Published in final edited form as:

Am J Geriatr Psychiatry. 2015 June ; 23(6): 579–588. doi:10.1016/j.jagp.2014.03.013.

Association of depressive symptomatology with receipt of informal caregiving among older American Indians: The Native Elder Care Study

Marc B. Schure, PhD¹ and R. Turner Goins, PhD²

Marc B. Schure: Mark.Schure@va.gov

¹Health Services Research and Development, VA Puget Sound Health Care System, 1100 Olive Way, Suite 1400, Seattle, WA 98101. Telephone: 206-277-4727. Fax: 206-764-2935

²Department of Social Work, College of Health and Human Sciences, Western Carolina University and Center for Healthy Aging, Mountain Area Health Education Center

Abstract

Objectives—Our study objectives were to identify the primary sources of informal caregiving and to examine the association of depressive symptomatology with receipt of informal caregiving among a sample of community-dwelling older American Indians.

Design—We conducted a cross-sectional study of older American Indians.

Participants—Community-dwelling adults aged ≥55 years who are members of a federally recognized American Indian tribe in the Southeast U.S.

Measurements—We collected information on the participant's primary caregiver, number of informal care hours received in the past week, depressive symptomatology, demographic characteristics, physical health status, and assistance need.

Results—Daughters, spouses, and sons were the most common informal primary caregivers with distinct differences by sex of those receiving care. Compared to participants with lower levels, those with a high level of depressive symptomatology received substantially greater hours of informal care (33.4 vs. 11.5 hours per week).

Conclusions—Older American Indians with higher levels of depressive symptomatology received more informal caregiving than those with lower depressive symptomatology. The burden of caregiving of older adults is primarily shouldered by spouses and children with those who care for older adults with depressive symptomatology likely experiencing an even greater burden of care.

Keywords

American Indians; depressive symptomatology; informal caregiving

Correspondence to: Marc B. Schure, Mark.Schure@va.gov.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

According to the World Health Organization, by 2020, major depression will surpass many other serious diseases as the second leading contributor to the global burden of disease.¹ The prevalence of clinically significant depressive symptoms among older community-dwelling U.S. adults typically ranges from 8% to 16%,² with occurrence varying primarily by demographic characteristics. For example, some studies have found substantially higher prevalence among certain racial and ethnic minority populations.^{3,4} Late life depression is associated with increased number of chronic health conditions and physical disabilities.^{5–8}

The presence of comorbid depression appears to have a substantive impact on receipt of informal caregiving independent of physical health status. Informal caregiving is unpaid care provided by family members and friends to those in need of assistance with daily activities. Several studies have found that persons with chronic health conditions and physical disabilities that co-occur with depressive symptoms receive more informal and formal care than those without comorbid depressive symptoms.^{9–12} In fact, adults aged 70 years with depressive symptoms have been found to receive twice the number of informal caregiving hours than those without depressive symptoms.¹⁰ Moreover, additional research has indicated that after controlling for disease severity, comorbid depression was associated with greater outpatient service use and approximately 50% increased cost in medical care among U.S. adults.^{9,13}

The availability of informal caregivers is an important resource delaying and/or preventing institutionalization,¹⁴ and therefore, identifying caregiving need is a key component in achieving most older adults' desire to "age in place." Aging in place denotes older adults' capacity for continued residence at home even until advanced age.¹⁵ Informal caregiving need is often determined by the number of activities of daily living (ADLs) and/or instrumental activities of daily living (IADLs) in which a person has difficulty performing. Over 6 million U.S. adults aged 65 years need some form of caregiving,¹⁶ with approximately two-thirds of them eventually needing such care for an average of two years.¹⁷ U.S. adults aged 65 years who died at home between 2000–2002 received an average of 65.8 informal caregiving hours per week during their last year of life.¹⁸

STUDY OBJECTIVE

Older American Indians experience some of the highest rates of physical disability^{19–21} and disproportionately suffer from poorer physical and mental health compared to other racial and ethnic populations.^{22,23} Evidence suggests that the prevalence of clinically significant depressive symptomatology among older American Indians is higher than that of same-aged adults of other races and ethnicities.^{4,24} No identified studies have examined the association of depressive symptomatology with the receipt of informal care among older American Indians. There is a critical need to assess receipt of informal care in this vulnerable population, as evidenced by a high unmet need for long-term care.^{25,26} Thus, our study objectives were to identify the primary sources of informal caregiving and to examine the association of depressive symptomatology with receipt of informal caregiving among a sample of community-dwelling older American Indians.

METHODS

Study Design and Data Collection

Data for this study originate from the Native Elder Care Study, a cross-sectional study of community-dwelling older adult members of a federally recognized American Indian tribe located in the Southeast region of the U.S.²⁷ Data were collected from 2006 to 2008 using in-person interviewer-administered surveys and included information about demographic characteristics, physical disability, mental and physical health, personal assistance needs, health care use, and psychosocial factors. The tribe's institutional review board, tribe's health board, tribal council, tribal elder council, and [blinded for review] institutional review board approved the project. All study participants provided informed consent and received a \$20 gift card for completing the interview. The [blinded for review] institutional review board approved the secondary data analyses for this study.

Sample

Study inclusion was being an enrolled tribal member, aged 55 years, a resident in the tribal service area, non-institutionalized, and having passed a cognitive screen. We used an age threshold of 55 years rather than 65 years because it was requested by the project's tribal stakeholders and data has shown rapid declines in health status and shorter life expectancy among American Indians compared to other racial and ethnic groups.^{28,29} Based on age and residential location, we generated a list of 1,430 eligible tribal members from tribal enrollment records. To ensure equal representation across the range of ages, an age-stratified random sample was taken of 680 tribal members from the following age groups: 55–64, 65–74, and 75 years. We recruited study participants by a telephone call or a visit to their home. Of the 680 individuals, 47 could not be located and 50 were deemed ineligible. Of the remaining 583 persons, 78 declined participation, resulting in a total of 505 participants and an 86.6% response rate. Of the 195 persons who had an assistance need, 180 were receiving informal care at the time of this study.

Measures

Sources and Receipt of Informal Caregiving—We identified the most predominantly-used caregivers by asking participants who helps them the most (among the unpaid persons), with a list including spouse/significant other, daughter, daughter-in-law, son, son-in-law, granddaughter, grandson, neighbor, and other (specifying the relationship to the respondent). Receipt of informal caregiving was measured as the reported number of informal care hours received per week by study participants with disability-associated assistance needs. Participants, who had difficulties in performing one or more ADLs or IADLs, were asked the number of hours of unpaid per week they receive for these activities.

Depressive Symptomatology—Depressive symptomatology was assessed with the Centers for Epidemiologic Studies—Depression (CES-D) scale.³⁰ This scale has been widely used in population-based studies and its validity and reliability has been confirmed among older adults and across different racial and ethnic groups,³¹ including older American Indians.³² Participants were asked how often they felt each symptom in the past week, with sample items including (1) I felt fearful, (2) I enjoyed life, and (3) people were

unfriendly. The response options included: 0 = rarely or none of the time; 1 = some or a little of the time; 2 = occasionally or a moderate amount of time; and, 3 = most or all of the time. Positive affect items were reverse coded. Therefore, the total sum score ranges from 0 to 60 comprising both the count and frequency of experiencing each of the CES-D items. For our study sample, the internal consistency was high ($\alpha = 0.89$). Based on past recommendations, we used a tiered (low: 0–9, moderate: 10–19, and high: 20) approach for identifying subsyndromal depression in addition to identifying higher depressive symptomatology.³³

Demographic Characteristics—Demographic characteristics included age, sex, marital status (married/partner versus unmarried), educational attainment (<12 years versus 12 years), and living arrangements (living alone versus living with others).

Physical Health Conditions—Physical health conditions included physical disability and number of chronic health conditions. We defined physical disability as having difficulty with one or more of eight ADLs and/or eight IADLs.^{34,35} The ADLs we examined included bathing/showering, dressing, eating, transferring, walking, toileting, grooming, and getting outside and the IADLs we examined included using the telephone, light housework, heavy housework, preparing meals, shopping, managing money, managing medications, and transportation. We assessed the number of chronic health conditions among 12 common self-reported chronic medical conditions, which included heart disease, stroke, angina, congestive heart failure, heart attack, lung disease, Parkinson's disease, cancer, diabetes, high blood pressure, kidney disease, and liver disease. Respondents were asked if, since age 55, a doctor had told them they had one of the listed 12 conditions with “yes” and “no” response options.

Assistance Need—For each of the eight ADLs and eight IADLs, we classified respondents as having an assistance need versus no assistance need. Those reporting having some level of difficulty performing a task but did not report a need for assistance with that activity were classified as having no assistance need. Those reporting some level of difficulty performing an activity and reporting needing assistance or more assistance for that activity were classified as having an assistance need. Then, we created a count variable of the number of ADL and/or IADL assistance needs with a score range from 0 to 16.

Statistical Analyses

First, we generated numbers and weighted percentages of sample characteristics across tiers (low, moderate, high) of depressive symptomatology. Individual responses were weighted to account for differential sampling rates across the three age groups. We used chi-square tests to evaluate the bivariate relationships of depressive symptomatology with each of the sample characteristics. We then used Poisson regression models to compare the unadjusted and adjusted relationship between depressive symptomatology and number of informal care hours received. Predicted unadjusted and adjusted mean number of informal care hours was then computed using StataCorp statistical software's *margins* command and corresponding effect sizes were calculated using the Cohen's *d* effect size calculation method. Specifically, we adjusted for physical disability, chronic health conditions, assistance need, and

demographic characteristics. We dropped cases for which information on the number of informal caregiver hours received was completely missing, and imputed missing data on the remaining variables³⁶ with the multiple imputation chained equations method.³⁷ We then estimated the variance inflation factor to test for multicollinearity among the independent variables, which was not found to be a substantive issue. Of the 180 in the study sample, 10 had complete missing data on depressive symptomatology. We used *t*-tests to compare the completely missing cases on the dependent variable with the others by demographic variables. Comparisons from these *t* tests showed that those with completely missing data on the dependent variable were more likely to be of younger age ($t = -3.21$, $df = 260$, $p = 0.002$), male sex ($t = -2.64$, $df = 260$, $p = 0.009$), and have higher educational attainment ($t = 2.69$, $df = 259$, $p = 0.008$). All analyses were conducted using StataCorp's statistical software package version 12.0.³⁸

RESULTS

The study sample characteristics by tiers of depressive symptomatology are presented in the Table. Of the 170 participants, 60.3% had low, 26.6% had moderate, and 13.1% had high depressive symptomatology. Depressive symptomatology varied by certain demographic and physical health characteristics. Specifically, we found that tiers of depressive symptomatology were significantly associated with educational attainment (chi-square = 7.15, $df = 2$, $p = 0.028$), ADL difficulties (chi-square = 14.06, $df = 4$, $p = 0.007$), IADL difficulties (chi-square = 19.62, $df = 4$, $p = 0.001$), and number of assistance needs (chi-square = 21.68, $df = 6$, $p = 0.001$).

Among respondents in our analytic sample, 82.2% reported receiving informal care versus 35.5% receiving formal (paid) care; only 3.9% indicated receiving care from both. Two-thirds ($n=120$) of our sample reported the number of people they received care from either informal or formal care, or both. Results indicated that 8.3% did not receive care, 30.8% received care from one person, 44.7% from two or three persons, and 16.7% from 4 persons. Chi-square analyses indicated that greater number of caregivers was associated with number of assistance needs (chi-square = 43.51, $df = 9$; $p < 0.001$), ADL difficulties (chi-square = 128.24, $df = 6$, $p = 0.006$), and IADL difficulties (chi-square = 229.05, $df = 6$, $p = 0.007$).

Figure 1 shows the percent of those who received informal care by type of their primary caregiver. The most common sources of informal caregiving were daughters, spouses, and sons. Some differences were found in respect to the proportions of males and females reporting primary caregiver source. Of those indicating spouse as the primary caregiver, 55.9% were females and 44.1% were males. For those indicating other sources other than spouse as primary caregiver, the proportion of women was substantially greater than the proportion of males, with women accounting for 100% of person indicating son- or daughter-in-laws and neighbors as their primary caregiver.

Poisson regression results showed a significant unadjusted and adjusted positive association between depressive symptomatology and informal care use hours with corresponding incident rate ratios (IRRs) and 95% confidence intervals (CIs). Specifically, the unadjusted

IRR was 1.74 [95% CI = 1.27, 2.38] ($df = 177$, $p < 0.001$). The adjusted IRR was 1.70 [95% CI = 1.23, 2.36] ($df = 177$, $p = 0.001$). Unadjusted and adjusted mean number of informal care hours received per week by levels of depressive symptomatology are presented in Figures 2a and 2b, respectively. The unadjusted mean number of informal care hours received in the past week by low, moderate, and high levels of depressive symptomatology was 11.4 [95% CI = 7.76, 15.10] ($z = 5.32$, $p < 0.001$), 19.9 [95% CI = 14.73, 25.05] ($z = 6.71$, $p < 0.001$), and 34.6 [95% CI = 18.24, 51.00] ($z = 3.96$, $p < 0.001$) hours, respectively. When adjusting for demographic characteristics, physical disability, chronic health conditions, and assistance need, the mean number of informal care hours received per week by those with low, moderate, and high depressive symptomatology was 11.5 [95% CI = 7.89, 15.08] ($z = 4.48$, $p < 0.001$), 19.6 [95% CI = 14.51, 24.65] ($z = 5.48$, $p < 0.001$), and 33.4 [95% CI = 16.92, 49.85] ($z = 2.95$, $p < 0.001$) hours, respectively. Corresponding effect sizes of adjusted informal care use hours by tiers of depressive symptomatology were low. Comparisons across each tier generated the following effects sizes for the adjusted model: low to moderate ($d = -0.28$), moderate to high ($d = -0.17$), and low to high ($d = -0.28$).

CONCLUSION

Our data show the majority of our sample of older American Indians received care primarily from relatives, with few using a combination of informal and formal help. Also, over 60% of our sample indicated that they receive help from two or more persons. Our findings support others that indicate the burden of care for older adults is primarily that of immediate family members.^{39–42} The most commonly used sources of informal care found in our sample are mostly consistent with previous findings of informal care networks for older community-dwelling adults across different races and ethnicities.^{40–42} For example, one study showed that spouses, daughters, and sons were the primary caregiver sources of among U.S. veterans.⁴⁰ Among current Medicare beneficiaries, these findings remained consistent with the noteworthy exception that sons were least likely to be a primary caregiver, below that of friends and other relatives.⁴¹ Data from the 1989 and 1999 National Long-Term Care Survey and Informal Caregiver Survey show how primary caregiver trends have changed over time with children taking on a greater role compared to spouses.⁴²

We also found that those with a greater number of depressive symptoms received a greater amount of informal caregiving. Specifically, we found that unadjusted and adjusted mean number of received informal care hours more than doubled between those with low versus those with high depressive symptomatology. Only one known population-based study examined the effect of depressive symptoms on informal care use among the older old (70 years), which found that those with higher depressive symptomatology received twice the number of caregiving hours compared to those with lower depressive symptomatology.¹⁰

Plausible explanations for why greater depressive symptoms lead to greater informal care can best be understood with the conceptual framework of the Disablement Process Model,⁴³ whereby greater depressive symptomatology expedites pathology's effect on physical disability and disease severity. Evidence supports that depressive symptomatology has direct adverse physiologic effects, such as increased inflammation and decreased immunity levels as well as indirect impacts from decreased adherence to healthy lifestyle behaviors (i.e., diet,

exercise, medication-taking).^{9,44,45} Also, a review of existing evidence found a bi-directional relationship between greater depressive symptomatology and physical disability,⁴⁶ with each found to be independently predictive of informal caregiver burden.¹² In sum, there is substantive evidence to implicate a number of mechanisms by which depressive symptomatology may lead to greater informal caregiving use.

Although not statistically significant, we found greater prevalence of depressive symptoms among the younger age bracket of our sample. Some evidence supports and helps to explain the inverse relationship between age and depressive symptomatology by showing that social, economic, and psychosocial factors correspond with different cohorts of older adults.⁴⁷ Specifically, one study showed that lower economic hardship and fewer negative relationships helped explain the lower prevalence of depressive symptomatology among the older old. Conversely, this same study showed that as personal mastery decreased with age, it suppressed the magnitude of this trend.⁴⁷ Such findings align with the Disablement Process Model⁴³ whereas psychosocial factors may either exacerbate or slow the process towards physical disability and need for care.

Greater informal care receipt among those with higher levels of depressive symptomatology poses interesting scientific questions regarding current American Indian cultural values and practices. Traditional value orientations in American Indian communities tend to foster interdependence, rather than autonomy, through extended family systems.⁴⁸ Such value systems may translate into greater reliance on informal caregiving for assistance needs among older adults. However, we do not know if these value systems still function today as they once did and future studies are warranted to examine the extent to which these cultural value systems function today to the benefit of aging American Indians. Similarly, it would be worthwhile determining if values supporting both the identification of and response to older adults with higher levels of depressive symptomatology differ across racial and ethnic groups. An important question remains whether other factors, such as cultural values and traditions, act as mediating mechanisms in the observed associations between higher depressive symptomatology and greater informal care use. Qualitative studies examining such questions would offer useful theoretical models for quantitative researchers who seek to empirically test such questions.

Our results should be viewed in the context of some limitations. As a cross-sectional study, we were unable to establish causality. Longitudinal studies will contribute to our understanding of depressive symptoms' relative contribution to caregiving use and need. Other omitted variables could have been associated with receipt of informal caregiving and depressive symptomatology and hence reveal a spurious relationship between our main independent and dependent variable. However, we believe that controlling for assistance need greatly substantiated our findings. It is particularly worth noting that all the data we examined were based self-reported and therefore subject to participant bias. It has been posited that specific American Indian values could lead to them not to admit or report an assistance need,^{49,50} which may have lead our study participants to have under-reported both use and need of care. Another related concern is differential recall of depressive symptoms. Some evidence exists to suggest that persons with higher levels of distress are more likely to over-report use of services compare to those with low levels of distress^{51,52}

and such bias would inflate our findings. Similarly, while the differences in mean number of informal care hours was substantial among those with different levels of depressive symptoms, the large variability found among those with high depressive symptoms may have reduced the calculated effect sizes. Finally, our results are limited to older American Indian adults of a single tribe; therefore, caution should be exercised in generalizing these results to older members of other tribes.

In sum, our study shows that older American Indians with physical disabilities and higher depressive symptomatology use greater informal care compared to those without or lower depressive symptomatology. Evidence suggests that American Indian caregivers, compared to American Indians who are not caregivers, have poorer mental and physical health.⁵³ Compared to their racial and ethnic counterparts, American Indian caregivers may face additional stressors such as poverty and decreased accessibility to services.⁵⁴ Needs assessment studies will help guide future programming and policies aimed at the provision of long-term care services and aid of informal caregivers' burden of care. The Native American Caregiver Support Program, funded by the Administration on Aging, is designed to offer informational and instrumental support to American Indian caregivers.⁵⁵ One non-traditional intervention program has shown promising effects on the health of American Indian caregivers.⁵⁶ Future research is needed to track the effectiveness of these types of programs on long-term health outcomes on caregivers and those whom are receiving care. Similarly, little is known about the effectiveness of depression treatment interventions among older American Indians.⁵⁷ Future studies are warranted to evaluate the impact of existing depression treatments in this population.

While our study focused on informal caregiving use among American Indians, seen in conjunction with existing evidence, we believe that our findings warrant greater attention for all older adult populations with caregiving needs. Specifically, we recommend that clinicians and policy makers pay close attention to the increased care needs and informal caregiver burden of those caring for older adults with high levels of depressive symptomatology. A broad spectrum of interventions, including stress-reduction strategies and specialized training to deal with the special needs of adults with poor mental health, are recommended to improve outcomes for the caregiver and the care receiver.⁵⁸ Provided current aging and health trends, subsequent generations will be presented with tremendous economic and social challenges of providing adequate and quality long-term care to older adults.

Acknowledgments

This study was funded in part from the National Institute of Aging, NIH (# AG022336) and from Oregon State University's College of Public Health and Human Sciences. We would like to thank Drs. Adam Branscum and Alan Acock for providing analytic recommendations.

References

1. World Health Organization. [Accessed September 24, 2012] Mental health: Depression. 2012. http://www.who.int/mental_health/management/depression/definition/en/
2. Blazer DG. Depression in late life: Review and commentary. *J Gerontol A Biol Sci Med Sci*. 2003; 58(3):M249–M265.

3. González HM, Haan MN, Hinton L. Acculturation and the prevalence of depression in older Mexican Americans: Baseline results of the Sacramento Area Latino Study on Aging. *J Am Geriatr Soc.* 2001; 49(7):948–953. [PubMed: 11527487]
4. Curyto KJ, Chapleski EE, Lichtenberg PA, Hodges E, Kaczynski R, Sobeck J. Prevalence and prediction of depression in American Indian elderly. *Clin Gerontol.* 1998; 18(3):19–37.
5. Alexopoulos GS. Depression in the elderly. *Lancet.* 2005; 365(9475):1961–1970. [PubMed: 15936426]
6. Brault MW, Hootman J, Helmick CG, Theis KA, Armour BS. Prevalence and most common causes of disability among adults--United States, 2005. *MMWR.* 2009; 58(16):421–426. [PubMed: 19407734]
7. Chapman DP, Perry GS, Strine TW. The vital link between chronic disease and depressive disorders. *Prev Chronic Dis.* 2005; 2(1):1–10.
8. Gill TM, Allore HG, Holford TR, Guo Z. Hospitalization, restricted activity, and the development of disability among older persons. *JAMA.* 2004; 292(17):2115–2124. [PubMed: 15523072]
9. Katon WJ. Clinical and health services relationships between major depression, depressive symptoms, and general medical illness. *Biol Psychiat.* 2003; 54(3):216–226. [PubMed: 12893098]
10. Langa KM, Valenstein MA, Fendrick AM, Kabeto MU, Vijan S. Extent and cost of informal caregiving for older Americans with symptoms of depression. *Am J Psychiat.* 2004; 161(5):857–863. [PubMed: 15121651]
11. Badger TA. Depression, physical health impairment and service use among older adults. *Public Health Nurs.* 2007; 15(2):136–145. [PubMed: 9564218]
12. McCullagh E, Brigstocke G, Donaldson N, Kalra L. Determinants of caregiving burden and quality of life in caregivers of stroke patients. *Stroke.* 2005; 36(10):2181–2186. [PubMed: 16151029]
13. Luber MP, Meyers BS, Williams-Russo PG, et al. Depression and service utilization in elderly primary care patients. *Am J Geriatr Psychiat.* 2001; 9(2):169–176.
14. Davey A, Femia EE, Zarit SH, et al. Life on the edge: Patterns of formal and informal help to older adults in the United States and Sweden. *J Gerontol B Psych Sci Soc Sci.* 2005; 60(5):S281–S288.
15. Farber, N.; Shinkle, D. *Aging in Place: A State Survey of Liveability Policies and Practices.* Washington DC: AARP Public Policy Institute; 2011.
16. Kaye HS, Harrington C, LaPlante MP. Long-term care: Who gets it, who provides it, who pays, and how much? *Health Affairs.* 2010; 29(1):11–21. [PubMed: 20048355]
17. Wysocki, A.; Butler, M.; Kane, RL.; Kane, RA.; Shippee, T.; Sainfort, F. *Long-term care for older adults: A review of home and community-based services versus institutional care.* Rockville, MD: Agency for Healthcare Research and Quality; 2012.
18. Rhee YJ, Degenholtz HB, Lo Sasso AT, Emanuel LL. Estimating the quantity and economic value of family caregiving for community-dwelling older persons in the last year of life. *J Am Geriatr Soc.* 2009; 57(9):1654–1659. [PubMed: 19682115]
19. Denny CH, Holtzman D, Goins RT, Croft JB. Disparities in chronic disease risk factors and health status between American Indian/Alaska Native and White elders: Findings from a telephone survey, 2001 and 2002. *Am J Public Health.* 2005; 95(5):825–827. [PubMed: 15855458]
20. Goins RT, Moss M, Buchwald D, Guralnik JM. Disability among older American Indians and Alaska Natives: An analysis of the 2000 Census public use microdata sample. *Gerontol.* 2007; 47(5):690–696.
21. Moss MP, Schell MC, Goins RT. Using GIS in a first national mapping of functional disability among older American Indians and Alaska natives from the 2000 census. *Int J Health Geogr.* 2006; 1–11. [PubMed: 16390549]
22. Barnes PM, Powell-Griner E, Adams PF. Health characteristics of the American Indian and Alaska Native adult population, United States, 1999–2003. *Adv Data.* 2005; 356:1–24.
23. Centers for Disease Control and Prevention. *CDC Health Disparities and Inequalities Report--United States, 2011.* Atlanta, GA: Centers for Disease Control and Prevention; 2011.
24. John R, Kerby DS, Hennessy CH. Patterns and impact of comorbidity and multimorbidity among community-resident American Indian elders. *Gerontol.* 2003; 43(5):649–660.

25. Goins RT, Bogart A, Roubideaux Y. Service provider perceptions of long-term care access in American Indian and Alaska Native communities. *J Health Care Poor Underserved*. 2010; 21(4): 1340–1353. [PubMed: 21099083]
26. Schure MB, Conte KC, Goins RT. Unmet assistance need among older American Indians with physical disabilities: The Native Elder Care Study. *Gerontol*. Accepted for publication December 2013.
27. Goins RT, Garrouette EM, Fox SL, Geiger SD, Manson SM. Theory and practice in participatory research: Lessons from the Native Elder Care Study. *Gerontol*. 2011; 51(3):285–294.
28. Hayward MD, Heron M. Racial inequality in active life among adult Americans. *Demography*. Feb; 1999 36(1):77–91. [PubMed: 10036594]
29. Indian Health Service. Facts on Indian Health Disparities. U.S. Department of Health and Human Services; 2013.
30. Radloff LS. The CES-D scale a self-report depression scale for research in the general population. *Appl Psych Meas*. 1977; 1(3):385–401.
31. Mui, A.; Burnette, D.; Chen, L. Cross-cultural assessment of geriatric depression: A review of the CES-D and GDS. In: Skinner, JH.; Teresi, JA.; Holmes, D.; Stahl, SM.; Stewart, AL., editors. *Multicultural measurement in older populations*. New York, NY: Springer Publishing Co; 2002. p. 147-178.
32. Chapleski EE, Lichtenberg PA, Dwyer JW, Youngblade LM, Tsai PF. Morbidity and comorbidity among Great Lakes American Indians: Predictors of functional ability. *Gerontol*. 1997; 37(5):588–597.
33. Barry LC, Allore HG, Bruce ML, Gill TM. Longitudinal association between depressive symptoms and disability burden among older persons. *J Gerontol A Biol Sci Med Sci*. 2009; 64(12):1325–1332. [PubMed: 19776217]
34. Fillenbaum, GG. *Multidimensional functional assessment of older adults: The Duke Older Americans Resources and Services procedures*. Hillsdale, NJ: L. Erlbaum Associates; 1988.
35. Lawton MP, Brody EM. Assessment of older people: Self-maintaining and Instrumental Activities of Daily Living. *Nurs Res*. 1970; 19(3):278.
36. von Hippel PT. Regression with missing Ys: An improved strategy for analyzing multiply imputed data. *Sociol Methodol*. 2007; 37(1):83–117.
37. Royston P, White IR. Multiple Imputation by Chained Equations (MICE): Implementation in Stata. *J Stat Soft*. 2011; 45(4):1–20.
38. Stata Statistical Software. College Station, TX: StataCorp LP; 2012. Version 12 [computer program]
39. Schulz R, Martire LM. Family caregiving of persons with dementia: Prevalence, health effects, and support strategies. *Am J Geriatr Psychiat*. 2004; 12(3):240–249.
40. Van Houtven CH, Oddone EZ, Weinberger M. Informal and formal care infrastructure and perceived need for caregiver training for frail US veterans referred to home and community-based services. *Chronic Illn*. 2010; 6(1):57–66. [PubMed: 20308351]
41. Van Houtven CH, Taylor DH Jr, Steinhauser K, Tulskey JA. Is a home-care network necessary to access the Medicare hospice benefit? *J Palliative Med*. 2009; 12(8):687–694.
42. Wolff JL, Kasper JD. Caregivers of frail elders: Updating a national profile. *Gerontol*. 2006; 46(3): 344–356.
43. Verbrugge LM, Jette AM. The disablement process. *Soc Sci Med*. 1994; 38(1):1–14. [PubMed: 8146699]
44. Segerstrom SC, Miller GE. Psychological stress and the human immune system: A meta-analytic study of 30 years of inquiry. *Psychol Bull*. 2004; 130(4):601–630. [PubMed: 15250815]
45. Zorrilla EP, Luborsky L, McKay JR, et al. The relationship of depression and stressors to immunological assays: a meta-analytic review. *Brain Behav Immun*. 2001; 15(3):199–226. [PubMed: 11566046]
46. Lenze EJ, Rogers JC, Martire LM, et al. The association of late-life depression and anxiety with physical disability: A review of the literature and prospectus for future research. *Am J Geriatr Psychiat*. 2001; 9(2):113–135.

47. Schieman S, Van Gundy K, Taylor J. The relationship between age and depressive symptoms: A test of competing explanatory and suppression influences. *J Aging Health*. 2002; 14(2):260–285. [PubMed: 11995743]
48. Red Horse J. Traditional American Indian family systems. *Fam Sys Health*. 1997; 15(3):243–250.
49. Loftin JD. The “harmony ethic” of the conservative Eastern Cherokees: A religious interpretation. *J Cherokee Stud*. 1983; 8:40–43.
50. Moss MP. TOLERATED ILLNESS™ concept and theory for chronically ill and elderly patients as exemplified in American Indians. *J Cancer Educ*. 2005; 20(S1):17–22. [PubMed: 15916515]
51. Rhodes AE, Fung K. Self-reported use of mental health services versus administrative records: Care to recall? *Int J Method Psych Res*. 2004; 13(3):165–175.
52. Rhodes AE, Lin E, Mustard CA. Self-reported use of mental health services versus administrative records: Should we care? *Int J Method Psych Res*. 2002; 11(3):125–133.
53. Spencer SM, Goins RT, Henderson J, Wen Y, Goldberg J. Influence of caregiving on health-related quality of life among American Indians. *J Am Geriatr Soc*. 2013; 61(9):1615–1620. [PubMed: 24001320]
54. Jervis LL, Jackson MY, Manson SM. Need for, availability of, and barriers to the provision of long-term care services for older American Indians. *J Cross Cult Gerontol*. 2002; 17(4):295–311. [PubMed: 14617961]
55. Administration on Aging. [Accessed October 1, 2013] National Family Caregiver Support Program. 2013. http://www.aoa.gov/AoARoot/AoA_Programs/HCLTC/Native_Americans/index.aspx
56. Korn L, Logsdon RG, Polissar NL, Gomez-Beloz A, Waters T, Rysler R. A randomized trial of a CAM therapy for stress reduction in American Indian and Alaskan Native family caregivers. *Gerontol*. 2009; 49(3):368–377.
57. Fuentes D, Aranda MP. Depression interventions among racial and ethnic minority older adults: A systematic review across 20 years. *Am J Geriatr Psychiat*. 2012; 20(11):915–931.
58. Dunkin JJ, Anderson-Hanley C. Dementia caregiver burden: A review of the literature and guidelines for assessment and intervention. *Neurology*. 1998; 51(S1):S53–S60. [PubMed: 9674763]

Figure 1.

Percent of sample using informal care by primary caregiver.

Note: Percentages are weighted per age-stratified sampling design.

Figure 2a. Unadjusted mean number of informal care hours.

Figure 2b. Adjusted mean number of informal care hours.

Figure 2.

Figures 2a and 2b. Poisson models showing adjusted and adjusted mean number of informal care hours received per week by levels of depressive symptomatology and 95% confidence intervals

*Note: Poisson regression models indicate that the association between depressive symptomatology and number of informal care hours received is statistically significant for both the unadjusted ($IRR = 1.74$, $df = 177$, $p < 0.001$) and adjusted model ($IRR = 1.70$, $df = 177$, $p < 0.001$). For the adjusted model, Cohen's d effects sizes by tiers are: low to moderate ($d = -0.28$), moderate to high ($d = -0.17$), and low to high ($d = -0.28$).

Table 1Table. Sample Characteristics by Depressive Symptomatology ($n = 170$)

Sample Characteristics	Depressive Symptomatology			<i>p</i> value
	Low (0–9)	Moderate (10–19)	High (20)	
	(<i>n</i> =108)	(<i>n</i> =42)	(<i>n</i> =20)	
	Percent (Number)			
Age				0.237
55–64	51.1 (23)	33.3 (15)	15.6 (7)	
65–74	69.8 (37)	17.0 (9)	13.2 (7)	
75	66.7 (48)	25.0 (18)	8.3 (6)	
Sex				0.625
Male	58.8 (27)	33.6 (10)	7.6 (3)	
Female	60.8 (81)	24.3 (32)	14.9 (17)	
Marital Status				0.978
Married/Partner	60.0 (40)	26.5 (15)	13.5 (7)	
Divorced/Separated/Widowed	60.1 (68)	26.9 (27)	12.4 (13)	
Living Arrangement				0.306
Lives Alone	68.6 (33)	25.3 (10)	6.2 (3)	
Lives with Others	58.5 (74)	26.2 (31)	15.4 (17)	
Educational Attainment				0.028
<12 years	50.1 (46)	36.2 (28)	13.2 (9)	
12 years	68.2 (62)	18.6 (14)	12.9 (11)	
Number of ADL Difficulties				0.007
0 ADLs	92.7 (26)	3.1 (1)	4.2 (2)	
1 – 2 ADLs	59.4 (52)	24.4 (20)	16.1 (12)	
3 ADLs	44.8 (30)	41.9 (21)	13.3 (6)	
Number of IADL Difficulties				0.001
0 IADLs	82.2 (13)	7.9 (2)	9.9 (2)	
1 – 2 IADLs	78.0 (61)	16.3 (12)	5.7 (5)	
3 IADLs	37.8 (34)	41.0 (28)	21.2 (13)	
Chronic Conditions				0.373
0	62.0 (15)	24.4 (3)	13.7 (1)	
1 – 2	67.6 (55)	24.0 (17)	8.3 (10)	
3	46.7 (38)	33.7 (22)	19.6 (9)	
Heart Disease				0.401
Yes	59.3 (25)	21.5 (8)	11.4 (7)	
No	61.4 (83)	27.2 (33)	19.2 (13)	
Stroke				0.537
Yes	43.0 (13)	36.4 (7)	11.9 (4)	
No	64.0 (95)	24.0 (34)	20.6 (16)	
Angina				0.110
Yes	65.7 (11)	23.2 (8)	11.1 (5)	

Sample Characteristics	Depressive Symptomatology			<i>p</i> value
	Low (0–9)	Moderate (10–19)	High (20)	
	(n=108)	(n=42)	(n=20)	
No	40.6 (96)	33.7 (31)	25.7 (15)	0.107
Congestive Heart Failure				
Yes	64.2 (12)	23.0 (10)	12.8 (4)	
No	45.9 (95)	37.6 (30)	16.5 (16)	0.160
Heart Attack				
Yes	64.8 (11)	22.9 (9)	12.3 (3)	
No	41.1 (95)	42.0 (31)	17.0 (16)	0.720
Lung Disease				
Yes	61.8 (16)	26.4 (5)	11.8 (4)	
No	55.7 (92)	22.8 (36)	21.5 (16)	0.750
Parkinson's Disease				
Yes	100.0 (1)	0.0 (0)	0.0 (0)	
No	60.8 (107)	26.0 (41)	13.2 (20)	0.240
Cancer				
Yes	63.2 (19)	21.8 (11)	14.9 (2)	
No	50.3 (89)	44.7 (30)	5.0 (18)	0.730
Diabetes				
Yes	60.8 (51)	25.7 (17)	13.5 (8)	
No	61.1 (57)	26.1 (24)	12.9 (12)	0.330
High Blood Pressure				
Yes	68.1 (75)	22.2 (30)	9.7 (17)	
No	59.1 (33)	26.2 (10)	14.7 (3)	0.360
Kidney Disease				
Yes	61.2 (10)	26.5 (4)	12.3 (4)	
No	60.5 (97)	18.2 (36)	21.2 (16)	0.380
Liver Disease				
Yes	60.6 (2)	0.0 (0)	25.2 (1)	
No	74.8 (106)	26.4 (41)	12.9 (19)	0.001
Assistance Need				
0	84.8 (14)	10.1 (3)	5.0 (1)	
1 – 2	81.6 (51)	11.1 (6)	7.3 (5)	
3 – 4	45.3 (19)	38.6 (13)	16.1 (5)	
5	38.4 (24)	41.4 (20)	20.1 (9)	

Note: Percentages are weighted per age-stratified sampling design. *p* value significance levels based on chi-square tests. Degrees of Freedom = 6 for assistance need; 4 for age, number of ADL & IADL difficulties, and chronic conditions; and, 2 for all other sample characteristics. Ten cases from the sample were missing information on depressive symptomatology.