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## Family economic strengthening and mental health functioning of caregivers for AIDS-affected children in rural Uganda

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### Abstract

In sub-Saharan Africa, many extended families assume the role of caregivers for children orphaned by AIDS (AIDS-affected children). The economic and psychological stress ensued from caregiving duties often predispose caregivers to poor mental health outcomes. Yet, very few studies exist on effective interventions to support these caregivers. Using data from a randomized controlled trial called Suubi-Maka ( $N = 346$ ), this paper examines whether a family economic strengthening intervention among families caring for AIDS-affected children (ages 12–14) in Uganda would improve the primary caregivers' mental health functioning. The Suubi-Maka study comprised of a control condition ( $n = 167$ ) receiving usual care for AIDS-affected children, and a treatment condition ( $n = 179$ ) receiving a family economic strengthening intervention, including matched savings accounts, and financial planning and management training to incentivize families to save money for education and/or family-level income generating projects. This paper uses data from baseline/pre-intervention (wave 1) interviews with caregivers and 12-month post-intervention initiation (wave 2). The caregiver's mental health measure adapted from previous studies in sub-Saharan Africa had an internal consistency of .88 at wave 1 and .90 at wave 2. At baseline, the two study groups did not significantly differ on caregiver's mental health functioning. However, at 12-month follow-up, multiple regression analysis located significant differences between the two study groups on mental health functioning. Specifically, following the intervention, caregivers in the treatment condition reported positive improvements on their mental health functioning, especially in the symptom areas of obsession–compulsion, interpersonal sensitivity, hostility, and psychoticism. Findings point to a need for programs and policies aimed at supporting caregivers of AIDS-affected children to begin to consider incorporating family-level economic strengthening components in their usual care protocols, especially in low-resource countries of sub-Saharan Africa. Economic empowerment programming may help enhance the well-being of caregivers and their families.

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## Keywords

Uganda; sub-Saharan Africa; orphaned children caregivers; mental health; children savings accounts

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## Introduction

In sub-Saharan Africa, 15 million children below age 18 are estimated to have lost one or both parents to AIDS (UNAIDS, 2010). In Uganda, one of the countries in sub-Saharan Africa heavily affected by HIV/AIDS, an estimated 1.2 million children have been orphaned as a direct result of AIDS (UNICEF, 2012). Without the presence of their biological parents, care and support for these children, both emotionally and economically, continue to be a challenge to society as a whole. Indeed, national surveys from 40 sub-Saharan African countries indicate that one in six households (with children) is caring for an orphaned child, and 90% of orphaned children who have lost both parents are relying on the care of extended family members (Monasch & Boerma, 2004).

In communities affected by HIV/AIDS, the disease tends to kill the young and those in their prime years of economic production. This leaves behind children with socially and economically disadvantaged caregivers (DeSilva et al., 2008). The ongoing stress to meet AIDS-affected children's health-care, educational, and food security needs brings serious mental health impacts to caregivers and their families (Kuo & Operario, 2009). Caregivers' psychological well-being is an important determinant of parenting quality. This has been shown to have a direct impact on children's well-being (Armstrong, Birnie-Lefcovitch, & Ungar, 2005). Given the significant implications of caregivers' mental health, this study aims at contributing to the body of literature on the potential of evidence-based interventions in addressing the mental health needs of orphaned children's caregivers. Specifically, the study evaluates how a family-based economic strengthening intervention, guided by asset theory (Sherraden, 1990), may affect mental health functioning of caregivers in Uganda – a country heavily affected by HIV/AIDS.

## Literature review

### Mental health of caregivers of orphaned children

Nearly half of the population in sub-Saharan Africa lives on less than \$1.25 a day (UNDP, 2012). It is well documented that the financial strain people in poverty experience might deteriorate their psychological health. Lund et al. (2010) carried out a systematic review of 115 studies on poverty and mental disorders in low- and middle-income countries and found positive associations between a variety of poverty measures and common mental health disorders (e.g., depression, anxiety, and somatoform disorders). The authors noted that the pathway of this association could be explained through the social causation hypothesis, which holds that conditions of poverty may increase the risk of mental illness through elevated stress, social exclusion, and decreased social capital. For caregivers of AIDS-affected orphans, caregiving responsibilities, in addition to being in poverty, may expose caregivers to greater psychological risks.

In regard to demographic characteristics and economic stability, caregivers for AIDS-orphaned children tend to be female and older, with fewer years of education and no access to emergency credit for family financial stability. Moreover, caregiving families for AIDS-orphaned children tend to be large with several child dependents (DeSilva et al., 2008). These disadvantageous factors, coupled with the fact that most countries in sub-Saharan Africa have no established government social welfare support for families caring for AIDS-affected families, place such families at greater economic and psychological risk in their caregiving role. Caregivers may experience exacerbated chronic health conditions, stress-related somatic complaints, or poor mental health functioning due to the stress to meet their children's food security, health care, and educational needs (Kuo & Operario, 2009, 2011; Kuo, Operario, & Cluver, 2012).

Recent studies indicate that in comparison to caregivers for non-orphaned children, caregivers of AIDS-orphaned children suffer from debilitating mental health outcomes (DeSilva et al., 2008; Kuo & Operario, 2011; Kuo et al., 2012). For example, Kuo et al. studied over 1500 adult caregivers in South Africa and found that caregivers of orphaned children were significantly more likely – in comparison to their non-orphan caregivers – to meet the clinical threshold of depression and report elevated levels of anxiety, post-traumatic stress, and overall poor health (Kuo & Operario, 2011; Kuo et al., 2012). Similar results were reported by DeSilva et al. (2008) and Ssengonzi (2007). Specifically, a qualitative study in Uganda (by Ssengonzi (2007)) found that caregivers of AIDS-orphaned children experience high levels of economic, emotional, physical, and nutritional stress. This adversely impacts on the caregivers' mental and physical health functioning.

Research delineating mechanisms contributing to caregivers' poor mental health and physical health functioning points to the influence of poverty, unemployment as well as caregivers' disadvantageous demographic attributes, including being older, female, more poorly educated (Kagotho & Ssewamala, 2012; Kuo & Operario, 2011; Kuo et al., 2012). Specifically, Kagotho and Ssewamala found that economic status (measured by having cash savings and financial support from others) is highly negatively correlated with the depression levels – meaning that caregivers with cash savings and financial support were less likely to be depressed.

Studies on caregivers often share limitations of not being based on strong theoretical framework, not employing large enough random samples with enough statistical power, not utilizing control groups, and not using longitudinal data to observe changes over time (Kuo & Operario, 2009). In sub-Saharan Africa, limited evidence exists that rigorously documents the effectiveness of interventions focused on caregivers of orphaned children, especially in addressing caregivers' mental health functioning (Lund et al., 2011). Taken as a whole, existing studies point to a need for interventions to address the mental health functioning of caregivers impacted by poverty. By this writing, there are few rigorous studies examining the impact of economic strengthening interventions on psychological well-being of caregivers (Lund et al., 2011). Against that backdrop, this paper examines the impact of a family economic strengthening intervention on the mental health functioning of caregivers for AIDS-affected children.

## An economic strengthening intervention guided by assets-theoretical framework

Asset theory posits that assets have psychological, social, and economic benefits for individuals and families. When people hold assets, their behavior, attitudes, hopes for the future, and overall health are influenced (Sherraden, 1990). Several empirical studies by Ssewamala et al. – exclusively focused on orphaned and vulnerable children support this theory in the sub-Saharan African context (Curley, Ssewamala, & Han, 2010; Ssewamala, Alicea, Bannon, & Ismayilova, 2008; Ssewamala, Han, & Neilands, 2009; Ssewamala, Han, Neilands, Ismayilova, & Sperber, 2010; Ssewamala & Ismayilova, 2009). For example, using data from a feasibility study that recruited AIDS-orphaned children under an asset-building program called SEED-Uganda, Ssewamala et al. found that although adolescents in the treatment and control groups did not significantly differ on their baseline scores on the key outcome variables of interest (specifically, educational planning and HIV prevention attitudes), data obtained at 12-month follow-up revealed significant differences between children in the treatment and control groups on these outcomes, with children in the treatment group registering more positive changes on all these outcomes. Findings from a similar study, called Suubi-Uganda, with a bigger sample and a relatively longer follow-up period (3 years) pointed to similar outcomes on a multitude of outcomes, including children’s mental health functioning (Ssewamala, Neilands, Waldfogel, & Ismayilova, 2012); self-esteem and physical health (Ssewamala et al., 2009); and educational outcomes (Ssewamala & Ismayilova, 2009).

Yet, however informative the SEED and Suubi-Uganda studies were, they were limited by a relatively small sample and an exclusive focus on children. They did not examine the impact of the intervention on the caregivers of the children. The current paper – focused on Suubi-Maka – is different from earlier studies in that it examines the impact of a family economic strengthening program on the mental health functioning of the caregivers. It is possible that an economic empowerment intervention may improve the outcomes of children without necessarily improving the outcomes of their caregivers. It is also possible that when an intervention provides an economic support mechanism, a caregiver’s stress level will be reduced and mental health well-being improved. To the best of our knowledge, there is no study that has rigorously examined – using a randomized controlled trial (RCT) – the impact of an economic empowerment intervention on the mental health outcomes of caregivers. Hence the current study will contribute to our understanding of the impact of an actual intervention focused on economic strengthening in addressing caregivers’ distress and mental health functioning.

In sum, the research question of this study is: Does a family economic strengthening intervention rooted in an assets-accumulation theoretical framework improve mental health of caregivers? If so, what aspects of mental health functioning improve?

### The intervention: Suubi-Maka

Suubi-Maka, a Luganda word meaning “Hope for Families”, is a RCT study funded by National Institute of Mental Health (NIMH; grant number RMH081763) and administered from 2008 to 2012. Suubi-Maka examines the effect of a family economic empowerment intervention on AIDS-affected children and their caregivers. The intervention creates

economic opportunities for families in Uganda who are caring for children orphaned due to the AIDS pandemic. The Suubi-Maka program contains three key components. First, it provides matched child development accounts (CDAs) for enhancing children's educational opportunities and for sponsoring family-level income generating projects. Second, it provides an adult mentor for children so they could have an ongoing caring relationship. An ongoing caring relationship is believed to be a source of resilience and is protective of mental health when they experience stress and adversity. Third, it provides financial planning and management workshops focused on asset building and future planning for children and their caregivers.

## Methods

### Sample and data

A total of 346 AIDS-orphaned children (defined as those who have lost one or both parents to AIDS) enrolled in the last two years of primary school (average age 14) as well as their primary caregivers ( $N = 346$ ) were recruited to participate in the Suubi-Maka study. Children were recruited from ten semi-urban public primary schools located in Rakai and Masaka Districts. The two districts are characterized by high HIV/AIDS prevalence rates relative to other districts in the country, with a prevalence rate of 8.5% compared to a national average of 6.5% (Government of Uganda, 2010). All students from the 10 schools meeting the inclusion criteria were invited to participate in the study. All eligible participants accepted to participate. The 10 schools included in the study were matched on their level of academic performance based on the government-administered primary leaving examinations (PLE). The PLE is a national examination taken by every student graduating from primary school. The same exam is used as a qualification for admission to secondary school. Each of the 10 selected schools was randomly assigned to one of the two study conditions: Suubi-Maka (treatment;  $n = 179$ ) or Usual Care (control;  $n = 167$ ).

All selected children from a particular school received the same intervention. This was intended to prevent contamination. Each child in the control condition received the usual services for orphaned children (Usual Care) plus mentorship. Usual care comprises the provision of counseling, food aid, scholastic materials (including textbooks) provided by faith-based organizations, nongovernmental organizations, and pastors in the community. Mentorship was conducted by undergraduate students from a local university: Makerere University. Mentorship was done over a 12-month period with an average of one mentorship meeting per month. The exercise followed a standardized manual that covers topics on asset-building, future planning, and self-protection from risk.

Each child in the Suubi-Maka condition received the Usual Care (described above) plus a matched CDA. The matched savings had to be spent on children's education and/or family small business development. The accounts were matched at a rate of 2:1 – meaning that the intervention contributed \$2 dollars to each \$1 saved by a participating family. In addition, each child and their adult caregiver in the Suubi-Maka condition also received a 1–2 hour financial planning and management training, including training on microenterprise development and how to start an income-generating project.

The caregiver questionnaires were administered via in-person interviews. All interviews were conducted by trained Ugandan research assistants familiar with the study geographical area and fluent in the local language spoken in the area: Luganda. Each interview was conducted in a private room at the schools to which the caregivers' children attended. Each interview lasted approximately 30 minutes. This paper utilizes data from the first two assessment points: baseline (pre-intervention/wave 1), and at 12-month follow-up (post-intervention initiation/wave 2). In the analysis, the sample size was reduced from the original 346 (at baseline) to 330 at wave 2 due to missing values and/or attrition (see Table 1). No significant differences were found between the dropout group and the overall sample on observable socioeconomic characteristics.

## Measures

The outcome measure for this study is mental health functioning of caregivers. The mental health functioning scale used was adapted from the Brief Symptom Inventory (Derogatis, 1993). This adapted scale has been used in previous studies in Africa with ideal psychometric properties (Kagotho & Ssewamala, 2012; Ssewamala et al., 2008). The scale consists of 34 items covering nine mental health symptom dimensions, ranging from somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, to psychoticism (e.g., "Feeling no interest in things", "Feeling hopeless about the future", "Feeling easily annoyed or irritated", "Feeling that you are watched or talked about by others", "Poor appetite", "Pains in heart or chest", etc.). Each item has 5-point responses ranging from never (1) to always (5). Internal consistency (Cronbach's  $\alpha$ ) of the scale is .88 at wave 1 and .90 at wave 2. We created a summated score for the 34 items. A higher score represents higher levels of mental health distress. Summated scores for each symptom dimension were also calculated to further delineate the program effect.

Participation in the Suubi-Maka intervention program is a key independent variable. This variable is dichotomized as Yes (treatment group) or No (control group). The study includes several covariates of caregiver's socioeconomic status and family characteristics. First, we include age and gender of caregivers and household size. Second, three proxies for financial strain and financial security caregivers experience were included: (1) the presence of financial support from others (dichotomized as "Yes" or "No"); (2) employment of caregivers (categorized as "no work", "farmers", and "other work"); and (3) the presence of financial savings (dichotomized as "Yes" or "No"). In addition, the study controls for family relations – measured by six items with five response points (never, rarely, sometimes, most of the time, and always) (e.g., "Do your family members ask each other for help before asking nonfamily members for help?" "Do family members like to spend free time with each other?", etc.). The Cronbach's alpha for the family relations items is .72, signifying an acceptable level of internal consistency. Last, we capture and include in our regression models changes in family relations between waves 1 and 2 (calculated as family relations at wave 2 minus family relations at wave 1).

## Analytical procedure

First, we analyze the socioeconomic background of participants using univariate statistics (means and frequencies). Second, we run bivariate statistics comparing the treatment group versus the control group, specifically using independent *t*-tests for continuous variables (caregiver's age, household size, family relations, and mental health), plus cross tabulation for categorical variables (caregiver's gender, financial support from others, employment status, and financial savings). Third, we utilize multiple regression analysis to examine the impact of Suubi-Maka intervention program on caregivers' overall mental health functioning at wave 2 controlling for the covariates at wave 1. Further, we examine the program impact on each mental health symptom dimension.

## Results

### Descriptive and bivariate analysis findings

Caregivers' average age is 45.93. A majority of caregivers are females (79.39%). The average household size is 6.53 people. About 44% of caregivers reported that they had other people financially supporting their families/households. In regard to family relations, participants reported a mean score of 26.01 (wave 1) and 27.02 (wave 2) on an overall summated score of 30. The theoretical range on the family relations measure is 6 to 30. Thus, the reported scores on family relations signify high levels of family cohesion.

At baseline/pre-intervention, the two study groups did not report any significant differences on caregiver's gender, household size, financial support from others, family relations, and mental health functioning. However, our analyses located some statistical differences (at baseline) between the two groups on: age of caregivers, employment status, and whether they had any money saved. Specifically, the control group reported relatively older caregivers (mean age = 48 years) compared to caregivers in the treatment condition (mean age = 44 years). In addition, caregivers in the treatment condition were less likely to report their primary employment as farmers; and they were also more likely to report having some money saved (not necessarily in the bank) than caregivers in the control condition. We control for all these observable differences in the regression analysis. It is important to note that although the two study groups did not differ on overall mental health functioning at baseline (74.05 for the control vs. 73.23 for the treatment condition), at wave 2 our analysis located significant differences between the two groups. The treatment group reported better mental health functioning scores (60.39) than participants in the control condition (65.70).

### Multivariate analysis findings

Table 2 presents results on whether participation in the SUUBI-Maka program influences mental health functioning of caregivers for AIDS-affected children. We control for socioeconomic characteristics and family characteristics.

First, the key finding is that caregivers in the treatment condition have significantly lower levels of mental health distress at wave 2 than caregivers in the control group ( $\beta = -4.07$ , 95% *CI* =  $-7.35, -.79$ ).

Second, the changes in family relations between wave 1 and 2 have a significant influence on caregivers' mental health functioning ( $\beta = -.90$ , 95%  $CI = -1.45, -.35$ ). Caregivers reporting a positive change in family relations are also likely to report lower levels of mental health distress at wave 2.

Third, caregivers who are older reported significantly higher level of mental health distress than caregivers who are younger ( $\beta = .12$ , 95%  $CI = .00, .24$ ).

Fourth, caregivers with high levels of mental distress at wave 1 are likely to report higher levels of mental health distress at wave 2 ( $\beta = .50$ , 95%  $CI = .41, .59$ ). The other covariates are not significantly related to mental health distress at wave 2.

Table 3 presents caregiver's mental health functioning in each symptom dimension at baseline and 12-month follow-up. After controlling for covariates, participation in the Suubi-Maka program is associated with reduced obsession-compulsion, interpersonal sensitivity, hostility, and psychoticism.

## Discussion

Findings from this study suggest that family economic strengthening may be a viable and effective approach, over and above usual care, in supporting poor caregivers for AIDS-affected children in low resource settings, experiencing psychological distress from caregiving responsibilities. The intervention presented in this paper sets a new innovative direction for program design, a direction that is different from the traditional psychological counseling approach to address mental health issues. Findings from this RCT show that interventions assisting families to accumulate assets and financial resources not only improve the economic well-being of families, but may also improve the mental health functioning of caregivers for orphaned children. Indeed, as premised by asset theory, it seems financial assets (in this case savings and small business development) do exhibit multi-faceted benefits economically and psychologically. Interventions that promote family-level economic strengthening may help enhance the psychosocial well-being of caregivers.

The negative association between changes in family relations during the reported study period (baseline to 12-month follow-up) and caregiver's level of psychological distress may suggest that when caregivers experience an improvement in family relations, their psychological distress may be reduced. To our knowledge, there is no known research documenting the impact of family relations on the mental health functioning of caregivers for AIDS-affected orphans. Supporting and improving the family functioning of the caregiving families might also be an intervening point to elevate the mental health functioning of caregivers.

Further, we find that older caregivers tend experience a higher level of psychological distress. This finding corroborates earlier findings by DeSilva et al. (2008). The finding is important because it highlights the necessity to have interventions catering to the needs of older caregivers, especially when addressing stress and difficulties they experience. However, more studies are needed to explore how to best meet the specific needs of older caregivers.



Another attempt we have made in this study is to explore how a family economic strengthening intervention affects specific mental health symptom dimensions of caregivers. Little is known about caregivers' mental health functioning beyond the scope of depression and anxiety, let alone how different mental health symptoms respond to interventions. Utilizing the subscales in the overall mental health functioning questionnaire, we find that although caregivers' symptoms of depression and anxiety do not improve significantly through the Suubi-Maka program, caregivers' obsessive compulsive symptoms – a subtype of anxiety – are reduced. In addition, we find that participation in the Suubi-Maka program is significantly associated with reductions in caregivers' emotional hostility and unstableness (being easily irritated and experiencing temper outbursts out of control), psychotic symptoms (social alienation and psychotic thoughts) as well as interpersonal sensitivity (a sense of inferiority and discomfort during interpersonal interactions).

The positive program impact on mental health was registered not only for caregivers but also for the children participants included in the study. Han, Ssewamala, and Wang (2013) examined impacts of the same Suubi-Maka intervention on AIDS-affected children's mental health well-being. They found children's participation in the Suubi-Maka program to be associated with improved mental health. Specifically, levels of hopelessness and depression showed statistically significant reductions for program participants when compared to those in the control group. However, through which mechanism Suubi-Maka influence both the psychological well-being of caregivers and orphaned children requires future examination.

While this study offers exciting evidence on effective services for caregivers of AIDS-affected children, several limitations are worth noting. First, the study did not collect information regarding caregivers' physical health status. Therefore, we are unable to know whether family economic strengthening interventions also have the potential to bring positive impacts to caregiver's physical health. Second, the Suubi-Maka program aims at helping both the AIDS-affected children and their caregiving families to thrive. Thus, caregivers are not the exclusive target for the intervention. A great proportion of the intervention components are provided to the children, with the hope that caregivers' burden could be alleviated to an extent. Therefore, we do not know how caregivers' mental health functioning would respond to economic empowering interventions if they (caregivers) were the exclusive target. Third, the reported data are derived from self-report of caregivers. Future studies may want to incorporate administrative and biomedical data.

## Conclusion

This study examined the impact of a family economic strengthening intervention, Suubi-Maka, on mental health functioning of caregivers providing care for AIDS-affected orphans. Through this experimental study design, findings support the notion that economic empowerment interventions may have the potential to reduce mental health distress of caregivers for orphaned children. The findings contribute to the existing scanty evidence on effective interventions for addressing caregivers' psychological distress. To support caregivers to cope with stresses associating with caregiving, the conventional psychological counseling may not be the only avenue. Interventions empowering families to accumulate economic/financial assets have multiplier effects of not only enhancing the family's

financial resources and children's well-being but also improving the psychological functioning of caregivers. This finding could inform the design and implementation of future interventions for caregivers, especially those supporting AIDS-orphaned children in low-resource countries. Future studies should investigate the mechanisms of change, through which economic strengthening and family relations influence mental health functioning of caregiver. Studies are also needed to delineate, through the family economic empowerment interventions, how the mental health of caregivers affects orphans' mental health functioning and other psychosocial outcomes.

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**Table 1**

Descriptive and bivariate statistics of the sample.

	Total sample (N = 330)	Control group (n = 159)	Treatment group (n = 171)	<i>t</i> -Statistics or $\chi^2$
	Mean (SD) or %	Mean (SD) or %	Mean (SD) or %	
Caregiver's age	45.93 (14.70)	48.00 (15.15)	44.00 (14.03)	2.49*
Caregiver's gender (%)				
Male	20.61	18.87	22.22	.57
Female	79.39	81.13	77.78	
Household size	6.53 (2.28)	6.42 (2.07)	6.63 (2.47)	-.81
Employment				
No work	9.09	8.81	9.36	21.79***
Farmers	61.52	73.58	50.29	
Other work	29.39	17.61	40.35	
Any money saved				
No	65.45	70.44	60.82	3.37†
Yes	34.55	29.56	39.18	
Financial support from others (%)				
No	56.36	57.86	54.97	.28
Yes	43.64	42.14	45.03	
Family relations at wave 1	26.01 (3.49)	26.23 (3.18)	25.81 (3.75)	1.11
Family relations at wave 2	27.02 (2.93)	27.11 (2.81)	26.95 (3.04)	.49
Change of family relations	1.01 (4.23)	.87 (4.26)	1.14 (4.21)	-.57
Mental health at wave 1	73.63 (19.13)	74.05 (19.44)	73.23 (18.88)	.39
Mental health at wave 2	62.95 (17.96)	65.70 (18.74)	60.39 (16.86)	2.71**

Notes: (1) For bivariate statistics, *t*-tests were used for continuous variables and chi-square tests were used for categorical variables.

(2) †*p* < .10;

\* *p* < .05;

\*\* *p* < .01;

\*\*\* *p* < .001.

(3) Original sample size was 346. Four cases were excluded from the analysis due to missing information (3 from the treatment group and 1 from the control group). An additional 12 cases were dropped from the analysis due to attrition (five from the treatment group and seven from the control group).

**Table 2**

Regression on caregiver's mental health.

	<b>b(SE)</b>	<b>95% CI</b>
Constant	37.91 (11.31)**	15.65, 60.17
Treatment group	-4.07 (1.67)*	-7.35, -.79
Caregiver's gender (Male)		
Female	3.89 (2.18) <sup>†</sup>	-.40, 8.19
Caregiver's age	.12 (.06)*	.00, .24
Household size	-.32 (.37)	-1.04, .41
Employment (No work)		
Farmers	1.18 (2.95)	-4.63, 6.98
Other employment	.53 (3.26)	-5.89, 6.95
Any money saved (No)		
Yes	-.57 (1.81)	-4.12, 2.99
Financial support from others (No)		
Yes	.58 (1.73)	-2.83, 3.99
Family relations at wave 1	-.62 (.34) <sup>†</sup>	-1.29, .04
Changes of family relations	-.90 (.28)**	-1.45, -.35
Caregiver mental health at wave 1	.50 (.04)***	.41, .59
Adjusted $R^2$		.350
$F$ -value ( $df$ )		17.10*** (11)
$N$		330

Notes: variables in parenthesis are references.

<sup>†</sup>  $p < .10$ ;\*  $p < .05$ ;\*\*  $p < .01$ ;\*\*\*  $p < .001$ .

Table 3

Descriptive, bivariate statistics, and regression of treatment effects on mental health sub-indicators.

Sub-indicators	Total sample ( <i>N</i> = 330)		Control group ( <i>n</i> = 159)		Treatment group ( <i>n</i> = 171)		Regression on treatment effects on caregiver's mental health sub-indicators			
	Mean ( <i>SD</i> )	Mean ( <i>SD</i> )	Mean ( <i>SD</i> )	Mean ( <i>SD</i> )	<i>t</i> -Statistics	<i>b</i> ( <i>SE</i> )	95% <i>CI</i>	Adjusted <i>R</i> <sup>2</sup>	<i>F</i> -value ( <i>df</i> )	
Somatization (7-item)										
Wave 1	14.27 (5.65)	15.09 (5.87)	13.50 (5.33)	2.58*						
Wave 2	13.98 (5.15)	14.90 (5.26)	13.12 (4.91)	3.17**		-0.69 (.45)	-1.57 .19	.4350	24.03*** (11)	
Obsession-Compulsion (6-item)										
Wave 1	14.68 (4.63)	14.53 (4.53)	14.82 (4.73)	-0.56						
Wave 2	11.88 (4.37)	12.55 (4.56)	11.27 (4.11)	2.68**		-1.09 (.45)*	-1.98 -.20	.1905	8.04*** (11)	
Interpersonal Sensitivity (3-item)										
Wave 1	6.49 (2.82)	6.50 (2.72)	6.49 (2.91)	.06						
Wave 2	5.45 (2.38)	5.76 (2.40)	5.17 (2.32)	2.27*		-0.61 (.25)*	-1.10 -.11	.1438	6.02*** (11)	
Depression (4-item)										
Wave 1	8.13 (2.77)	8.13 (2.92)	8.14 (2.63)	-0.05						
Wave 2	6.61 (2.51)	6.72 (2.38)	6.50 (2.63)	.80		-0.07 (.27)	-0.61 .47	.1110	4.74*** (11)	
Anxiety (3-item)										
Wave 1	6.59 (2.90)	6.88 (3.10)	6.33 (2.68)	1.73†						
Wave 2	5.30 (2.37)	5.58 (2.49)	5.05 (2.22)	2.05*		-0.32 (.24)	-0.79 .15	.2281	9.84*** (11)	
Hostility (2-item)										
Wave 1	4.05 (1.98)	3.94 (1.93)	4.15 (2.03)	-0.93						
Wave 2	3.72 (1.71)	3.94 (1.70)	3.52 (1.71)	2.25*		-0.47 (.18)**	-0.82 -.12	.2039	8.66*** (11)	
Phobic Anxiety (1-item)										
Wave 1	3.04 (1.44)	2.87 (1.43)	3.19 (1.44)	-2.06*						
Wave 2	2.14 (1.25)	2.15 (1.18)	2.13 (1.31)	.12		-0.10 (.14)	-0.38 .18	.0094	1.28(11)	
Paranoid Ideation (3-item)										
Wave 1	7.27 (2.57)	7.30 (2.62)	7.24 (2.54)	.20						

Sub-indicators	Total sample ( <i>N</i> = 330)			Control group ( <i>n</i> = 159)			Treatment group ( <i>n</i> = 171)			Regression on treatment effects on caregiver's mental health sub-indicators			
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	<i>t</i> -Statistics	<i>b</i> (SE)	95% CI	Adjusted <i>R</i> <sup>2</sup>	<i>F</i> -value ( <i>df</i> )			
Wave 2	5.98 (2.20)	6.03 (1.98)	5.94 (2.39)	.37	-.09 (.24)	-.57,	.39	.0823	3.68*** (11)				
Psychoticism (3-item)													
Wave 1	5.57 (2.34)	5.34 (2.24)	5.79 (2.42)	-1.75 <sup>†</sup>									
Wave 2	4.44 (1.68)	4.64 (1.80)	4.26 (1.56)	2.01*	-.38 (.18)*	-.74,	-.02	.1239	5.23*** (11)				

Notes: (1) *N* = 330.

(2) <sup>†</sup>*p* < .10;

\* *p* < .05;

\*\* *p* < .01;

\*\*\* *p* < .001.

(3) Each regression model controls for caregiver's gender, age, household size, employment, savings, received financial support from others, family relations at wave 1, changes of family relations, and the corresponding mental health sub-indicators at wave 1.