

Research report

# The impact of altruistic behaviors for children and grandchildren on major depression among parents and grandparents in the United States: A prospective study

Takeo Fujiwara<sup>a,b,\*</sup>, Cynthia K. Lee<sup>a</sup>

<sup>a</sup> Centre for Community Child Health Research, Child and Family Research Institute, Vancouver, BC, Canada

<sup>b</sup> Department of Pediatrics, University of British Columbia, Vancouver, BC, Canada

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## Abstract

**Background:** Although previous studies have suggested that altruistic behaviors are beneficial for mental health, few studies have examined the impact of altruistic behaviors for children and grandchildren (ABC) on the mental health of parents and grandparents using a longitudinal study design. It is needed to test whether paternal and maternal ABC prevent the development of mental health problems in later life.

**Method:** The association between three types of ABC (informal assistance, emotional support, financial support) in 1995–1996 and major depression (MD) in 1998 were examined using a nationally representative longitudinal study in the US (the National Survey of Midlife Development in the United States (MIDUS) in 1995–1996 and the MIDUS Psychological Experience Follow-Up study in 1998,  $N=724$ ).

**Results:** Moderate amounts of informal assistance and financial support by fathers/grandfathers, but not by mothers/grandmothers, showed a protective effect on MD 2–3 years later, holding parents/grandparents and children covariates. Emotional support was not associated with MD for both sexes after adjusting for covariates.

**Limitation:** The sample size in this study was relatively small and not all possible covariates were adjusted. The effect of children's/grandchildren's responses for ABC on the development of parental MD was not examined.

**Conclusion:** The impact of ABC on MD in 2–3 years varies depending on the types of ABC and the sex of parents/grandparents. Moderate amounts of informal assistance and financial support had a protective effect on MD in later life among fathers/grandfathers, but not among mothers/grandmothers.

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**Keywords:** Altruistic behavior; Depression; Family; Mental health; Sex difference

## 1. Introduction

Several studies have suggested a link between altruistic behaviors and mental health. Altruistic behavior is defined as “behavior intended to benefit another, even when this risks possible sacrifice to the welfare of the actor” (Monroe, 1996). Schwartz et al. (2003) found that those who do something for others showed better

\* Corresponding author. Centre for Community Child Health Research, Child and Family Research Institute, 4480 Oak Street, F612B, Vancouver, BC, Canada V6H 3V4. Tel.: +1 604 875 2000x5185; fax: +1 604 875 2384.

E-mail address: [tfujiwara@cw.bc.ca](mailto:tfujiwara@cw.bc.ca) (T. Fujiwara).

mental health. Fujiwara (2007) reported that altruistic behavior had a tendency to protect generalized anxiety disorder, but was harmful for major depression. However, few studies have investigated the impact of altruistic behaviors towards children.

The impact of altruistic behaviors for children on parents' mental health has a complex mechanism. Previous studies have shown that adults who have children, especially mothers, report more psychological distress than childless adults (Bebbington et al., 1991; Brown and Harris, 1978; Dean et al., 1995; Gove and Geerken, 1977; Hope et al., 1999; Pearlin, 1974). More specifically, parents who have ill or young children tend to develop mental disorders (Meltzer and Mindell, 2006; Raina et al., 2005). Most of the literature on caregiving for children focuses on ill children or young children, so it is not hard to assume that the impact of caregiving on parents is stressful. Few studies have focused on altruistic behaviors towards all children including healthy and unhealthy. Some research has suggested that parenting benefits the health of parents, as parents are able to obtain rewards through the fulfillment received from caregiving (Ane-shensel et al., 1981; Burton, 1998; Kandel et al., 1985; Schwartz and Gidron, 2002).

In addition, as family assistance flows from parents to adult children (Eggebeen and Hogan, 1990; Rossi and Rossi, 1990; Soldo and Hill, 1993), grandparents assume the responsibility of raising grandchildren in response to their adult child's illness, financial need, divorce, or work commitment (Goodman and Silverstein, 2002; Musil and Ahmad, 2002) and a growing number of adults take care of grandchildren (Szinovacz, 1998). Research has also shown that caregiving for grandchildren may deteriorate the mental health of grandparents (Blustein et al., 2004; Minkler et al., 1997; Strawbridge et al., 1997; Szinovacz et al., 1999). However, some research suggests that caregiving is beneficial for the caregivers' health, as caregivers are able to obtain rewards and fulfillment through caregiving (Burton and DeVries, 1992; Gattai and Musatti, 1999; Hayslip et al., 1998; Jendrek, 1993; Pruchno and McKenney, 2002).

Lee et al. (2003) showed that those who take care of healthy children were more likely to die by coronary heart disease in the Nurse Health Study, suggesting that caregiving for healthy children can also be stressful. However, this study did not examine the impact of altruistic behaviors for non-ill children on the father's mental health. A recent study showed that new fathers did not show depressive symptoms after the delivery of a new baby, while mothers showed higher postpartum depressive symptoms in Denmark (Munk-Olsen et al., 2006), suggesting that fatherhood is not as stressful as motherhood.

For middle aged adults, the age range of children varies from very young to older. Few studies have investigated the impact of altruistic behavior for adult children, such as provision of transportation, emotional support, or financial support. As these altruistic behaviors may not be physically time consuming, the impact of these behaviors might be different from caregiving to young children: the effect of rewards might be larger than the effect of stress.

Therefore, it is needed to investigate the impact of altruistic behaviors for children and grandchildren, covering a wide range of ages and health statuses, on the mental health of parents, using a longitudinal, nationally representative sample. As few studies have evaluated the mental health of parents using a diagnostic tool, it should be done by diagnosis of a mental disorder, such as major depression (MD). Diagnostic outcome evaluation makes the link between the results of this investigation and clinical settings easier to interpret.

In the present study, we are exploring the following hypotheses: 1) altruistic behaviors for children and grandchildren (ABC), which include non-ill and adult, will have a protective effect for MD of parents/grandparents in later life, and 2) the protective effect is larger for men (fathers/grandfathers) than women (mothers/grandmothers).

## 2. Method

### 2.1. Participants

For baseline data, we used the The National Survey of Midlife Development in the United States (MIDUS) data originally collected in 1995–1996 as a collaborative, interdisciplinary investigation of the patterns, predictors, and consequences of midlife development in the areas of physical health, psychological well-being, and social functioning (Brim et al., 2003). Respondents were selected from a nationally representative, random-digit dial sample of non-institutionalized, English-speaking adults, between 25 and 74 years of age, selected from working telephone banks in the coterminous United States. Detailed information regarding the MIDUS study has been published previously (Brim, 2000). The sample for the current analysis includes original MIDUS survey respondents who completed both the telephone survey (response rate 70%), which included CIDI-based baseline diagnoses of MD and parents/grandparents covariates, as well as the mail-in questionnaire (response rate 87%), which captured information related to ABC and children covariates. The combined response rate for both the telephone survey and the mail-in questionnaire was 60.8%. Follow-up data was obtained using the

Psychological Experiences Follow-Up Study implemented in 1998 (Wethington et al., 2005). The primary objective of the follow-up study was to explore how adults perceive psychological change in their lives. This study was a random telephone follow-up of 724 respondents of the original MIDUS random-digit-dial sample (the response rate was 82%). After explaining the study to the informant, a household listing was generated of people in the age range of 25–74, and a random respondent was selected. Men and older people were over-sampled.

## 2.2. Measures

### 2.2.1. Major Depression (MD)

MIDUS researchers assessed MD in both the original and follow-up study using telephone responses to the screening versions of the WHO CIDI-SF, Version 1.0 (Kessler et al., 1998; Wittchen, 1994, World Health Organization, 1990). The diagnosis of MD was based on definitions and criteria specified in the DSM-III-R (American Psychiatric Association, 1987). The test–retest reliability and clinical validity of CIDI-SF diagnoses have previously been examined and were found to be high (Blazer et al., 1994). Moreover, the MD scales employed in the present study was used in a previous publication, where it was based upon the responses of the MIDUS dataset (Fujiwara, 2007; Kessler et al., 1999). In the original MIDUS survey, the time frame for inquiring about MD symptoms was the previous 12 months, while in the follow-up MIDUS survey, MD items inquired about the past 5 years to capture all depressive episodes during follow-up.

### 2.2.2. Altruistic behaviors for children and grandchildren (ABC)

ABC was measured by mail-in questionnaire in three dimensions: informal assistance, emotional support, and financial support. Informal assistance was assessed by asking the following question: “On average, about how many hours per month do you spend providing unpaid assistance, such as help around the house, transportation, or childcare, to your grandchildren or grown children?” Emotional support was assessed by the following question: “On average, about how many hours per month do you spend giving informal emotional support, such as comforting, listening to problems, or giving advice to your children or grandchildren?” For the question of informal assistance and emotional support, respondents answered by the number of hours. Financial support was measured by the following question: “On average, about how many dollars per month do you or your family living

with you contribute to your grandchildren or grown children? If you contribute food, clothing or other goods, include their dollar value.” Respondents answered by the amount of dollars. ABC measurements were further categorized into three, non-ABC, low ABC, and high ABC. First, those who did not do ABC were categorized as non-ABC. Second, those who provided some amount of altruistic behaviours were divided into two groups, low ABC and high ABC. Cut-off of low and high ABC was decided based on their distributions of combined sample of women and men. Therefore, informal assistance was categorized as 0, 1–10, and 11 or more hours/months of informal assistance; emotional support was categorized as 0, 1–12 and 13 or more hours/month of emotional support. For financial support, certain portions of the sample provided exactly 50 dollars (4.8%) and 100 dollars (5.2%), making it hard to divide it into 2 identical proportions. Therefore, financial support was divided into 0, 1–50 dollars and 51 and more dollars per month.

### 2.2.3. Parents/grandparents covariates

Parents/grandparents covariates which were considered to be associated with MD were age, race, education, working status, marital status, and perceived physical health, assessed by telephone interview. Age was categorized as 25–34, 35–44, 45–54, 55–64, and 65–74 years old for further analysis. Race was categorized as Whites, Blacks, and Others. Education was categorized into 4 groups: less than high school, graduated high school, some college, and graduate college and more. Working status was categorized as full-time working, retired, homemaker, and unemployed. Marital status was categorized as married and unmarried. Perceived physical health was measured as poor, fair, good, very good, and excellent.

### 2.2.4. Children covariates

The number of children for each respondent was assessed by telephone interview by asking for the number of biological, step, adopted, and other types of children raised by respondents. The total number of children was calculated by summation of these measures. Children’s ages were also assessed, but were not included in the model, as age of children was highly correlated with age of caregivers. In addition, status of children was assessed by self-administered mail questionnaire using the following questions: “Please indicate whether the following problems have happened to any of your children in the past 12 months: a) chronic disease or disability, b) emotional problems (e.g., sadness, anxiety), and c) financial problems (e.g., low income, heavy debts).” Respondents

answered by dichotomous choice (i.e. yes or no). Grandchildren covariates were not included as MIDUS did not investigate them.

### 2.3. Analysis

First, ordered logistic regression was performed to see the sex differences of ABC. Second, logistic regression was used to see the association between ABC in 1995–1996 and MD in 1998. We examined the association

Table 1  
Characteristics of parents/grandparents and children (weighted mean and percentage)

		Women (mother/grandmother; weighted N=322)		Men (father/grandfather; weighted N=314)	
		Mean or %	SE	Mean or %	SE
Parents/grandparents covariates					
Age (mean)		48.1	0.9	46.9	0.9
Age (category)	25–34	20.2		18.6	
	35–44	25.4		32.3	
	45–54	17.7		19.1	
	55–64	22.7		15.1	
	65–74	14.0		14.9	
Race	White	86.5		87.9	
	Black	9.6		7.0	
	Other	3.9		5.1	
Education	<High school	10.1		8.7	
	High school	42.4		37.3	
	Some college	27.9		24.4	
	≥College	19.6		29.7	
Working status	Full-time	52.8		75.1	
	Retired	13.2		17.5	
	Homemaker	23.5		0.8	
	Unemployed	10.6		6.6	
Marital status	Married	69.0		83.0	
	Unmarried	31.0		17.0	
Perceived physical health	Poor	4.1		1.6	
	Fair	16.2		11.2	
	Good	37.5		31.4	
	Very good	26.8		38.6	
	Excellent	15.5		17.2	
Major depression at baseline	Yes	14.2		9.2	
Children covariates					
Number of children		2.66	0.11	2.32	0.11
Chronic disease or disability	Yes	7.0		4.3	
Emotional problems	Yes	20.2		11.6	
Financial problems	Yes	21.8		18.8	

Table 2

Distribution of altruistic behaviors for children and grandchildren (weighted percentage) and coefficients of ordered logistic regression to predict altruistic behaviors for children and grandchildren by sex of parents/grandparents

		Women (mother/grandmother; weighted N=322)		Men (father/grandfather; weighted N=314)		Coefficient <sup>a</sup>
		%		%		
Informal assistance (h/month)	0	59.7		62.9		0.199
	1–10	21.2		23.9		
	11+	19.1		13.2		
Emotional support (h/month)	0	18.2		21.5		0.345*
	1–12	37.3		44.0		
	13+	44.5		34.6		
Financial support (dollar/month)	0	70.6		67.0		–0.178
	1–50	16.4		17.5		
	51+	12.9		15.6		

\* $p < 0.05$ .

<sup>a</sup>Reference group is men.

using the following 4 models: 1) unadjusted model (Model 1), 2) adjusted for parents/grandparents' covariates (Model 2), 3) adjusted for children covariates (Model 3), and 4) adjusted for parents/grandparents' and children's covariates (Model 4). Sampling weights were applied to adjust for possible selection bias and differential non-response. See detailed weights method for MIDUS in other literature (Wethington et al., 2005). The STATA SE statistical package, version 9, was used to manage the data and to perform the analysis. It is assumed that the association has an independent and significant effect if  $p < 0.05$  and is weak if  $p < 0.1$ .

### 3. Results

Weighted number of participants was 322 for women (mothers/grandmothers) and 314 for men (fathers/grandfathers). Table 1 describes the characteristics of participants. The mean age of parents/grandparents was 47.5 years (SD=0.9). The racial majority was Whites for both sexes. The majority of participants completed a high school education or higher for both. Approximately 75% of men and 53% of women were full-time workers. Less than 1% of men were homemakers compared to 23.5% for women. Married respondents were distributed as 69% for women and 83% for men. The average number of children for women was 2.66 and for men was 2.32. The percentages of those who have children

Table 3

Weighted odds ratios of major depression predicted by altruistic behaviors for children and grandchildren among women (mothers/grandmothers) (weighted  $N=322$ )

	Model 1 (Unadjusted)	Model 2 (Adjusted for parents/ grandparents covariates <sup>a</sup> )	Model 3 (Adjusted for children covariates <sup>b</sup> )	Model 4 (Adjusted for parents/ grandparents <sup>a</sup> and children covariates <sup>b</sup> )
Informal assistance				
No informal assistance	Reference	Reference	Reference	Reference
Informal assistance (1–10 h/month)	1.08 (0.50–2.31)	1.58 (0.64–3.87)	1.28 (0.56–2.92)	1.70 (0.64–4.52)
Informal assistance (11+ h/month)	0.84 (0.34–2.02)	1.18 (0.42–3.33)	1.09 (0.39–3.11)	1.33 (0.40–4.43)
Emotional support				
No emotional support	Reference	Reference	Reference	Reference
Emotional support (1–12 h/month)	1.26 (0.47–3.37)	1.78 (0.62–5.09)	1.73 (0.60–5.00)	2.34 (0.70–7.80)
Emotional support (13+ h/month)	1.70 (0.66–4.39)	1.56 (0.58–4.21)	2.29* (0.89–5.91)	2.04 (0.70–6.01)
Financial support				
No financial support	Reference	Reference	Reference	Reference
Financial support (1–50 \$/month)	1.33 (0.59–2.97)	2.46* (0.96–6.28)	1.31 (0.53–3.21)	2.44* (0.86–6.90)
Financial support (51+ \$/month)	0.70 (0.29–1.70)	1.02 (0.36–2.94)	0.84 (0.32–2.18)	1.25 (0.38–4.06)

\*  $p < 0.1$ .

<sup>a</sup> Parents/grandparents covariates include major depression at baseline, age, race, education, working status, marital status, and perceived physical health.

<sup>b</sup> Children covariates include number of children, having chronic disease or disability, emotional problems, and financial problems.

with a difficult condition (i.e. having chronic disease or illness, emotional problems, and financial problems) were higher among women than men, especially for

emotional problem. Twenty percent of women reported that their children have emotional problems, while 12% of men reported the same problems for their children.

Table 4

Weighted odds ratios of major depression predicted by altruistic behaviors for children and grandchildren among men (fathers/grandfathers) (weighted  $N=314$ )

	Model 1 (Unadjusted)	Model 2 (Adjusted for parents/ grandparents covariates <sup>a</sup> )	Model 3 (Adjusted for children covariates <sup>b</sup> )	Model 4 (Adjusted for parents/ grandparents <sup>a</sup> and children covariates <sup>b</sup> )
Informal assistance				
No informal assistance	Reference	Reference	Reference	Reference
Informal assistance (1–10 h/month)	0.39* (0.14–1.05)	0.37* (0.12–0.11)	0.32** (0.12–0.88)	0.28** (0.08–0.91)
Informal assistance (11+ h/month)	0.34 (0.06–1.86)	0.30 (0.05–1.65)	0.30 (0.04–2.18)	0.24 (0.03–1.75)
Emotional support				
No emotional support	Reference	Reference	Reference	Reference
Emotional support (1–12 h/month)	0.60 (0.20–1.76)	0.73 (0.17–3.15)	0.42 (0.14–1.21)	0.41 (0.10–1.67)
Emotional support (13+ h/month)	3.16** (1.18–8.48)	3.63** (1.18–11.12)	2.54* (0.85–7.59)	2.52 (0.68–9.33)
Financial support				
No financial support	Reference	Reference	Reference	Reference
Financial support (1–50 \$/month)	0.08** (0.01–0.61)	0.11** (0.02–0.60)	0.06*** (0.01–0.44)	0.04*** (0.01–0.23)
Financial support (51+ \$/month)	0.43 (0.14–1.28)	0.50 (0.14–1.75)	0.38* (0.13–1.12)	0.59 (0.17–2.02)

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

<sup>a</sup> Parents/grandparents covariates include major depression at baseline, age, race, education, working status, marital status, and perceived physical health.

<sup>b</sup> Children covariates include number of children, having chronic disease or disability, emotional problems, and financial problems.

Table 2 describes the distribution of ABC. Women had a significantly longer duration of emotional support by ordered logistic regression. Almost half of the women provided emotional support longer than 13 h per month, while one-third of men provided the same support. Although not significant, women also provided a longer duration of informal assistance. Men are more likely to support children and grandchildren financially, and they tend to provide larger amounts of money than women; however, the difference was not statistically significant.

Table 3 shows weighted odds ratio of MD in 1998 by ABC among women. Over all, ABC in 1995–1996 was not associated with MD in 1998 among women in either model. We found a weak harmful effect of longer emotional support (13+ h/month) on MD in Model 3 and lower amount of financial support (1–50 dollars/month) on MD in Model 2 and Model 4.

Table 4 shows the weighted odds ratio of MD in 1998 by ABC among men. In model 4, men who provide shorter informal assistance (1–10 h/month) were 72% less likely to have MD in 2–3 years. Financial supportive behavior also had a protective effect on major depression: men who give 1–50 dollars per month were 96% less likely to have MD 2–3 years later. Interestingly, a dose–response was not observed for both ABC: fathers who provide longer informal assistance (11+ h/month) and higher amounts of financial support (51+ dollars/month) were not significantly associated with MD. On the contrary, longer emotional support (13+ h/month) by men had a harmful effect on father's MD in Model 1 (OR: 3.16, 95% CI: 1.18–8.48) and Model 2 (OR: 3.63, 95% CI: 1.18–11.12). This association became non-significant after adjusting for children's covariates (Model 3 and Model 4).

#### 4. Discussion

Among men, providing a moderate amount of informal assistance or financial support, but not emotional support, had a protective effect on the onset of MD in 1998. Among women, the impact of ABC on MD in later life was not observed. Our first hypothesis, that ABC has a protective effect on MD, was supported among men, but not among women. Our second hypothesis, that a protective effect of ABC on MD would be higher among men than women, was supported as well.

Baruch and Barnett's study (1986) examining a fathers' participation in family work found that fathers who engaged in child care felt more competent and satisfied in their parental roles and reported higher self-esteem than fathers who did not participate in child care. In a separate study by Barnett et al. (1992) looking at men's multiple roles and their relationship to men's

psychological distress; it was shown that the quality of both men's marital and parental roles helped to buffer men from the negative mental health effects associated with a poor job-related experience. Therefore, fathers/grandfathers who engage in ABC are likely to feel more competent in their parental-role and to feel fulfilled, helping to buffer the development of MD in men. Plaisier et al. (2008) found that the work role had a protective effect for depression among men, in which having a job was related to positive consequences for men's self-image. Applying this argument, providing ABC might improve men's self-image.

However, as a cautionary note, too much informal assistance and financial support may be stressful and dilute the beneficial impact. Our results did not show a dose–response for informal assistance and financial support by males on the development of MD in later life. This suggests that moderate amounts of these ABC have a protective effect; however, if it is too much, say, 20 h of informal assistance per month or 500 dollars of financial support, stress may arise and dilute the rewards of doing these ABC. If fathers provided higher amounts of ABC, they may have higher expectations for a positive response from children. However, if the response from children was less positive than expected, fathers might be disappointed.

Generally speaking, ABC were not associated with MD in later life among women. Although a weak harmful effect was found for longer emotional support and smaller amounts of financial support, these associations are hard to interpret as children's covariates are not sufficiently covered. Non-association between ABC and MD among women suggests that doing something for children/grandchildren is less stressful and less rewarding for women. One way of interpreting this finding includes mothers regarding ABC as a part of the normative family role (Simon, 1995). The sex difference is argued to be due to differences in the salience of the parental role for men and women. For example, it is taken for granted that mothers are to take care of children, therefore, mothers rarely improve their self-image through providing ABC. Rather, they may not feel fulfilled and instead feel guilty if the response from children was negative even after providing altruistic behaviors. In other words, for mothers, ABC did not change their mental health status; it is neither stressful nor rewarding.

We found that providing higher amounts of emotional support for children was harmful for MD among men. The finding that specific types and amounts of ABC yields distress for parents/grandparents contributes to the caregiving literature. Providing informal assistance and financial support was protective for major depression; whereas, providing emotional support was harmful for

major depression among men. Our findings can be explained using the ‘caregiving stress model’ explained by Pearlman et al. (1990) in which a distinction is made between primary stressors (e.g. strains that stem directly from the patient) versus secondary stressors that stem from the conditions (e.g. overload). As emotional support is not physically stressful, providing high amount of emotional support to children acts as a type of secondary stressor. The harmful effect of emotional support for men can be explained by the responses from children; children who need emotional support are harder to satisfy and children may demand emotional support even if fathers/grandfathers think that they have given enough. On the contrary, providing informal assistance and financial support are easy ways to satisfy a child/grandchild. According to traditional social roles, mothers are said to have more nurturing qualities, therefore, mothers tend to be the ones to provide emotional support for children. This helps to explain why it’s harmful for fathers to provide high amounts of emotional support.

Several limitations need to be addressed. First, this study has a relatively small sample size for a nationally representative sample. Although we applied weighting in the analysis, further research using larger sample sizes could produce more robust results. Second, relatively smaller numbers of subjects precluded to investigate the association between ABC and MD using more detailed categorization of ABC. Third, we could not adjust for all the possible parents/grandparents and children covariates which influences the onset of MD. Covariates of grandchildren are not included either. For example, if we could include job stress as parents/grandparents’ covariates or bullied experience as children covariates, the results may change. Fourth, we could not assess other types of ABC, such as playing with children or helping children to study. As specific types of ABC were associated with MD, it is needed to investigate the association between a wider range of ABC and MD. Fifth, children’s responses to parental ABC were not measured. If the child’s response was negative, the positive impact may not be expected. The interaction between parent’s and children’s reactions to parental altruistic behavior needs to be investigated. Sixth, with regard to outcome measures, it would be better to diagnose MD using DSM-IV, which is currently used. In addition, other types of mental disorders which are associated with psychological distress, such as generalized anxiety and panic disorders, were not used in the present study, as a follow-up to the MIDUS study measured MD only. Further research measuring a wider spectrum of mental disorders may confirm the protective effect of ABC on paternal mental health.

Despite these limitations, there are several strengths to this study. First, we used a longitudinal design in order to determine the direction of associations and infer causality. MD at baseline was adjusted in the final model; therefore, reverse causation (i.e. having MD is the cause of doing less ABC) may not explain the protective effect of ABC on MD among men. Second, the MIDUS study used an established diagnostic scale of MD based on the DSM-III-R. The results found in the present study are applicable in clinical settings, where the DSM is used. Third, the data collected in the MIDUS study is a nationally representative sample; therefore, the findings can be generalized within the United States society. Fourth, the findings showed concrete types and amount of ABC to prevent MD. Previous research tends to fail to suggest concrete suggestions for altruistic behaviors.

Based on the findings, we have several implications. In order to ascertain the effectiveness of ABC to prevent MD prospectively, especially for men, it is needed to set up a community-based randomized controlled study. In addition, it might be useful for psychiatrists and clinical psychologists to know that ABC is a predictive protective factor of MD for men, but not for women.

In conclusion, the impact of ABC on MD in 2–3 years varies depending on the types of ABC and the sex of parents/grandparents. Moderate amounts of informal assistance and financial support had a protective effect on MD in later life among fathers/grandfathers, but not among mothers/grandmothers. It is recommended to set up a randomized controlled study to ascertain the effectiveness of ABC in the prevention of MD of parents/grandparents. Further research using larger sample sizes and longitudinal study designs are also needed to confirm the findings in this study.

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#### **Conflict of interest**

No conflict declared.

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