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Factors Associated with Depression amongst Family Caregivers Involved in Care for Community-dwelling Persons of Middle Age and Older: Based on Data from Indonesia Family Life Survey

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Abstract

Caring for frail elderly individuals tends to induce depression and stress in caregivers, which constitutes a risk factor for their discontinuance of at-home care. The maintenance of family caregivers' mental well-being is important for both family caregivers and care recipient. The aim of this research was to identify factors associated with depression amongst family caregivers involved in the care of community-dwelling persons of middle age and older in Indonesia. We analysed 1,569 dyads of community-dwelling persons of middle age and older and their family caregivers from Indonesia Family Life Survey 4, which was initiated by Research and Development (RAND, USA) in 2007. The Center for Epidemiologic Studies Depression Scale (CES-D) was used to measure caregivers' depression. In total, 53.32 % of caregivers were female family caregivers, and 8.00 % presented with depression. A multivariable analysis showed that the factors related positively to the high depression for family caregivers in Indonesia were living in an urban area, having higher per capita monthly household expenditures, having poor self-rated health, and experiencing more symptoms and feeling pains, while those related negatively to the depression were being of an older age, and having paid work. Current policies and programmes for supporting older persons in Indonesia tend to cover the lower income class; however, our results indicate that family caregivers living in urban areas and with higher monthly expenditures are associated with greater instances of depression. As an addition to the current programmes for supporting the poor elderly, we suggest that support programmes and services may be helpful for improving depression among family caregivers in Indonesia for those living in urban areas who belong to middle and upper classes.

Keywords: Depression, Family caregivers, Urban, Middle and upper class, Indonesia

1. Introduction

Family caregivers for older adults are described as 'hidden patients' (Fengler *et al.* 1979) because they do not have sufficient opportunities and enough time to receive adequate treatment or counselling for mental and physical disorders, per their involvement in the care of older adults. Consequently, it is often the case that their conditions become worse, even if they avoid worrying about their disease or disorder (Schulz *et al.* 1999). Caring for frail elderly individuals tends to induce depression and stress in caregivers (Barnes *et al.* 1992), which constitutes a risk factor for their discontinuance of at-home care (Arai *et al.* 2001). In the worst cases, depression and stress from the provision of care may lead to caregiver suicides (Chiang *et al.* 2015), care abandonment, or violence towards care recipients. Thus, the maintenance of family caregivers' mental well-being is important for both family caregivers and their older charges.

Although some research has been developed to identify factors associated with family caregivers' depression in developed counties, much less research is available with respect to developing countries, particularly in Asian countries, where the ageing population is increasing rapidly (Arai *et al.* 2014; Clark *et al.* 2010). Our research focuses on Indonesia, the fourth most populous nation in the world, where the proportion of the population aged 60 years and older was 8.2 % in 2010 and is projected to be 14 % by 2025 (UNFPA, 2014). Family ties in Indonesia are very strong, so care for frail older parents has been basically and traditionally provided by family members. However, the country's social structure has gradually changed with rapid economic growth and ensuing urbanization. The total fertility rate in Indonesia decreased from 4.43 in 1980 to 2.34 in 2013 (Bloom *et al,* 2010). Decreasing birth rates and ageing populations constitute a serious and urgent issue on a worldwide scale. Given that 80 % of the 1.5 billion older people worldwide live in developing countries (UNFPA, 2012), policies and services to support them and their family caregivers may be needed in those nations. The clarification of factors associated with depression amongst family caregivers may constitute a first step towards the consideration of supportive policies and services that meet their needs.

In this research, we aimed to clarify the factors associated with depression amongst caregivers involved in care for community-dwelling older persons in Indonesia. We focused on potential factors such as care recipient demographic variables, care recipient physical disabilities, care recipient chronic illnesses and Body Mass Index (BMI), caregiver demographic variables, caregiver symptoms and body pains, hours spent caregiving, caregiver per capita monthly house expenditures, and caregiver community networks and social capital. This study is the first study to survey the factors associated with depression amongst family caregivers involved in the care for persons of middle age and older in Indonesia.

2. Methods

2.1 Study setting

We conducted a secondary analysis based on data from Indonesia Family Life Survey 4 (IFLS 4), which was conducted by Research and Development (RAND, USA) in 2007. IFLS is a multipurpose longitudinal household survey that collects data from more than 30,000 individuals from 12,000 households in Indonesia and is representative of approximately 83 % of the entire population (Strauss *et al*. 2009; Hanandita *et al*. 2015). IFLS 4 was the first wave to use a validated mental health instrument. In this study, the data for family caregivers involved in the care for community-dwelling adults of middle age and older (≥40) were included in the analysis.

In total, there were 11,160 observations of data for the adults of middle age and older that comprised the sample. In this study, we used respondents who had completely answered activities of daily living (ADL) and instrumental activities of daily living (IADL) and acknowledged the need for assistance in their daily activities. The sample consisted of 1,569 dyads of persons of middle age and older, and their family caregivers. The family caregivers were those who (1) were identified by a person of middle age or older as the individual who most assisted with their care, (2) were 15 years of age or older, and (3) were able to answer a short version of CES-D. We excluded family caregivers who did not spend at least an hour per day with their recipients.

2.2 Depression measure

A short version of CES-D, an examination consisting of a series of 10 questions, was used to assess depression in IFLS 4. CES-D is a widely used tool for measuring symptoms of depression amongst general populations and is considered to be a reliable and valid screening instrument in developing societies, including Indonesia (Mackinnon *et al*. 1998; Radloff 1977). It has also been reported that little is lost in using short version of CES-D (Kohout *et al*. 1993). We used the CES-D score as a continuous variable, with scores ranging from 0 to 30. A score of 10 points or higher indicates depression (Mausbach *et al*. 2014; Gallagher *et al*. 2011). We categorized the participants into the following two groups: the group with depression (≥10) and the group without depression (<10).

2.3 Care recipient and Caregiver factors

Previous studies have indicated that factors of care recipients that are associated with caregivers' depression are age (Lin *et al*. 2012), functional disability (Peyrovi *et al*. 2012; Gallagher *et al*. 2011; Qiu *et al*. 2008; Hasegawa *et al*. 2014),and moderate dementia (Arai *et al*. 2014). They also point out that female caregivers (Arai *et al*. 2014, Cohen *et al*. 2002; Gallicchio *et al*. 2002; Roth *et al* 2008) and spousal caregivers are at a higher risk of depression (Roth *et al*. 2008; Tang *et al*. 2008); other risk factors may include the younger age of a caregiver (Tsai *et al*. 2013; Roth *et al*. 2008), a income (Arai *et al*. 2014; Miyashita *et al*. 2009), the duration of care (Lin *et al*. 2012), longer hours spent caregiving (Arai *et al*. 2014; Miyashita *et al*. 2009), poor subjective health (Arai *et al*. 2014; Tsai *et al*.; Joling *et al*. 2012; Cucciare M. *et al*. 2010; Gallicchio *et al*. 2002), a low educational level (Tsai *et al*. 2013; Gallagher *et al*. 2011; Roth *et al* 2008), co-residence with the care recipient (Arai *et al*. 2014), and a limited use of social services (Arai *et al*. 2014).

Referring to the factors identified by previous studies we selected similar variables from IFLS 4 data. We also added other variables from IFLS 4. The caregivers' characteristics included age, sex (male/female), marital status (other/married), relationship to the care recipient (other/spouse, and other/biological child), co-residence with care recipient (no/yes), residential area (rural/urban), educational level (incomplete compulsory education/complete compulsory education or higher level), paid work (no/yes), log of per capita monthly household expenditures, self-rated health (very healthy, somewhat healthy/unhealthy, somewhat healthy), number of symptoms, number of body pains, patient care (no/yes), days spent caregiving during the last four weeks, hours spent caregiving per day, the presence of any other persons assisting in caregiving (no/yes), medical insurance (no/yes), and social capital, including the number of community participation and the number of trusted neighbours.

We attempted to conduct two types of analyses concerning the relationship between care recipients and caregivers. Although previous research noted that the spousal relationship was a risk factor of depression for family caregivers, our account showed that the biological child share was higher than the spousal share. For the caregivers, the relationship to the care recipients was first classified and coded as two variables, spouse and other. The relationship was then classified and coded as two other variables, biological child and other.

Social capital was measured using two continuous variables, community activities and trust. Both were measured using continuous variables and calculated as the average response to 14 community participation questions and seven trust questions.

The measures for care recipients included age, sex (male/female), ADL and IADL scores, cognitive capacity, number of chronic illnesses and BMI. The IFLS used 13 ADL items and 5 IADL items, which were adapted from the US Health and Retirement Study. In the IFLS 4 survey, respondents aged 40 years and older were asked whether they were able to perform these activities easily (code=3) or with difficulty (code=2) or were unable to perform them at all (code=1). The resulting ADL and IADL scores were the total sums of the respondents' replies (Sujarwoto *et al*. 2015). The cognitive capacity was measured by word recall. For the IFLS 4 survey, the respondents were read a list of ten simple nouns. After answering unrelated questions, they were asked about ten minutes later to recall as many words as they could. The cognitive capacity was measured using the average number of correctly recalled words (Witoelar *et al*. 2009).

2.4 Statistical analyses

A chi-square test for categorical variables, and a t-test for continuous variables were conducted to examine the bivariate relationship between caregiver factors and care recipient factors to caregivers' depression. A stepwise selection was used by dropping any non-significant variables from the model. The significant variables were then entered into a logistic regression after examining multicollinearity. The odds ratios (OR) with a 95 % confidence interval (CI) were reported as statistically significant. The data were analysed using Stata version 13.1 (Stata Corp., College Station, TX, USA; 2013)

3. Results

Table 1 describes caregivers' and care recipients' characteristics. With respect to socio-demographic characteristics, caregivers in this sample had a mean age of 35.56 years. More than half were female (53.92 %), and 62.40 % of the caregivers were married. In total, 59.34 % of the caregivers were the biological children of the older persons receiving the care. Furthermore, 87.00 % of caregivers lived together with their care recipients, and nearly half of the family caregivers lived in urban areas (48.50 %). In total, 44.22 % of caregivers had completed compulsory education and higher levels of education, and 67.69 % of family caregivers had paid work. The mean log of per capita monthly household expenditures was 12.31. 15.30 % of family caregivers characterized their health as unhealthy or somewhat unhealthy. The mean number of symptoms was 2.35. The mean number of body pains was 0.98. Furthermore, 96.05 % of family caregivers had not received patient care at a hospital, puskesma, or clinic during the past 12 months. The mean number of days spent caregiving was 9.93 days; the mean number of hours spent caregiving per day was 2.43 hours. In total, 55.39 % of family caregivers indicated that they had no other individuals to assist them, and 76.42 % caregivers had no medical insurance. The mean number of community participation was 1.45, and the mean number of trusted neighbours was 2.43. We observed that 8.09 % of the caregivers presented with depression.

The average age of the care recipients was 59.64, and 70.42 % were female. The average ADL score was 35.39, and the average IADL score was 13.33. The average cognitive capacity was 3.88 words. The mean number of chronic illnesses was 0.85. The mean BMI was 22.49.

Table 1: Caregivers' and care recipients' socio-demographic characteristics (n=1,569)

Age [Mean±SD]			[35.56±14.88]
Sex	Male	723	(46.08)
	Female	846	(53.92)
Marital status	Other	590	(37.60)
	Married	979	(62.40)
Relationship to the care recipient			
	Spouse	398	(25.37)
	Biological child	931	(59.34)
	Non-biological child	21	(1.34)
	Son/daughter-in-law	68	(4.33)
	Other relatives	145	(9.24)
Co-residence with care recipient			
	No	204	(13.00)
	Yes	1,365	(87.00)
Residential are	Rural	808	(51.50)
	Urban	761	(48.50)
Educational level	Incomplete compulsory education (<9)	820	(55.78)
	Complete compulsory education (≥9)	650	(44.22)
Paid work	No	507	(32.31)
	Yes	1,062	(67.69)
Log of per capita monthly household expenditures [Mean±SD]			[12.31±0.99]
Self-rated health	Very healthy, somewhat healthy	1,329	(84.70)
	Unhealthy, somewhat unhealthy	240	(15.30)
Number of symptoms [Mean±SD]			[2.35±2.08]
Number of body Pains [Mean±SD]			[0.98±1.43]
Patient care at a hospital, puskesmas, clinic or other			
	No	1,506	96.05
	Yes	62	3.95
Days spent caregiving during the last four weeks [Mean±SD]			[9.93±10.99]
Hours spent caregiving per day [Mean±SD]			[2.43±2.77]
Presence of any other persons assisting in caregiving			
	No	869	(55.39)
	Yes	700	(44.61)
Medical insurance	No	1,199	(76.42)
	Yes	370	(23.58)
Number of community participation [Mean±SD]			[1.45±1.34]
Number of trusted neighbours [Mean±SD]			[2.43±0.30]
CES-D	Not depressed (<10)	1586	(91.91)
	Depressed(≥10)	138	(8.09)
Care recipients' characteristics (n=1,569)			n (%)
Age [Mean±SD]			[59.64±11.79]
Sex	Male	510	(29.58)
	Female	1214	(70.42)
ADL score [Mean±SD]			[35.39±3.91]
IADL score [Mean±SD]			[13.33±1.92]
Cognitive capacity [Mean±SD]			[3.88±2.09]
Number of chronic illness [Mean±SD]			[0.85±1.05]
BMI [Mean±SD]			[22.49±4.82]

As shown in table 2, we found that the caregivers' age, marital status, residential area, paid work, log of per capita monthly household expenditures, self-rated health, number of symptoms, number of body pains, number of trusted neighbours and the care recipients' age were associated with depression within a statistical significance of 0.05.

Table 2: Bivariate analysis of Caregivers' and care recipients' socio-demographic characteristics and depression n=1,569

Item		Not depressed (CES-D < 10) n (%) 1,442(91.91)		Depressed (CES-D ≥ 10) n (%) 127(8.09)		p-value	
Caregivers' characteristics							
Age [Mean±SD]		[35.87±14.98]		[32.04±13.20]		<0.001	†
Sex	Male	670	92.67	53	7.33	0.30	
	Female	772	91.25	74	8.75		
Marital status	Other	531	90.00	59	10.00	0.03	
	Married	911	93.05	68	6.95		
Relationship to the care recipient							
	Other	1,075	91.80	96	8.20	0.79	
	Spouse	367	92.21	31	7.79		
	Other	593	92.95	45	7.05	0.21	
	Biological-child	849	91.19	82	8.81		
Co-residence with care recipient							
	No	190	93.14	14	6.86	0.48	
	Yes	1,252	91.72	113	8.28		
Residential area	Rural	761	94.18	47	5.82	<0.001	
	Urban	681	89.49	80	10.51		
Educational level							
Incomplete compulsory education (<9)		758	92.44	62	7.56	0.29	
Complete compulsory education (≥9)		591	90.92	59	9.08		
Paid work	No	448	88.36	59	11.64	<0.001	
	Yes	994	93.60	68	6.40		
Log of per capita monthly household expenditures, rupiah [Mean±SD]		[12.28±0.02]		[12.65±0.10]		<0.001	†
Self-rated health							
very healthy, somewhat healthy		1,243	93.53	86	6.47	<0.001	
unhealthy, somewhat unhealthy		199	82.92	41	17.08		
Number of symptoms [Mean±SD]		[2.22±1.98]		[3.92±2.51]		<0.001	†
Number of body pains [Mean±SD]		[0.91±1.34]		[1.81±2.05]		<0.001	†
Patient care at a hospital, puskesmas, clinic or other							
	No	1,389	92.23	117	7.77	0.08	
	Yes	53	85.48	9	14.52		
Days spent caregiving during the last four weeks [Mean±SD]		[11.03±11.06]		[10.71±11.00]		0.77	†
Hours spent caregiving per day [Mean±SD]		[2.71±2.84]		[2.40±2.09]		0.24	†
Presence of any other persons to assisting in caregiving							
	No	794	91.37	75	8.63		
	Yes	648	92.57	52	7.43	0.38	
Medical insurance	No	1,097	91.49	102	8.51	0.28	
	Yes	345	93.24	25	6.76		
Number of community participation		[1.45±1.34]		[1.23±1.31]		0.07	†
Number of trusted neighbours		[2.43±0.30]		[2.51±0.32]		0.01	†
Care recipients' characteristics							
Age [Mean±SD]		[60.43±11.81]		[56.74±10.65]		<0.001	†
Sex	Male	428	91.45	40	8.55	0.66	
	Female	1,014	92.10	87	7.90		
ADL score [Mean±SD]		[35.21±4.01]		[35.14±4.09]		0.86	†
IADL score [Mean±SD]		[13.23±1.99]		[13.42±1.79]		0.31	†
Cognitive capacity [Mean±SD]		[2.14± 1.82]		[2.45±2.08]		0.07	†
Number of chronic illness [Mean±SD]		[0.84±1.05]		[0.88±1.03]		0.73	†
BMI [Mean±SD]		[22.48±4.86]		[22.68±4.36]		0.65	†

chi2, †t test

As shown in table 3, the logistic regression analysis revealed that independent factors for depression were the following seven caregiver characteristics: the caregivers' age (OR: 0.76; 95 % CI, 0.58-0.99), the residential area (OR: 1.66; 95 % CI, 1.11-2.49), the log of per capita monthly household expenditures (OR: 1.35; CI, 1.13-1.62), paid work (OR: 0.60; 95 % CI, 0.40-0.89), self-rated health (OR: 1.84; 95 % CI, 1.17-2.89), the number of symptoms (OR: 1.26; 1.15-1.38), and the number of pains (OR: 1.22; 95 % CI, 1.08-1.37).

Table 3: Logistic regression of caregivers' and care recipients' socio-demographic characteristics and depression

	OR	95%CI			
Caregivers' age	0.76	0.58	-	0.99	*
Residential area (ref. rural)	1.66	1.11	-	2.49	*
Log of per capita monthly household expenditures	1.35	1.13	-	1.62	**
Paid work (ref. not engage in paid work)	0.60	0.40	-	0.89	*
Caregivers' Self-rated health (ref. healthy)	1.84	1.17	-	2.89	**
Number of caregivers' symptoms	1.26	1.15	-	1.38	**
Number of caregivers' body pains	1.22	1.08	-	1.37	**
Care recipients' age	0.98	0.96	-	1.00	

**p<0.01, *p<0.05

Hosmer-Lemeshow Test; p=0.62

4. Discussion

There is no research regarding depression amongst family caregivers involved in the care of persons of middle age and older in Indonesia, so it is impossible to compare the result with previous studies in Indonesia. However, there is research that used the CES-D10 to assess depression amongst family caregivers in Taiwan and the CES-20 to assess depression in other countries. These studies determined that 29.84 % of family caregivers of nursing home residents in Taiwan manifested symptoms of depression(Tsai *et al.* 2013), and 40.00 % of family caregivers involved in caring for older persons with dementia in Iran manifested depressive symptoms (Peyrovi *et al.* 2012). Per the CES-D20, the percentage of family caregivers involved in the nursing care for older persons in Japan who manifested depressive symptoms was reported as ranging between 32.6 and 49.3(Arai *et al.* 2014; Oura *et al.* 2012). In the USA, this range was between 24.80 % and 40.00 % for family caregivers involved in care for the elderly with dementia (Clark *et al.* 2010; Joling *et al.* 2012). Our present estimate is considerably lower than estimates of the prevalence of depression amongst family caregivers in Taiwan, Japan, and the USA. These surveys and our own are distinguished by research methods, the characteristics of care recipients, and the percentage of the ageing population to the total population in each country. In particular, previous research tended to focus on older persons with dementia; our research focused on older persons who believed that they needed assistance in their daily lives. Consequently, we cannot simply opine on whether the prevalence of depression amongst family caregivers in Indonesia is lower or not. We need to conduct further research that compares the prevalence of depression amongst family caregivers between countries in Asia.

The factors associated with depression amongst family caregivers in our study were the younger age of caregivers, a residence in an urban area, high monthly household expenditures, paid work, lower self-rated health, more symptoms, and more body pains.

We found that younger family caregivers had more instances of depression than older family caregivers. This result is consistent with previous studies, which delineated younger caregivers' active multi-task roles, such as working, childrearing, doing housework, and caring for ageing parents (Magaña *et al.* 2007; Lee *et al.* 2013). Older caregivers, in contrast, had more time to develop resources and coping strategies that reduce their levels of psychological distress (Magaña *et al.* 2007). As an addition to this previous research, another possible explanation for this disparity is that older caregivers may enjoy a richer experience in caring for older persons, which helps to maintain their mental balance.

Although our results are consistent with a study in which depressive symptoms in African-American female caregivers living in rural areas were observed to be fewer than those in African-American female urban caregivers, the explanation for this relationship has not yet been fully developed (Rozario *et al.* 2008; McKenzie *et al.* 2010). The adverse impacts of urban social environments on mental health, such as stressful circumstances in an area lacking open spaces, are well recognized (Webb 1984; Lewis *et al.* 1994; Paykel *et al.* 2000). An additional possibility is that because cities in Indonesia are not age-friendly environments, the stress of family caregivers is increased.

Previous research showed a negative association between expenditures and mental health in Indonesia (Hanandita *et al.* 2014; Tampubolon *et al.* 2014). Our findings suggest the opposite. These might be explained from sample differences. The sample for the previous research, drawn from IFLS 4, was composed generally of respondents aged 14 years and older; our research focused on family caregivers who cared for their relatives aged 40 and over. We suggest that family caregivers with depression may need to purchase medical treatment and care for their older charges.

We found that family caregivers who did not engage in paid work were at a greater risk for depression than caregivers who had a paying job. We analysed sex, marital status, and daily activities for caregivers with depression who were not engaged in paid work activity. In total, 32 % of these caregivers were married females engaged in housekeeping activities. Our finding was consistent with previous research that reported depression amongst housewife (Lau *et al*. 2011).

Our research indicated that the caregivers' self-rated health and their number of symptoms were associated with caregivers' depression. Previous research also found similar associations. These studies linked limited support services and programmes for caregivers, lack of educational or counselling intervention for family caregivers and behavioural problems amongst care recipients to the development of poor self-rated health and associated symptoms amongst caregivers (Arai *et al*. 2014; Martin *et al*. 2007). These findings may be buttressed by the increased rate of poor self-health and additional symptoms identified by our study.

We found a greater instance of depression among family caregivers with body pains than amongst family caregivers with no body pains. Our finding on pain is consistent with previous research about pain and depression (Lee *et al*. 2013, Tamiya *et al*. 2002).

5. Conclusion

From the result, the factors related positively to the high depression for family caregivers in Indonesia were living in an urban area, having higher monthly household expenditures, having poor self-rated health, and experiencing more symptoms and feeling pains, while those related negatively to the depression were being of an older age, and having paid work. Although the association between family caregivers' depression and caregivers' age, self-rated health, experience symptoms, feeling pains are developed, the relationship between the depression and residential area, monthly household expenditure are not fully developed yet.

We found that in total, 51.96% of the depressed family caregivers in our research lived urban area and belonged to middle and upper classes, while in total 25.19 % of those lived in rural area and belonged to middle and upper class, in total 11.02% of those lived urban area and belonged to lower class, in total 11.81% of those lived in rural area and belonged to lower class. Middle class people were defined as people with a daily per capita expenditure between US $2 and US $20 of purchasing power parity in 2005 (Asian Development Bank 2010).

We conclude that family caregivers living in urban areas and with higher monthly expenditures have a higher risk of depression compared with those living in rural areas. There are laws and programmes for disadvantaged older persons in Indonesia. The Assistance to Displaced Older People (ASLUT) programme is one such programme. Since its operation in 2006, this social assistance cash transfer programme helps poor older persons who are severely disabled and highly dependent on others (Priebe *et al*. 2014). Our study indicates that of the total depressed family caregivers, approximately half live in an urban area and are middle or upper class. In addition to this current programme for supporting the poor elderly, we suggest that assistance programmes and services for family caregivers living in urban areas that target middle and upper classes may be helpful for improving depression among family caregivers.

There some limitations in our research. First, it is impossible for us to infer a causal relationship between some factors and family caregivers' depression due to our use of cross-sectional analyses. Second, we analysed the depression of family caregivers who cared for relatives aged 40 and over in general. It has been reported in the literature that family caregivers involved in care for older persons with severe disease or disability have a higher level of depression. Thus, future research should consider including those family caregivers. Third, although IFLS 4 contains data on Posyandu, which provide regional health care and social participation opportunities for older adults in Indonesia, we are unable to use them because of excessive missing data. We need to perform a survey to further clarify the role of Posyandu for older individuals in future research.

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