifically highlighted that individuals with an educational level lower than high school experienced increased burden in their caregiving roles. However, the present study diverges from these findings, revealing no significant relationship between caregiver burden and educational background, despite 70.5% of caregivers reporting education until the college or university level. This observation is consistent with the results reported by Yoon et al. (2014). One plausible explanation for the absence of a significant relationship in the present study is the hypothesis that caregivers with higher academic levels may employ more effective coping strategies when faced with the challenges inherent in caregiving. Caregivers with advanced education may possess a broader range of resources, both tangible and psychological, allowing them to navigate the complexities of caregiving more adeptly.

In the demographic analysis of this study, the findings indicate that three-quarters of women caregivers who reported experiencing minimal depression exhibited a statistically significant association between gender and depression. Women,

traditionally assuming a prominent role in caregiving responsibilities, may navigate unique challenges and exhibit distinct patterns of psychological well-being compared to their male counterparts. Another study stated that, consistently, those who were predicted to implement direct responsibility for their family and often stay at home were women (Faronbi *et al.*, 2019). Women were believed to care for their loved ones if the caregiver got sick due to their sympathetic nature and were ideally suited to deliver personal care. It emphasizes the importance of considering gender as a specific factor when addressing mental health in caregiving contexts.

The highest percentage of caregivers who confronted minimal depression were married caregivers and marriage has been linked positively to depression. Spousal caregivers had to take responsibility for their own families besides looking after the care recipients (Shakya, 2017), meaning they had a lot of obligations, which might cause depression. Nonetheless, this finding differed slightly from a study in Jordan, which stated that caregiver depression was associated with marital status. However, they declared that divorced, separated, widowed, or single caregivers have more signs of depression than married caregivers.

While providing delicate care for patients with chronic diseases, tremendous sacrifice and stress will lie with the informal caregivers, mainly if they live with their care recipient. Ninety-nine (79.8%) of other family members who delivered care had minimal depression, while four (3.2%) experienced severe depression. Other family members can be a daughter-in-law, son, or daughter (Zhang *et al.*, 2014). The Asian family is expected to have a sense of responsibility, especially in caring for their parents when they are getting older (Limpawattana *et al.*, 2013; Miyawaki, 2015).

Almost half of the caregivers in this study implemented care between 3-13 hours. There were 104 (84.6%) giving care between 3-13 hours, while 77 (81.9%) for 12-24 hours and faced minimal depression. However, a critical interpretation of these results is essential, recognizing the potential limitations and complexities associated with the relationship between caregiving hours and mental health. This outcome was similar to the studies (Malik, Gysels and Higginson, 2013; Abdul Hadi, Pasi and Yousef, 2018), where depressive symptoms were independent of the period of delivering care. In contrast, other research found that the hours of close supervision were highly significant for depression (Braich *et al.*, 2012). An extra hour required to implement the care each week can lead to greater

depressive symptoms and preparedness influences caregiver depression and depression influences caregiver mental health. (Petruzzo et al., 2019).

Furthermore this study also found that the CBI score was significantly and positively fair correlated with the BDI-II score, which was equivalent to a previous study with r=0.394 (Wang et al., 2016). As caregivers may feel sadness, worry, and anxiety due to the caregiving task that burdened them, this may indirectly cause depression in themselves. The only one related to the level of burden was the caregiver's relationship with a patient, which was consistent with previous research that stated that the patient's other family members, such as daughters (45.8%), were the ones that spent most of their time in caregiving (Ghazali et al., 2015). Moreover, the level of depression was statistically associated with both gender and marital status, which is in contrast with other studies (Lin, Chen and Li, 2013; Abdul Hadi, Pasi and Yousef, 2018). Women were believed to take care of their loved ones if they got sick due to women's sympathetic nature, and they were ideally suited to deliver personal care. Additionally, married caregivers had to take responsibility for their own families besides looking after the care recipients, meaning many obligations might cause depression (Shakya, 2017).

Controlling the burden and depression is essential as mental disorders, such as depression, are common, widespread ailments and influence over 264 million individuals worldwide (Collaborators, 2018). In line with our findings, the assessment of depression should routinely be integrated as an initial suicide risk screener as suicidal ideation was found to be most relatable in surprisingly low signs of depression (Rogers, Ringer and Joiner, 2018).

Several limitations exist in this study, one being that the researchers did not investigate the period of chronic disease that the patients experienced. Moreover, the caregivers were recruited from only one region of hospital service. As a result, the findings may not be generalized.

Conclusion

In conclusion, the present study illuminates the substantial challenges faced by caregivers providing support to patients with chronic diseases, revealing a notable prevalence of both caregiver burden and depression within this caregiving population. The majority of caregivers are experiencing a mild burden and minimal depression. The level of caregiver burden of patients with chronic diseases was substantially connected with the level of depression. The results suggest that early detection of caregiver burden could serve as a critical indicator for potential depressive symptoms. Integrating such support systems into healthcare practices may offer relief to caregivers, ultimately promoting their overall well-being and, consequently, enhancing the quality of care provided to individuals with chronic diseases. As a recommendation for future research, it is suggested to explore the specific challenges faced by caregivers in chronic disease settings and develop targeted interventions to reduce burden and prevent depression.

Acknowledgments

References

Abdul Hadi, A. B., Pasi, H. B. and Yousef, N. E. E. A. A. (2018) 'Prevalence of Depression amongst Caregivers of Stroke Patients Attending Hospital Universiti Sains Malaysia', *IIUM Medical Journal Malaysia*, 17(2 SE-). doi: 10.31436/imjm.v17i2.983.

Abdul Mulud, Z., Mccarthy, G. and Mohamad, N. (2018) 'Translation, Cross-Cultural Adaptation, Reliability and Validity of the Malay Version Caregiver Burden Inventory (CBI) for Caregivers of Individuals with Mental Illness', *Advanced Science Letters*, 24, pp. 293–295. doi: 10.1166/asl.2018.11988.

Akgul, N. and Ozdemir, L. (2014) 'Caregiver burden among primary caregivers of patients undergoing peripheral blood stem cell transplantation: A cross sectional study', *European Journal of Oncology Nursing*, 18(4), pp. 372–377. doi: 10.1016/j.ejon.2014.03.013.

Beck, A. T. *et al.* (1961) 'An inventory for measuring depression', *Arch. Gen. Psychiatry*, 4(6), pp. 561–571. doi: 10.1001/archpsyc.1961.01710120031004.

Braich, P. S. *et al.* (2012) 'Burden and Depression in the Caregivers of Blind Patients in India', *Ophthalmology*, 119(2), pp. 221–226. doi: https://doi.org/10.1016/j.ophtha.2011.07.038.

Chai, Y. C. *et al.* (2018) 'Caregiver depression: The contributing role of depression in patients, stigma, social support and religiosity', *International Journal of Social Psychiatry*, 64(6), pp. 578–588. doi: 10.1177/0020764018792585.

Chung, M. L. *et al.* (2010) 'Predictors of depressive symptoms in caregivers of patients with heart failure', *J. Cardiovasc. Nurs.*, 25(5), pp. 411–419. doi: 10.1097/JCN.0b013e3181d2a58d.

Collaborators, G. B. D. 2017 D. and I. I. and P. (2018) 'Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017', *Lancet*, 392(10159), pp. 1789–1858. doi: 10.1016/S0140-6736(18)32279-7.

Denno, M. S. *et al.* (2013) 'Anxiety and Depression Associated With Caregiver Burden in Caregivers of Stroke Survivors With Spasticity', *Archives of Physical Medicine and Rehabilitation*,

94(9), pp. 1731–1736. doi: https://doi.org/10.1016/j.apmr.2013.03.014.

Etemadifar, S. *et al.* (2018) 'Effects of family-centered empowerment intervention on stress, anxiety, and depression among family caregivers of patients with epilepsy', *Epilepsy Behav.*, 88, pp. 106–112. doi: 10.1016/j.yebeh.2018.08.030.

Faronbi, J. O. *et al.* (2019) 'Caring for the seniors with chronic illness: The lived experience of caregivers of older adults', *Archives of Gerontology and Geriatrics*, 82, pp. 8–14. doi: https://doi.org/10.1016/j.archger.2019.01.013.

Gbiri, C. A., Olawale, O. A. and Isaac, S. O. (2015) 'Stroke management: Informal caregivers' burdens and strians of caring for stroke survivors', *Ann. Phys. Rehabil. Med.*, 58(2), pp. 98–103. doi: 10.1016/j.rehab.2014.09.017.

Ghazali, S. B. *et al.* (2015) 'Burden of caregivers of the elderly with chronic illnesses and their associated factors in an urban setting in Malaysia', *Malaysian Journal of Public Health Medicine*, 15, pp. 1–9.

Institute for Public Health (2015) 'Summary for Policymakers', in (IPCC), I. P. on C. C. (ed.) *Climate Change 2013 – The Physical Science Basis: Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press, pp. 1–30. doi: DOI: 10.1017/CBO9781107415324.004.

Institute for Public Health (IPH) (2012) *National Health and Morbidity Survey (NHMS) 2011 (NMRR-10-757-6837) Volume III : Healthcare Demand and Out-of-Pocket Health Enpenditure*. Edited by Nordin Saleh et al. The National Health and Morbidity Survey 2011.

Kellner, S. *et al.* (2017) 'Perceived embarrassment and caregiver burden in essential tremor caregivers', *J. Neurol. Sci.*, 383, pp. 205–210. doi: 10.1016/j.jns.2017.11.020.

Lahlou-Laforêt, K. *et al.* (2015) 'Validity of Beck Depression Inventory for the assessment of depressive mood in chronic heart failure patients', *J. Affect. Disord.*, 184, pp. 256–260. doi: 10.1016/j.jad.2015.05.056.

Liang, Y.-D. *et al.* (2017) 'Caregiving burden and depression in paid caregivers of hospitalized patients: a pilot study in China', *BMC Public Health*, 18(1), p. 53. doi: 10.1186/s12889-017-4563-6.

Limpawattana, P. *et al.* (2013) 'Caregivers Burden of Older Adults with Chronic Illnesses in the Community: A Cross-Sectional Study', *Journal of Community Health*, 38(1), pp. 40–45. doi: 10.1007/s10900-012-9576-6.

Lin, W. F., Chen, L. H. and Li, T.-S. (2013) 'Adult Children's Caregiver Burden and Depression: The Moderating Roles of Parent–Child Relationship Satisfaction and Feedback from Others', *Journal of Happiness Studies*, 14(2), pp. 673–687. doi: 10.1007/s10902-012-9348-0.

Lum, H. D. *et al.* (2014) 'Caregiving in heart failure: Relationship quality is associated with caregiver benefit finding and caregiver burden', *Heart Lung*, 43(4), pp. 306–310. doi: 10.1016/j.hrtlng.2014.05.002.

Malik, F. A., Gysels, M. and Higginson, I. J. (2013) 'Living with breathlessness: A survey of caregivers of breathless patients with lung cancer or heart failure', *Palliative Medicine*, 27(7), pp. 647–656. doi: 10.1177/0269216313488812.

Miyawaki, C. E. (2015) 'A Review of Ethnicity, Culture, and Acculturation Among Asian Caregivers of Older Adults (2000-2012)', *SAGE Open*, 5(1), p. 2158244014566365. doi: 10.1177/2158244014566365.

Mukhtar, F. and P. S. Oei, T. (2011) 'A review on the prevalence of depression in Malaysia', *Curr. Psychiatry Rev.*, 7(3), pp. 234–238. doi: 10.2174/157340011797183201.

National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) (2019a) *About Chronic Diseases*, *Center for Disease Control and Prevention (CDC)*. Available at: https://www.cdc.gov/chronicdisease/about/index.htm.

National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) (2019b) *Health and Economic Costs of Chronic Diseases*, *Center for Disease Control and Prevention (CDC)*. Available at: https://www.cdc.gov/chronicdisease/about/costs/index.htm.

Novak, M. and Guest, C. (1989) 'Application of a multidimensional caregiver burden inventory', *Gerontologist*, 29(6), pp. 798–803. doi: 10.1093/geront/29.6.798.

Olagundoye, O. and Alugo, M. (2018) 'Caregiving and the Family', in Mollaoglu, M. (ed.). Rijeka: IntechOpen, p. Ch. 1. doi: 10.5772/intechopen.72627.

Othman, Z. *et al.* (2014) 'Caregiver Burden is Associated with Cognitive Decline and Physical Disability of Elderly Post-Stroke Patients', *Middle-East Journal of Scientific Research*, 22(9), pp. 1265–1271. doi: 10.5829/idosi.mejsr.2014.22.09.9216.

Park, C. H. *et al.* (2012) 'Determinants of the burden and positivity of family caregivers of terminally ill cancer patients in Korea', *Psycho-Oncology*, 21(3), pp. 282–290. doi: 10.1002/pon.1893.

Petruzzo, A. *et al.* (2019) 'Influence of preparedness on anxiety, depression, and quality of life in caregivers of heart failure patients: Testing a model of path analysis', *Patient Education and Counseling*, 102(5), pp. 1021–1028. doi: https://doi.org/10.1016/j.pec.2018.12.027.

Pucciarelli, G. *et al.* (2018) 'Quality of life, anxiety, depression and burden among stroke caregivers: A longitudinal, observational multicentre study', *Journal of Advanced Nursing*, 74(8), pp. 1875–1887. doi: 10.1111/jan.13695.

Rogers, M. L., Ringer, F. B. and Joiner, T. E. (2018) 'The association between suicidal ideation and lifetime suicide attempts is strongest at low levels of depression', *Psychiatry Res.*, 270, pp. 324–328. doi: 10.1016/j.psychres.2018.09.061.

Shakya, D. (2017) 'Burden and Depression among Caregivers of Hemodialysis Patients', *Palliative Medicine & Care: Open Access*, 4(1), pp. 1–6. doi: 10.15226/2374-8362/4/1/00131.

Strang, S. *et al.* (2019) 'Support to informal caregivers of patients with severe chronic obstructive pulmonary disease: a qualitative study of caregivers' and professionals' experiences in Swedish hospitals', *BMJ Open*, 9(8), p. e028720. doi: 10.1136/bmjopen-2018-028720.

Vahidi, M. *et al.* (2016) 'Other Side of Breast Cancer: Factors Associated with Caregiver Burden', *Asian Nursing Research*, 10(3), pp. 201–206. doi: https://doi.org/10.1016/j.anr.2016.06.002.

Wang, L.-J. *et al.* (2016) 'Depression, caregiver burden and social support among caregivers of retinoblastoma patients in China', *Int. J. Nurs. Pract.*, 22(5), pp. 478–485. doi: 10.1111/ijn.12458.

Yoon, S.-J. *et al.* (2014) 'Modifiable factors associated with caregiver burden among family caregivers of terminally ill Korean cancer patients', *Supportive Care in Cancer*, 22(5), pp. 1243–1250. doi: 10.1007/s00520-013-2077-z.

Zhang, Q. *et al.* (2014) 'Factors Influencing Sleep Disturbances among Spouse Caregivers of Cancer Patients in Northeast China', *PLOS ONE*, 9(10), p. e108614. Available at: https://doi.org/10.1371/journal.pone.0108614.

Zhu, W. and Jiang, Y. (2018) 'A meta-analytic study of predictors for informal caregiver burden in patients with stroke', *J. Stroke Cerebrovasc. Dis.*, 27(12), pp. 3636–3646. doi: 10.1016/j.jstrokecerebrovasdis.2018.08.037.

Zincir, B. S. *et al.* (2014) 'Burden and depressive symptoms associated with adult-child caregiving for individuals with heart failure', *ScientificWorldJournal*, 2014, p. 641817. doi: 10.1155/2014/641817.