Hours Spent Caregiving, Activities of Daily Living, Caregiver Gender, Role Overload, and Depression Symptoms: An Examination among Family Dementia Caregivers

Claire M. McDonald

Annapolis, Maryland

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Claire McDonald

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Committee Chair or Co-Chair
Adrian J. Bravo, Assistant Professor, Psychological Sciences
College of William & Mary

Meghan Quinn, Assistant Professor, Psychological Sciences
College of William & Mary

Danielle Dallaire, Professor, Psychological Sciences
College of William & Mary

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ABSTRACT

Background: While research has examined stressors and depression in family dementia caregivers, few studies have focused on the associations between time spent caregiving, Activities of Daily Living (ADL) dependency, role overload, and depressive symptoms. *Present Study***:** The present study tested two mediation models: hours caregiving → role overload → depressive symptoms and ADL dependency → role overload → depressive symptoms. *Methods:* The study consisted of two samples, one using data from round 11 of the National Health and Aging Trends Study (NHATS) and the National Study of Caregiving (NSOC) and the other collected data using Academic Prolific. In the NHATS/NSOC sample, participants (n = 283) were majority female (70.32%) and white (63.25%) dementia caregivers within the U.S. recruited to participate in a survey on aspects of caregiving for a Medicare beneficiary aged 65 or older. In the Prolific sample, participants (n = 150; 51.33% female, 68% white), were recruited to complete an online survey that contained many of the same questionnaires as the NSOC survey. *Results:* Results indicated a significant indirect effect suggesting that greater hours spent caregiving were associated with more depressive symptoms via higher role overload in the NHATS/NSOC sample. Additionally, there were significant indirect effects suggesting that greater ADL dependency was associated with more depressive symptoms via higher role overload in both samples. While gender did not significantly moderate the pathways in these models, women did report significantly more hours caregiving in the past month and significantly greater role overload compared to men. Conclusions: These findings suggest that depressive symptoms manifest in family dementia caregivers via role overload and warrants further investigation for clinical application.

Key words: dementia caregiving, activities of daily living, role overload, depression

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This work is dedicated to the family dementia caregiver in my own life, my grandmother Peg McDonald.

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Introduction

Approximately 80% of people living with dementia are being cared for by their families in the community (Huang, 2022). Precisely, an estimated 6.7 million Americans are living with Alzheimer’s or other dementias (e.g. Lewy Body dementia and frontotemporal lobe dementia) and at least 11 million Americans provide unpaid care for them (Alzheimer’s Association, 2023). Family caregiving generally involves significant amounts of time, energy, and money beyond what is normal in family relationships (Schulz & Martire, 2004). Nationally representative studies have found that dementia caregivers report higher emotional stress, greater physical strain, worse health, and higher depressive symptoms compared to caregivers of individuals with other disabilities (Badana et al., 2019; Ory et al., 1999; Riffin et al., 2017; Sheehan et al., 2021). Focusing on depression among this at-risk population, a recent metanalysis of 43 studies found that adjusted pooled prevalence of depression in dementia caregivers is 31.2% (Collins & Kishita, 2020). Depression reduces caregivers’ quality of life (Montgomery et al., 2018) and is even a risk factor for caregiver suicide (Joling et al., 2019). Caregiver depression can also negatively impact the care recipient; research has found an association between caregiver depression and more rapid cognitive decline of the care recipient (Norton et al., 2013). Taken together, it is crucial to establish predictors and other contributing factors of depression in dementia caregivers.

Caregiving Hours and Burden as Risk Factors

Dementia caregiving often involves assisting with Activities of Daily Living (ADLs) and/or Instrumental Activities of Daily Living (IADLs). ADLs are basic self-maintenance functions, like bathing and feeding (Katz, 1983), whereas IADLs are more complex levels of organized behavior, like housekeeping and managing finances (Lawton & Brody, 1969). Caregiver ADL and IADL assistance is a crucial factor within the caregiving context because it is associated with higher reports of caregiver physical, emotional, and financial strain (Badana et al., 2019). Research has found that dementia caregivers report higher numbers of impairments in ADLs among the persons they cared for (Sheehan et al., 2021) and assist with significantly more ADLs than nondementia caregivers (Ory et al., 1999). When a person living with dementia decreases in one ADL or IADL function, it results in nearly five more hours of monthly caregiving compared with a similar functional decrease for someone without dementia (Jutkowitz, Gozalo, et al., 2020). Moreover, Huang and colleagues (2022) found that higher level of ADL dependency predicted depression in dementia caregivers. As posited by Lazarus and Folkman's (1984) Stress Process Model, an individual's health and well-being are not affected by the stressors themselves, but by how the individual appraises them (i.e., subjective burden). Once a caregiver interprets a demand like ADL dependency as stressful, other negative outcomes may result, including depression.

In addition to ADL and IADL assistance, the amount of time spent caregiving is another crucial factor in caregiver well-being outcomes. Research has established that dementia caregivers spend significantly more hours per week providing care than did nondementia caregivers (Ory et al., 1999; Sheehan et al., 2021). Specifically, Ory and colleagues (1999) found that a higher percentage of dementia caregivers provide 40 or more hours of constant care during the week than nondementia caregivers. Additionally, the amount of time required for caregiving increases as dementia progresses. One study showed that people with dementia required 151 hours of caregiving per month at the outset of dementia and increased to 283 hours per month eight years later (Jutkowitz, Gaugler, et al., 2020). This longer duration of caring is important because it is associated with higher reports of physical strain and financial strain (Badana et al., 2019). A study by Sallim and colleagues (2015) found that, compared with caregivers who spend less time caregiving for patients with Alzheimer's Disease, caregivers who spend a greater number of hours caregiving have 2.44 times higher odds of having depression. Given such strong relationships between caregiving hours and burden on mental health, it is important to identify mechanisms linking caregiver demand (i.e., hours spent/ADLs) to elevated risk of depression.

Role Overload as a Mediator

To better understand the relationship between aspects of caregiving, like ADL assistance and caregiving duration and well-being outcomes, Pearlin and colleagues (1990) created the Stress Process Model for caregivers of people living with dementia. Pearlin's model is comprised of four domains:

backgrounds/context of stress, the stressors, mediators of stress, and outcomes of stress. The stressors are then categorized as objective or subjective indicators of stress. Objective stressors include ADL/IADL dependences, whereas subjective indicators include role overload and relational deprivation. Role overload is defined as the subjective feelings of being overwhelmed by care-related responsibilities (Aneshensel et al., 1995). Role overload can lead to burnout, which is a “psychological syndrome that emerges as a prolonged response to chronic interpersonal stressors on the job” (Maslach & Leiter, 2016, p. 103). Burnout is characterized by three dimensions: overwhelming exhaustion, feelings of cynicism and depersonalization, and a sense of ineffectiveness or lacking accomplishment (Maslach & Leiter, 2016). A metanalysis reported that both family caregivers and professional caregivers experience greater burnout compared to non-caregivers (Gérain & Zech, 2021). As posited by the Jobs Demand-Resources Model (Demerouti et al., 2001), burnout mediates the relationship between job demands (stressors) and health outcomes. Similarly, the informal Caregiving Integrative Model (Gérain & Zech, 2019) theorizes burnout as a mediator between stressors and health outcomes. In addition to these theoretical models, a recent empirical study (Yin et al., 2023) found that burnout significantly mediated the relationship between long working hours and depressive symptoms in professional caregivers (i.e., medical staff).

Of interest for this paper is role overload as a mediator of the relationship between hours spent caregiving/ADL dependency and depressive outcomes.

Research has found that dementia caregivers who reported higher levels of burnout also reported higher levels of depressive symptoms and lower quality of life (Takai et al., 2009). Fauth and colleagues (2016) found a significant positive correlation between caregiver role overload and depressive symptoms. Data from the National Health and Aging Trends Study (NHATS) indicated that greater role overload significantly predicted greater symptoms of depression and anxiety in caregivers of people living with dementia (Nah et al., 2022). Taken together, more hours spent caregiving may relate to higher risk for depressive symptoms via higher role overload. However, whether such associations differ across caregiving identities, such as caregiver gender, is limited.

Caregiving Gender as a Moderator

Aspects of caregiving identity are crucial to understanding well-being related outcomes, as some identities are risk factors. Gender is one of the main predictors of caregiver well-being (Alzheimer’s Association, 2023). Caregivers who are women experience higher levels of burden, role overload, depression and impaired health compared to caregivers who are men (Alzheimer’s Association, 2023; Fauth et al., 2016; Mills et al., 2009; Papastavrou et al., 2007). Understanding the mechanisms of stress process in women is important because approximately two-thirds of dementia caregivers are women (Kasper et al., 2014). One explanation of poorer mental health in female caregivers is that women spend more time caregiving and assist more with ADL/IADLS than male caregivers (Alzheimer’s Association, 2023; Kasper et al., 2015). It is also argued that due to gender socialization, both women and men feel that women are more responsible and obliged to provide care (Kokorelias et al., 2021). These societal expectations result in men being less likely to be involved in caregiving (Swinkels et al., 2017). It has also been observed that women are more likely to experience social restrictions because of their caring role, which can lead to poorer mental health outcomes (Papastavrou et al., 2007). As posited by Pearlin and colleagues (1990, p. 585), “Women and men live in different structural contexts and the unequal distributions of rewards, privileges, opportunities, and responsibilities leads to different kinds and intensities of stressors to which people are exposed”. Based on these findings and societal expectations, the present study examined whether relationships between caregiver burden, role overload, and depressive symptoms differed across gender (i.e., test of moderation).

Purpose of Present Study and Hypotheses

The purpose of the present study was to examine the relationships between hours spent caregiving, ADL dependency, role overload, and depressive symptoms among family dementia caregivers. We hypothesized that greater hours spent caregiving would be associated with greater depressive symptoms via higher reports of role overload (i.e., test of mediation). Additionally, we hypothesized that greater ADL dependency would be associated with greater depressive symptoms via higher reports of role overload. Furthermore, we examined how these relationships differ based on caregiver gender. Specifically, we hypothesized that associations (i.e., paths) in the model would be stronger for female compared to male caregivers (i.e., test of moderation).

Methods

Participants and Procedures

The current study used participant data from round 11 of the National Health and Aging Trends Study (NHATS) and the National Study of Caregiving (NSOC), which were collected by web or telephone from June 2021 to January 2022 (Freedman et al., 2022). NHATS gathers data from a nationally representative sample of Medicare beneficiaries ages 65 and older (Freedman et al., 2022). NSOC collects data from up to five family and other unpaid caregivers for each NHATS participant who assisted with daily activities in the last month (i.e., mobility activities, self-care activities, and household activities for health or functioning reason; Freedman et al., 2023). The population of interest for the current study was unpaid caregivers of people living with dementia.

Three types of information from NHATS were used to identify persons who had probable dementia: a report by the participant or proxy respondent that a doctor told the participant that they had dementia or Alzheimer's disease; a score that indicates probable dementia on the AD8 Dementia Screening Interview (Galvin et al., 2005), which is administered to proxy respondents who are answering the NHATS interview for the participant; and cognitive tests that evaluate the participant's memory, orientation, and executive function (Kasper et al., 2014). Of the 3,817 participants, 458 had probable dementia, 264 had possible dementia, 2666 had no dementia, and 429 were deceased, living in a nursing home, or had missing data according to the NHATS dementia classification code. Of the 458 NHATS participants with probable dementia, there were 283 corresponding caregivers with valid responses for the study variables in NSOC.

Due to the replication crisis facing psychological studies (Ioannidis, 2005; Yong, 2012), we opted to collect data from an additional sample of family dementia caregiver participants in the United States. First, we conducted a screener questionnaire in Prolific that was open to participants who identified as "caregivers" in their profile. This screener consisted of two items. The first item said "I identify as an unpaid caregiver for someone living with dementia" for the participant to endorse with a yes or no response. The second item asked the participant to "Indicate the type of dementia that the person you provide care for has been diagnosed with" with potential responses being: Alzheimer's Disease, Vascular dementia, Lewy Body dementia, Frontotemporal dementia, early onset dementia, and other. Notably, we also included two responses that were made up kinds of dementia: viral encephalitis dementia and posterior cortical atrophy dementia. Inclusion of these fake dementia diagnoses were in attempt to screen out participants who were not real dementia caregivers. Ultimately, one hundred and sixty-five participants were recruited from this screener in December of 2023. When recruiting participants on Prolific, we balanced the sample by gender. As stated earlier, caregivers are more likely to be women, which was reflected in the

NSOC sample having more women (N=199) than men (N= 84). Therefore, gender balancing the smaller Prolific sample was optimal for testing the moderating influence of gender.

Prolific participants were required to be age 18 or older, reside in the U.S., and identify as an unpaid caregiver to an individual living with dementia. Upon signing up, eligible participants completed this fifteen-minute study using an online Qualtrics survey. Informed consent was provided online to participants, and they could only begin the survey if they agreed to the terms and conditions. Participants were asked to complete a battery of questionnaires, which included scales identical to those that NSOC participants were asked, as well as attention checks to ensure data quality. After completing the battery of questionnaires, participants were paid $2.50. Fifteen participants were excluded due to failed attention checks, reporting zero hours caregiving in the past month, and failing to respond appropriately to study questions (e.g., responding with ‘31’ when asked how many hours they spent caregiving per day).

In total, there were valid responses from 433 participants across both samples: 283 participants in the NHATS/NSOC sample and 150 participants in the Prolific sample. The NHATS/NSOC sample had an average caregiver age of 64.47 (*SD* = 12.30), spent an average of 125.75 hours (*SD* = 171.73) caregiving in the past month, reported an average annual income of $65,990 (*SD* = $59,250), were majority female (70.32%) and white (63.25%). The Prolific sample had an average caregiver age of 40.43 (*SD* = 11.33), spent an average of 153.67 hours (*SD* = 168.27) caregiving in the past month, reported an average annual income of $81,240 (*SD* = $77,860), was half female (51.33%) and majority white (68%). More detailed demographic information for each sample is presented in Table 1.

Measures

Caregiving Hours. Participants were asked to respond to the following statement: 1) “Thinking about all of the ways you helped in the last month, did you help on a regular schedule or did it vary? By regular schedule, we mean the same days and times every week" (Answer yes or no). If the participant answered yes, they were then asked, “Over the past week, how many days did you help the person living with dementia? (Enter 1-7)”. If the participant answered no, they were asked, “In the last month, how many days altogether did you help” (Enter 1-31). Finally, all participants were asked, “On a given day, how many hours did you help the person living with dementia? Helping can be defined as hands on care like bathing or feeding, assisting with activities of daily living like shopping or handling finances, providing emotional support or supervising. (Enter 1-24)”. As done in a prior study by NSOC PI’s Vicky Freedman (2014), the number of days they helped in a week was multiplied by the number of hours they helped in a day, and that number was multiplied by four for participants who reported helping on a consistent schedule. To estimate the hours helped in the last month for participants who did report helping on a consistent schedule, the number of days they helped in the past month was multiplied by the number of hours they helped in a day.

Caregiving Gender Identity. Participants were asked to respond to the following statement “Which of the following best describes your gender?” and were asked to select “male” or “female”.

Activities of daily living. Activities for daily living were assessed with seven questions drawn from the mobility and self-care sections of the NHATS questionnaire (Freedman et al., 2022). The questions asked, “In the last month, did you or anyone else ever help the care recipient: 1) leave their home or building to go outside 2) get around inside their home or building 3) get out of bed 4) eat, for instance, by cutting up food or feeding them 5) shower, take a bath, or wash up 6) use the toilet and 7) get dressed, for instance, by getting clothing over their head, helping with clothing behind their back like a belt or bra, or helping them put on socks or shoes.” Participants were asked to indicate their endorsement (0 = *no* and 1 = *yes*) of each activity and the items were summed such that higher scores indicate higher levels of ADL dependency.

Role overload. Role overload was assessed using the Caregiver Overload Scale (Pearlin et al., 1990) which evaluates feelings of being emotionally overwhelmed from caregiving. Participants responded to the four items measured on a 3-point Likert scale (0 = *not very much*, 1 = *somewhat*, and 2 = *very much*). Participants were told “Here are some statements about your energy level and the time it takes to do the things you have to do. How much does each statement describe you?". Time frame was not specified in the question. An example item is, "You have more things to do than you can handle". Composite scores were created by summing items, such that higher scores indicate higher levels of role overload (Internal reliability NHATS: α = .818, Prolific: α = .794).

Depression. Depression was measured using the Patient Health Questionnaire 2-item [PHQ-2] (Kroenke et al., 2003), which assesses one's psychological state relevant to depression over the last two weeks. Participants responded to the two items measured on a 4-point Likert scale (0 = *not at all*, 1 = *several days*, 2 = *more than half the days*, and 3 = *nearly every day*). Participants were asked "Over the last two weeks, how often have you been bothered by the following problems?". The two items are "Little interest or pleasure in doing things" and "Feeling down, depressed or hopeless". Composite scores were created by summing items, such that higher scores indicate higher levels of depression (Internal reliability NHATS: α = .703, Prolific: α = .850). It is important to note that 16.61% of participants in the NHATS/NSOC sample and 29.33% in the Prolific sample exceeded the cutoff (scores > 3) for probable depression.

Statistical Analysis Plan

To test the proposed models (Hours caregiving → Role overload → depressive symptoms and ADL dependency → Role overload → depressive symptoms), path analysis using M*plus* 8.8 (Muthén & Muthén 1998-2023) was conducted across each sample, examining indirect effects of hours caregiving/ADL dependency to depressive symptoms via role overload. Within the NHATS/NSOC sample, all 283 participants had valid scores for hours spent caregiving. However, only 146 participants had valid scores for ADL dependency and thus the ADL model only included 146 participants. The ADL dependency measures came from the NHATS data, not the NSOC data, and many of the responses were coded as missing. All models included income and caregiver general health (assessed a single item and higher scores indicate better general health) as covariates. Statistical significance for all associations (direct and indirect) was determined by 95% bias-corrected bootstrapped confidence intervals (based on 10,000 bootstrapped samples) that do not contain zero.

To test whether our model was invariant or non-invariant across gender, we conducted $\chi 2$ difference tests comparing a freely estimated multi-group model to a constrained multi-group model (i.e., constraining the paths of the mediation model) to determine whether constraining the paths to be equivalent across groups resulted in a worse fitting model. The chi-square difference test is commonly used to examine model invariance.

Results

Bivariate correlations among study variables across NHATS/NSOC and Prolific samples are reported in Table 2. In the NHATS/NSOC sample, hours spent caregiving was significantly positively correlated with ADL dependency (r = .34), role overload (r = .35), and depressive symptoms (r =.16). ADL dependency was significantly positively correlated with role overload (r =.21) but not depressive symptoms (r = .11). Depressive symptoms were significantly positively correlated with role overload (r =.36). In the Prolific sample, hours spent caregiving was significantly positively correlated with ADL dependency (r = .26) and role overload (r = .21), but not depressive symptoms (r = .06). ADL dependency was significantly positively correlated with role overload (r = .20) but not depressive symptoms (r = .03). Depressive symptoms were significantly positively correlated with role overload (r =.55).

Mediation Results

The total, indirect, and direct effects for the mediation models across both samples are summarized in Table 3 (indirect effects) and Figures 1 (direct effects for NHATS/NSOC sample) and 2 (direct effects for Prolific sample). Within the NHATS/NSOC sample, we found a significant indirect effect suggesting that greater hours spent caregiving were associated with more depressive symptoms via higher role overload. Additionally, we found significant indirect effects suggesting greater ADL dependency was associated with more depressive symptoms via higher role overload in both samples.

Gender Effects

To examine gender effects in the NHATS/NSOC sample, we ran a series of independent t-tests where means across each variable of interest were compared between male (n = 84) and female (n = 199) individuals. Results of the independent samples t-test are presented in Table 4. Women reported significantly more hours caregiving in the past month (M = 143.19, SD = 186.30) compared to men (*M* = 84.43, *SD* = 122.26), *t*(232)= -3.13, *p* =.002, Cohen's *d* = -0.35. Women also reported significantly greater role overload (*M* = 6.92, *SD* = 2.44) compared to men (*M* = 5.71, *SD* = 2.05), *t*(185)= -4.27, *p* <.001, Cohen's *d* = -0.52. There were no significant differences between men and women regarding depressive symptoms or ADL dependency.

To examine gender effects in the Prolific sample, we ran a series of independent t-tests where means across each variable of interest were compared between male (*n* = 73) and female (*n* = 77) individuals. Results of the independent samples t-test are presented in Table 4. Women reported significantly more hours caregiving in the past month (*M*= 202.29, *SD*= 204.61) compared to men (*M*= 102.38, *SD*= 95.97), *t*(109)= -3.86, *p* <.001, Cohen's *d* = -0.62. Women also reported a significantly greater role overload (*M*= 8.60, *SD*= 2.10) compared to men (*M* = 7.64, *SD* = 2.35) in the Prolific sample, *t*(148)= 2.63, *p* =.010, Cohen's *d* = -0.43. There were no significant differences between men and women regarding ADL dependency or depressive symptoms.

Constrained multi-group models compared to the freely estimated models indicated model invariance across gender for the hours caregiving → role overload → depressive symptoms model in both NHATS ($\Delta\chi^2$[3] = 3.64, *p* =.30) and Prolific ($\Delta\chi^2$[3] = 4.84, *p* = .18) samples. Model invariance was also found for the ADL dependency → role overload → depressive symptoms model in both NHATS ($\Delta\chi^2$[3] = 0.05, *p* = .99) and Prolific ($\Delta\chi^2$[3] = 2.98, *p* = .39) samples.

Discussion

The present study examined the relationships between hours spent caregiving, ADL dependency, role overload, and depressive outcomes among family dementia caregivers. Our hypothesis that greater hours spent caregiving would be associated with greater depressive symptoms via higher reports of role overload was partially supported. Role overload significantly mediated the associations between hours caregiving and depressive symptoms in the NHATS/NSOC sample but was not a significant mediator in the Prolific sample. Our hypothesis that greater ADL dependency would be associated with greater depressive symptoms via higher reports of role overload was supported. Role overload significantly mediated the associations between ADL dependency and depressive symptoms in both the NHATS/NSOC and Prolific sample.

In the context of Pearlin and colleague's (1990) Stress Process Model, ADL dependence and hours caregiving are objective stressors, role overload is a subjective stressor, and depression is an outcome. While the Stress Process Model identifies coping and social support as mediators of the relationship between primary stressors and outcomes, our study found role overload to be a mediator of the relationship between primary stressors and outcomes. This finding is in line with the Jobs Demand-Resources Model (Demerouti et al., 2001) and the informal Caregiving Integrative Model (Gérain & Zech, 2019) which posit burnout as a mediator of the relationship between stressors and health outcomes.

This study also examined how the relationships between hours spent caregiving, role overload, and depressive outcomes differ based on caregiver gender. Our hypothesis that associations in the models would be stronger for female compared to male caregivers was not supported, as all four constrained multi-group models indicated model invariance across gender when compared to the freely estimated models. This finding suggests that the association between hours spent caregiving, ADL, role overload, and depressive symptoms are equivalent in men and women, even though women reported significantly more time caregiving and higher role overload compared to men in both samples. Surprisingly, women did not report greater depressive symptoms compared to men in either of the samples, which contradicts previous findings (Lee et al., 2020; Papastavrou et al., 2009). This could be due to the nature of the PHQ2 measure, which only assess depressive symptoms with two items. Regardless of gender, more stressors are associated with more depressive symptoms via greater role overload. A potential reason that gender did not have a moderating effect on the model pathways was our small sample sizes and replication studies should be conducted. While all dementia caregivers could benefit from programs that alleviate caregiving stressors, women still reported caregiving for almost twice as many hours than men. This highlights the importance of finding structural ways to reprieve female dementia caregivers from the societal expectations of women to perform the majority of caregiving duties.

Previous studies have found that dementia caregivers have worse general health compared to adults who are not caregivers (Vitaliano, 2003) and caregivers of people without dementia (Pinquart & Sörensen, 2003). Specifically, dementia caregivers have higher rates of depression compared to adults who are not caregivers and caregivers of people without dementia (Collins & Kishita, 2020). Across both samples in this study, 21% (n= 91) of participants reported a score of 3 or greater on the PHQ2, which indicates that they are at risk for probable major depressive disorder. This is two and a half times the percentage of people in the U.S. general population who have reported having at least one major depressive episode, according to the Substance Abuse and Mental Health Services Administration (2022). These elevated rates of depressive symptoms in dementia caregivers are a public health issue, as caregiver depression is a risk factor for worse health outcomes in both the caregiver and the care recipients (Montgomery et al., 2018; Norton et al., 2013).

Limitations and Future Directions

A prominent limitation for this study is the demographic makeup of the samples. Both samples were majority white and previous research has shown that caregiving overload can manifest differently across race/ethnicity (Badana et al., 2019; Cohen et al., 2019). Further, participants in both samples had varying relationships with the person for whom they provided care. Research has shown that caregiving overload can also manifest differently depending on the relationship between the caregiver and care recipient (e.g., spouse, daughter, son; Pinquart & Sörensen, 2011). Future research may want to explore differences in race and relationship across the relationships between hours spent caregiving, ADL dependency, role overload, and depressive outcomes.

Another important limitation to address is the nature of our study design being cross-sectional and the limited causal claims we can make based off our limited understanding of the temporal order in the associations observed. Though some theories, like the Stress Process Model (Pearlin et al., 1990) and the informal Caregiving Integrative Model (Gérain & Zech, 2019) give us reason to think that stressors like hours spent caregiving and ADL dependency may be leading people to report higher levels of role overload and great depressive symptoms, it is plausible that a caregiver already has depression, or that greater depressive symptoms could lead to higher role overload. Establishing temporal order will be critical in understanding how to leverage the demonstrated associations for the development of prevention/intervention for caregivers of dementia relatives. NSOC has recently begun to administer follow-up surveys that will make longitudinal analyses possible in future studies.

Lastly, the measure for depressive symptoms used by NSOC is the PHQ2. While the PHQ2 may be sensible to use when administering a longer questionnaire battery to prevent fatigue, the PHQ9 is a superior screening test compared to PHQ2 (Anand et al., 2021). Notably, the PHQ9 screens for suicidality, whereas the PHQ2 does not. Prior studies have shown that dementia caregivers are at greater risk for suicidal ideation than the general population

(Joling et al., 2018; O'Dwyer et al., 2016). When researching depression, especially in dementia caregivers, it is important to collect data regarding suicidality.

Conclusion

Overall, and across two samples of family dementia caregivers, the present study found that more hours spent caregiving and ADL dependency relates to higher risk for depressive symptoms via higher role overload. While female caregivers spent more time caregiving and reported higher overload, these model pathways did not vary in strength across gender. Identifying risk factors through which depressive symptoms may manifest can inform which interventions may be best for alleviating depressive symptoms in family dementia caregivers. For example, Sheung-Tak Cheng and colleagues created a multicomponent intervention combining psychoeducation with benefit finding for dementia caregivers, which they called the Benefit Finding Intervention for Alzheimer Caregivers (Cheng et al., 2014). This intervention was delivered by a trained clinical with experience in gerontology and dementia. Sessions were facilitated on a weekly basis for eight consecutive weeks. Each session lasted an hour and a half to two hours and was delivered to a group of ten maximum dementia caregivers. A randomized controlled trial found this intervention to be efficacious in not only lowering participant's depressive symptoms, but also lowering participant's role overload (Cheng et al., 2017). Interventions with this two-fold approach should be highlighted as optimal options for family dementia caregivers.

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Table 1.

Frequencies of demographics for each sample.

	NHATS/NSOC Sample (*n = 283*)		Prolific Sample (*n = 150*)	
	n	%	n	%
Gender				
Female	199	70.32%	77	51.33%
Male	84	29.68%	73	48.67%
Relationship				
Spouse/partner	57	20.14%	1	0.67%
Daughter	123	43.46%	40	26.67%
Son	45	15.90%	44	29.33%
Daughter-in-law	1	0.35%	2	1.33%
Son-in-law	7	2.47%	1	0.67%
Stepdaughter	1	0.35%	1	0.67%
Granddaughter	10	3.53%	21	14.00%
Grandson	6	2.12%	10	6.67%
Other relative	23	8.13%	25	16.67%
Other nonrelative	10	3.53%	4	2.67%
Race				
White	179	63.25%	102	68.00%
Black	87	30.74%	27	18.00%
American Indian or Alaska Native	5	1.77%	2	1.33%
Asian	6	2.12%	15	10.00%
Native Hawaiian or Pacific Islander	2	0.71%	2	1.33%
Other	0	0.00%	2	1.33%

Table 2.
Bivariate correlations among study variables in both samples.

	1	2	3	4	5	6	M	SD
NHATS/NSOC sample								
1. Income	--						65.99[a]	59.25[a]
2. Health	**.27**	--					3.29	1.05
3. ADL	**-.20**	-.03	--				2.93	2.51
4. Hours	**-.20**	-.09	**.34**	--			125.75	171.73
5. Overload	-.05	**-.32**	**.21**	**.35**	--		6.56	2.39
6. PHQ2	**-.17**	**-.38**	.11	**.16**	**.36**	--	1.18	1.40
Prolific Sample								
	1	2	3	4	5	6	M	SD
1. Income	**--**						81.24[a]	77.86[a]
2. Health	**.19**	**--**					3.05	0.94
3. ADL	.06	.09	--				5.05	2.07
4. Hours	**-.18**	**-.20**	**.26**	**--**			153.67	168.26
5. Overload	**-.18**	**-.30**	**.20**	**.21**	**--**		8.13	2.27
6. PHQ2	**-.17**	**-.40**	.03	.06	**.55**	--	1.88	1.73

Note. Significant correlations (*p* < .05) are bolded for emphasis. [a] denotes thousands of dollars. Health is measured on a scale of 1 (poor) to 5 (excellent). ADL= Activities of Daily Living Dependency. Hours = Hours spent caregiving in the past month. Overload = role overload experienced by dementia caregiver. PHQ2= Patient Health Questionnaire 2 item score.

Table 3.
Summary of total, indirect, and direct effects of caregiving hours on depression symptoms across both samples.

NHATS/NSOC sample		
Outcome Variable:	*Depression Symptoms*	
Predictor Variable: *Hours spent caregiving in last month*	β	95% CI
Total	.119	-.012, .261
Indirect via Role Overload	**.087**	**.043, .146**
Direct	.032	-.102, .171
Predictor Variable: *ADL Dependency*	β	95% CI
Total	.077	-.090, .249
Indirect via Role Overload	**.061**	**.016, 0.132**
Direct	.016	-.141, .175
Prolific Sample		
Outcome Variable:	*Depression Symptoms*	
Predictor Variable: *Hours spent caregiving in last month*	β	95% CI
Total	-.043	-.197, .116
Indirect via Role Overload	.074	-.020, .158
Direct	-.117	-.233, .011
Predictor Variable: *ADL Dependency*	β	95% CI
Total	.092	-.058, .241
Indirect via Role Overload	**.122**	**.048, .218**
Direct	-.030	-.160, .107

Note. Significant associations are in bold typeface for emphasis and were determined by a 95% bias-corrected standardized bootstrapped confidence interval (based on 10,000 bootstrapped samples) that does not contain zero.

Table 4.
Comparing study variables and demographics across gender in the NHATS/NSOC sample.

NHATS/NSOC sample							
	Men *(n = 84)*		Women *(n = 199)*		*t*	*p*	Cohen's d
	M	*SD*	*M*	*SD*			
Income	64.73[a]	55.19[a]	66.52[a]	61.01[a]	-0.23	.817	-0.03
Health	3.30	1.03	3.29	1.06	0.08	.935	0.01
ADL	2.76	2.63	3.01	2.47	-0.56	.574	-0.10
Hours	**84.43**	**122.26**	**143.19**	**186.30**	**-3.13**	**.002**	**-0.35**
Overload	**5.71**	**2.05**	**6.92**	**2.44**	**-4.27**	**<.001**	**-0.52**
PHQ2	1.02	1.29	1.24	1.44	-1.19	.234	-0.16
Prolific Sample							
	Men *(n = 73)*		Women *(n = 77)*		*t*	*p*	Cohen's d
	M	*SD*	*M*	*SD*			
Income	**95.27**[a]	**100.90**[a]	**67.79**[a]	**42.70**[a]	**2.14**	**.034**	**0.36**
Health	**3.25**	**0.93**	**2.86**	**0.93**	**2.57**	**.011**	**0.42**
ADL	5.14	2.00	4.97	2.14	0.48	.631	0.08
Hours	**102.38**	**95.97**	**202.29**	**204.61**	**-3.86**	**<.001**	**-0.62**
Overload	**7.64**	**2.35**	**8.60**	**2.10**	**2.63**	**.010**	**-0.43**
PHQ2	1.95	1.82	1.82	1.65	0.45	.655	0.07

Note. Significant correlations ($p < .05$) are bolded for emphasis. [a] denotes thousands of dollars. Health is measured on a scale of 1 (poor) to 5 (excellent). ADL= Activities of Daily Living Dependency. Hours = Hours spent caregiving in the past month. Overload = role overload experienced by dementia caregiver. PHQ2= Patient Health Questionnaire 2 item score. Cohen's d values of .20, .50, and .80 correspond to small, medium, and large effect sizes, respectively (Cohen, 1992).

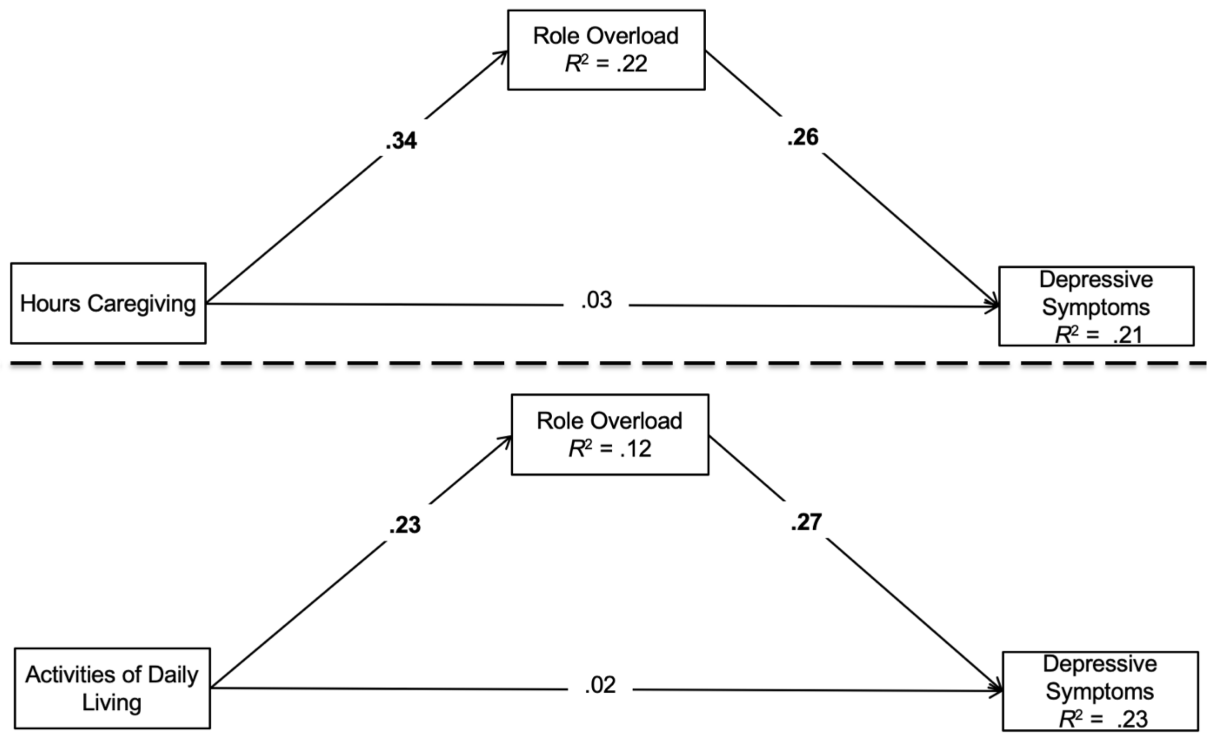

Figure 1. Mediation models in the NHATS/NSOC sample.

Notes. Significant pathways (p < .05) are bolded for emphasis.

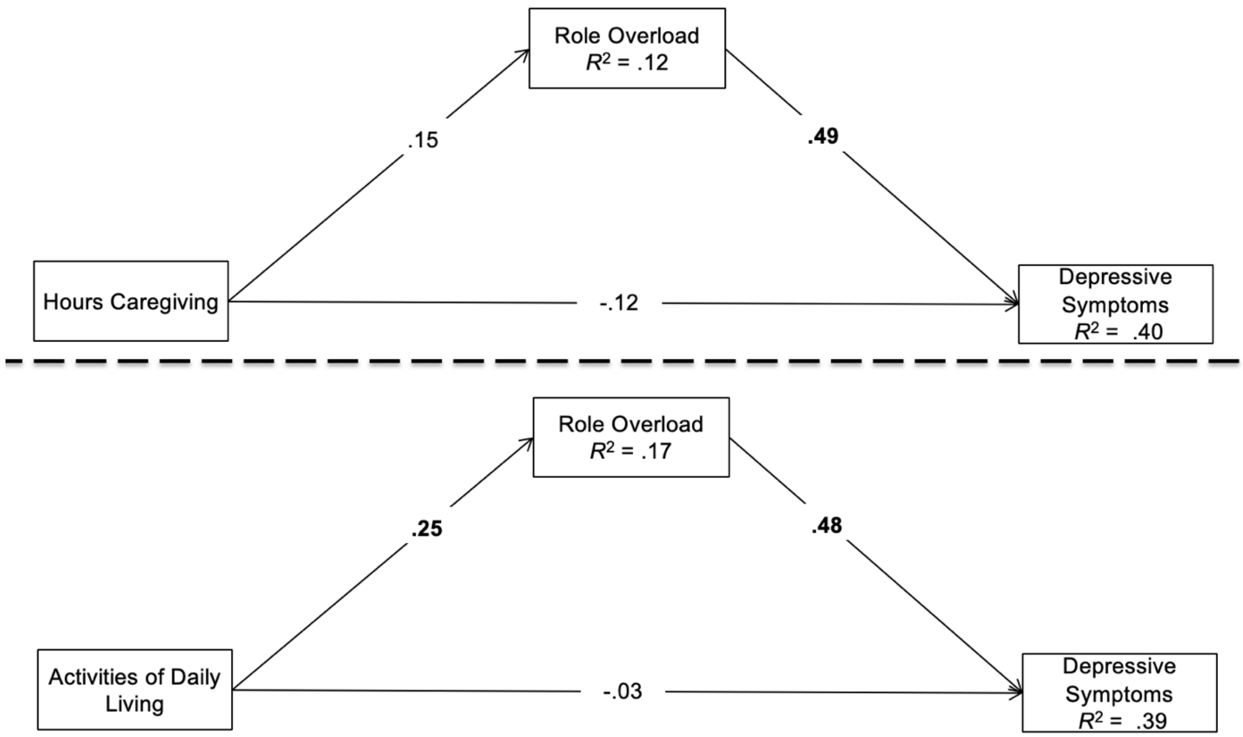

Figure 2. Mediation models in the Prolific sample.

Notes. Significant pathways (p < .05) are bolded for emphasis.