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Review Article

Systematic Review and Meta-Analysis of Racial and Ethnic Differences in Dementia Caregivers' Well-Being

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Abstract

Background and Objectives: Studies comparing racial/ethnic differences on measures of psychological and physical well-being for dementia caregivers have reported differences between minority and white caregivers. Recruitment methods often differ for minority and white participants due to enrollment targets and may lead to biased comparisons, especially in convenience samples. We aimed to examine racial/ethnic differences in dementia caregiver outcomes and to determine whether differences vary between studies with population-based or convenience samples.

Research Design and Methods: We systematically reviewed articles with primary data from PubMed, Google Scholar, and PsycINFO. We included studies comparing African American or Hispanic/Latino to white dementia caregivers on measures of psychological well-being or physical well-being. Reviewers screened titles and abstracts, reviewed full texts and conducted risk-of-bias assessments. Meta-analyses were conducted to assess effects by race/ethnicity and study bias.

Results: A total of 159 effects were extracted from 38 studies, 2 of which were population based. Random-effects models revealed small but statistically significant effects with better psychological well-being in African American caregivers compared with white caregivers in both population-based (d = –0.22) and convenience sample studies (d = –0.21). Hispanics/Latino caregivers reported lower levels of physical well-being than white caregivers (d = 0.12), though these effects varied by level of rated study bias.

Discussion and Implications: Consistency across study methods raises confidence in the validity of previous reports of better psychological well-being in African American caregivers. Future studies should use population-based samples with subgroups of Hispanic/Latino, Asian American, and American Indian caregivers that are culturally distinct on factors such as country of origin and tribe.

Keywords: Family caregiving, Community-dwelling, Well-being, Depression, Appraisals

In the United States, approximately 5.8 million people are living with dementia. An estimated 487,000 new cases of dementia developed in 2019, a number that is projected to double by 2050 ("2019 Alzheimer's Disease Facts and Figures," Alzheimer's Association, 2019). There is an increasing need for family caregivers who provide a substantial amount of care for this population, a majority of whom are community-dwelling. However, caring for a family member with dementia can be a long-term, stressful, and intensive process. While family caregiving has been linked to higher levels of distress indicators such as depression and perceived stress (Roth, Brown, Rhodes, & Haley, 2018), dementia caregivers report more severe adverse outcomes, such as increased depression and anxiety, compared with other groups of caregivers (Ory, Hoffman, Yee, Tennstedt, & Schulz, 1999; Pinquart & Sörensen, 2003).

Reviews on racial/ethnic differences in caregiving that focused on all caregivers (not just dementia caregivers) by Aranda and Knight (1997) and Dilworth-Anderson and Anderson (1994), and more recent reviews by Apesoa-Varano, Tang-Feldman, Reinhard, Choula, and Young (2015) and Capistrant (2016) concluded that caregivers from different racial or ethnic groups may differ in appraisal of caregiving as well as psychological and health outcomes related to cultural differences in attitudes about caregiving. Studies have proposed that African Americans experience low burden due to more positive perceptions toward their role as a caregiver, despite lower income, education, and socioeconomic status (Dilworth-Anderson, Williams, & Gibson, 2002; Lawton, Rajagopal, Brody, & Kleban, 1992). Hispanic caregivers may experience high distress because of socioeconomic factors such as lower levels of income and education (Coon et al., 2004; Gallagher-Thompson, Solano, Coon, & Areán, 2003; Mausbach et al., 2004). However, observational studies have reported conflicting evidence on racial and ethnic disparities in dementia caregivers' well-being. None of these reviews focused specifically on dementia caregivers, who are an important subgroup given the high levels of stress characteristic of dementia caregiving.

Mixed results have been observed in studies comparing African American and white dementia caregivers on measures of psychological well-being. Results have ranged from showing no significant differences between groups to showing that African Americans have better psychological well-being. Haley and colleagues (1996) found that African American dementia caregivers reported lower depression and had more positive appraisals of self-efficacy and stressfulness than white dementia caregivers, while Kim, Knight, and Longmire (2007) reported lower depression and burden in African American dementia caregivers that were not statistically significant from white dementia caregivers. Badana, Marino, and Haley (2019) found no differences in emotional stress while McCallum, Sorocco, and Fritsch (2006) found no differences in depression or perceived stress between African American and white dementia caregivers. Similarly, mixed findings have been observed in studies comparing Hispanic/Latino dementia caregivers to white caregivers. Gallagher-Thompson and colleagues (2006) found greater depression reported by Hispanic/Latino dementia caregivers compared with white dementia caregivers. Coon and colleagues (2004) found that Latina dementia caregivers had lower appraisals of stress than white dementia caregivers in the Resources for Enhancing Alzheimer's Caregiver Health (REACH) study.

The double jeopardy hypothesis states that being a member of a minority group creates additional disadvantage in physical health among African American older adults compared with white older adults (Ferraro & Farmer, 1996), and physical health is an important component of the stress process model for caregivers (Haley et al., 1996). Studies have indeed shown that African American caregivers have worse indicators of physical well-being compared with white caregivers. McCallum and colleagues (2006) found that African American dementia caregivers have flatter cortisol slopes over the course of the day, which may suggest more dysregulation in their stress response. Kim and colleagues (2007) found that African American dementia caregivers had significantly higher systolic and diastolic blood pressure compared with white caregivers, which was considered an indicator of poor cardiovascular health in the study. Gallagher-Thompson and colleagues (2006) observed the same phenomenon when comparing Hispanic/Latino dementia caregivers with white dementia caregivers.

Evidence of racial/ethnic differences in caregiver adaptation may be affected by selection biases that might be introduced in the process of recruiting dementia caregivers. Large-scale studies such as REACH I (Wisniewski et al., 2003) and REACH II (Belle et al., 2006) made specific and focused efforts to recruit adequate samples of racial and ethnic minorities, and these amplified recruitment efforts may have led to subpopulations that were healthier at baseline than white participants, who were largely recruited from clinical settings. This type of selection bias may be an important alternative explanation beyond cultural differences for the common finding that white dementia caregivers experience more adverse psychological and health outcomes than racial/ethnic minority dementia caregivers, though it would not explain why white caregivers experience better physical health outcomes. As such, previous meta-analyses have found that population-based studies may show differing results from those obtained using convenience samples (Pinquart & Sörensen, 2005; Roth et al., 2019). For example, Roth and colleagues (2019) found that population-based studies yielded no significant differences between caregivers and controls on biomarker indices of immunity or inflammation, while overall analysis of all studies showed a small but significant effect size of 0.151 *SD* units ($p < .001$). Pinquart and Sörensen found that studies with "representative" samples had smaller race differences on caregiver depression compared to convenience sample studies by 0.328 units of Cohen's d ($p < .01$), though the selection process for representative studies was unclear. In the context of racial disparities in dementia caregivers' well-being, Badana and colleagues (2019) used a nationally representative sample from the American Association of Retired Persons and found no significant differences in emotional stress between African American and white caregivers, and no difference between this comparison in a dementia caregiving subgroup, which conflicts with several studies that found significant differences between the two groups.

A previous systematic review and meta-analysis by Pinquart and Sörensen (2005) provided a comprehensive assessment of racial and ethnic differences in caregiving (not specific to dementia) for a broad range of characteristics including health care utilization, social support, and health outcomes for dementia caregivers. The goal of the present, updated systematic review and meta-analysis is to focus on dementia caregiving, examine only psychological and physical well-being, and compare these outcomes between (1) white caregivers and African American caregivers and (2) white caregivers and Hispanic/Latino caregivers. We aim to determine whether these findings are consistent across studies that used convenience samples versus population-based samples, and rigor of methods, in terms of psychological and physical well-being between white caregivers and racial/ethnic minority caregivers.

Methods

Search Strategy

This systematic review was preregistered with PROSPERO in January 2019 (registration number CRD42019121053, http://www.crd.york.ac.uk/PROSPERO). We systematically searched peer-reviewed literature published up to the end of 2019. The final PubMed search terms are provided in Table 1. We further refined these terms to conduct the same searches in PsycINFO and Google Scholar.

Inclusion criteria for studies were the following: (1) full research articles published in English, (2) studies comparing non-white dementia caregivers to white dementia caregivers on measures of psychological well-being (e.g., depression, anxiety, burden, appraisals) and physical well-being (e.g., self-rated health, cardiovascular measures, stress biomarkers), and (3) studies where all care recipients were community-dwelling. Only original data-based research reports were included, and review papers and editorial commentaries were excluded. Papers were included if the authors reported data on dementia caregivers, who were defined as persons caring for an adult with Alzheimer's disease or another form of dementia. No papers were excluded based on any assessments of the dementia ascertainment methods.

Systematic Review

The article review and selection process is shown in Figure 1. In the first round of screening, 1,200 titles and/or abstracts of studies were identified using the aforementioned search strategy by two review authors. After removing 137 duplicate articles, a total of 1,063 titles/abstracts were identified as potentially eligible for inclusion. After screening the abstracts, 82 full texts were retrieved and further screened by at least two of five review coauthors to determine whether it should be included. Disagreements between reviewers on study eligibility were resolved through discussion with all reviewers. We removed an article if there was another article from the same study or data set with a larger sample size and contained all the relevant outcomes. We removed three studies without all community-dwelling care recipients and six studies without extractable effects. We included 159 effects from 38 studies in the final meta-analysis.

Data Extraction

Data extraction from included studies for assessment of study quality and evidence synthesis included the following information: study population and participant

Table 1. Final Search Terms

	PubMed	PsycINFO	Google Scholar
Search terms	(dementia[Title/Abstract] OR Alzheimer*[Title/Abstract]) AND caregiv*[Title/Abstract] AND (black[Title/Abstract] OR "African American"[Title/Abstract] OR white[Title/Abstract] OR Caucasian[Title/Abstract] OR Hispanic[Title/Abstract] OR Latino[Title/Abstract] OR Asian[Title/Abstract] OR "American Indian"[Title/Abstract] OR "Alaska Native"[Title/Abstract] OR "Pacific Islander"[Title/Abstract] OR "Native Hawaiian"[Title/Abstract])	allintitle:(caregiver OR caregivers OR caregiving) (dementia OR Alzheimer OR Alzheimer's) (race OR racially OR ethnic OR ethnically OR ethnicity OR black OR white OR "African American" OR white OR Caucasian OR Hispanic OR Latino)	allintitle:(caregiver OR caregivers OR caregiving) (dementia OR Alzheimer OR Alzheimer's) (race OR racially OR ethnic OR ethnically OR ethnicity OR black OR white OR "African American" OR white OR Caucasian OR Hispanic OR Latino) ethnicity, OR black, OR "African American" OR white, OR Caucasian, OR Hispanic, OR Latino
Filters	English	"dementia" (major header filter)	N/A

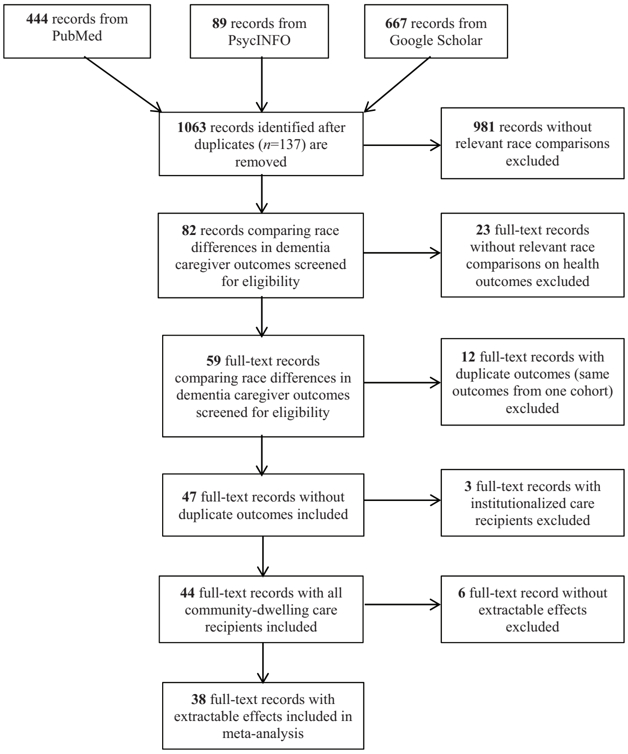

Figure 1. Study selection.

demographics; study methodology, including whether study was population-based or a convenience sample; recruitment, including whether participants were recruited from a clinical setting or from the community; relevant caregiver health outcomes; information on risk of potential bias and/or confounding. Population-based studies were defined as studies with probabilistic samples, such as those using data from a nationally representative database. Two review authors extracted data independently and discrepancies were resolved through discussion with a third author.

We included both caregiving appraisals (e.g., self-efficacy, mastery, stress, strain, burden), which are directly related to caregiving, and caregiver outcomes (life satisfaction, depression, etc.), which may not be directly related to caregiving. We categorized all outcomes into psychological or physical well-being but did not include external or resource factors such as social support or coping methods. We included caregiver appraisal as a measure of psychological well-being.

Risk-of-Bias Assessments

Using a 4-point scale of potential bias (1 = minimal, 2 = low, 3 = moderate, and 4 = high potential bias), the quality of individual studies were assessed on the following domains: (1) race/ethnicity definition (e.g., “non-Hispanic white” was considered the description of white caregivers with the least potential bias since it distinguishes between white caregivers who are not Hispanic and Hispanic caregivers who also identify as white) and selection methods (e.g., self-report was considered the gold standard), (2) similarity of recruitment for different race/ethnicity groups, (3) descriptors or adequate definitions of caregiving exposure (e.g., specify hours per week or care, number of years of caregiving), (4) adequacy of the descriptions of the caregiver health outcome assessment methods (e.g., CES-D is a reliable and valid measure of depression and therefore rated as having low potential bias), (5) adequacy of ascertainment of dementia, and (6) adequate explanation of the statistical methods for testing group differences, either before or after adjustment for potential confounders. We averaged the score over the six dimensions to obtain a final overall quality rating. Minimal potential bias was defined as an average score of 1.00–1.75, low potential bias as 1.76–2.50, moderate potential bias as 2.51–3.25, and high potential bias as 3.26–4.00.

At least two coauthors independently rated the quality of the methods reported in each of the articles included in this review. If the discrepancy between two raters in the overall quality rating for a particular article exceeded 1 point, the article was reviewed for risk of potential bias by the other four coauthors and resolved by overall consensus.

Meta-Analysis

We used the *metan* and *metaeff* methods in Stata version 15 to carry out the meta-analyses. We first extracted caregiver health data using means and standard deviations (*SD*) (or standard errors [*SE*]) or counts where available, and *p*-values and sample sizes from analytic models in the cases where neither means (and *SD* or *SE*) nor counts were available. The *metaeff* command was used to transform outcomes from various studies to a common format, yielding a standardized effect size and an *SD* (or *SE*) for each individual effect (Kontopantelis and Reeves, 2015). We first pooled effects for each study, which yielded a study-specific effect size and 95% confidence interval (CI), and then weighted the studies by sample size in the subsequent meta-analyses.

For each meta-analysis, we calculated an overall effect size between the white caregiver group and the non-white/minority caregiver group using the *metan* command (Harris et al., 2008), which uses Cohen’s method (1988) to pool all effects and express the overall effect in units of standardized mean differences. A 95% CI was also calculated for the overall effect size. This command employs a random-effects model using the method of DerSimonian & Laird (1986), with an estimate of heterogeneity taken from the Mantel–Haenszel model (StataCorp, 2019). The chi-squared statistic was used as a test of the heterogeneity for individual study effect sizes.

We only identified one eligible study with comparisons between white and East Asian caregivers (Adams, Aranda, Kemp, & Takagi, 2002). We did not include these comparisons in our meta-analyses but did include effects from other race comparisons in this study. As such, we conducted separate meta-analyses for studies comparing white caregivers to African American caregivers and for studies comparing white caregivers to Hispanic/Latino caregivers (Table 3). For each comparison, we conducted meta-analyses for (1) all studies, (2) population-based studies only, (3) convenience sample studies only, (4) studies with minimal bias, (5) studies with low bias, and (6) studies with moderate bias. Within each of these six categories, we conducted separate meta-analyses for (1) all effects, (2) effects characterized as psychological or emotional well-being (e.g., depression, strain, stress, or burden), including subjective appraisals, and (3) effects characterized as physical well-being (e.g., blood pressure, HbA1c, salivary cortisol level). We further stratified the effects for psychological or emotional well-being into "depression," "appraisal," and "other" (Table 4). Negative effect estimates indicated lower score on outcome for the nonwhite/minority caregivers compared with white caregivers. All outcomes were coded with higher scores corresponding to worse health.

Results

Table 2 lists 38 studies that were included in the meta-analysis in chronological order. Twenty-two studies (57.89%) compared white caregivers to only African American caregivers, eight studies (21.05%) compared white caregivers to only Hispanic/Latino caregivers, and eight studies (21.05%) had both comparisons. Two (5.26%) of the studies were population-based and 36 (94.74%) used convenience samples. Nearly every study (n = 37; 97.37%) assessed outcomes related to caregivers' psychological well-being, while only 17 (44.74%) assessed physical well-being. Results from the risk-of-bias assessment are also summarized in Table 2. Of the 38 studies rated, 16 (42.11%) had minimal potential bias, 13 (34.21%) had low potential bias, and 9 (23.68%) had moderate potential bias. None of the studies were scored as having high potential bias.

Measures

Table 2 summarizes the instruments used to measure psychological well-being that were used in each study. Several constructs were measured using different instruments across studies. For example, both the Center for Epidemiological Studies—Depression (CES-D) scale and the Geriatric Depression Scale were used to measure depression in multiple studies. A subscore for the brief symptom index (BSI) was also used as a measure of depression in one study (Haley et al., 1995).

Measures of appraisal included any subjective reaction to caregiving that was not an indicator of overall well-being could be applied to both caregivers and noncaregivers. In our study, measures of appraisal included caregiver bother, stress, strain, distress, burden, self-efficacy, satisfaction, mastery, positive aspects of caregiving, as well as specific types of appraisal including the need to know more, being able to accept the situation, etc.

Outcomes in the group for "other" include life satisfaction index, subscores for the BSI excluding depression, anxiety, negative outcomes, positive affect, positive cognition, symptoms subscale, somatic symptoms, hostility, psychological well-being, general symptom index, spiritual well-being, and psychological symptoms measured by the Symptom Checklist 90 (SCL-90).

Meta-Analysis

Table 3 summarizes results from the meta-analysis using the random-effects model. Stratified analyses for race/ethnicity comparison showed that effects for psychological well-being were significantly lower for African American caregivers compared with white caregivers, indicating better outcomes for African American caregivers. This effect held for studies at all levels of potential bias. When compared with white caregivers, African American caregivers had significantly better physical well-being in minimal-bias studies (p = .016), no difference in low-bias studies (p = .95) and significantly worse health in moderate-bias studies ($p < .001$).

Results for comparisons between Hispanic/Latino caregivers and white caregivers were less consistent. Overall, Hispanic/Latino caregivers had no differences in psychological well-being compared with white caregivers. However, they were found to have better psychological well-being in minimal-bias studies ($p < .001$), but worse psychological well-being in low-bias (p = .036) and moderate-bias studies (p = .001), compared to white caregivers. Overall, Hispanic/Latino caregivers had worse physical well-being than white caregivers (p = .005), which was also observed among studies with moderate bias. There were no studies with low bias that included physical well-being outcomes; among studies with minimal bias, there was no difference on physical well-being.

Overall effect estimates from population-based studies (n = 2), both of which only had comparisons between African American and white caregivers, showed significantly better psychological well-being (p = .033) but worse physical well-being (p = .014) in African Americans. Analysis of the convenience sample studies showed better overall and psychological well-being for African Americans ($p < .001$) and worse physical well-being in Hispanic/Latino caregivers (p = .005), compared with white caregivers.

Table 4 summarizes results from the analysis of psychological well-being, categorized into appraisals, depression and other, the last of which consists of all other measures of psychological well-being. The only measure of physical well-being included in this analysis was physical strain from

Table 2. Summary of Articles (*N* = 38) Included in Meta-Analysis

Study	Group compared to white caregivers	Measures of psychological well-being outcomes	Measures of physical well-being outcomes	Population-based	Potential bias
Hinrichsen & Ramirez (1992)	African American	Burden (ZBI), appraisal, psychopathology symptoms (SCL-90)	N/A	No	Low
Macera et al. (1992)	African American	Burden, depressive symptoms	Self-perceived health, hypertension	No	Moderate
Cox (1995)	African American	Depression, relationship strain	N/A	No	Low
Haley et al. (1995)	African American	Depressive symptoms (CES-D)[a], life satisfaction (LSI)[a], mental health outcomes (BSI)	N/A	No	Minimal
Haley et al. (1996)	African American	Depressive symptoms (CES-D), life satisfaction (LSI), caregiver bother (MBPC-R)	Overall physical health (CMI)	No	Minimal
Farran, Miller, Kaufman, & Davis (1997)	African American	Depressive symptoms (CES-D), task distress (CES-D)	Overall physical health	No	Moderate
Harwood et al. (1998)	Hispanic/Latino	Depressive symptoms (CES-D)	N/A	No	Low
Knight & McCallum (1998)	African American	Depressive symptoms (CES-D), anxiety (STAI), MD	Systolic blood pressure, diastolic blood pressure, heart rate	No	Moderate
Adams et al. (2002)	African American, Hispanic/Latino	Depression (OAHMQ), psychopathology symptoms (SCL-90), appraisal (CAQ)	N/A	No	Low
Mausbach, Coon, Cardenas, & Thompson (2003)	Hispanic/Latino	Depressive symptoms (GDS)	Overall physical health	No	Minimal
Coon et al. (2004)	Hispanic/Latino	Depressive symptoms (CES-D), well-being (CES-D subscale), anxiety (STAI)	Overall physical health (Ware, Kosinski, & Keller 1996)	No	Minimal
Haley et al. (2004)	African American	Depressive symptoms (CES-D)[a], anxiety (STAI)[a], PAC, caregiver bother (RMBPC)	Overall physical health (Ware et al., 1996)[a]	No	Minimal
Roff et al. (2004)	African American	Depressive symptoms (CES-D)[a], anxiety (STAI), behavioral bother (RMBPC)[a]	N/A	No	Minimal
Diwan, Hougham, & Sachs (2004)	African American	Role strain (CSI), personal strain (CSI), emotional strain (CSI)	N/A	No	Low
Sörensen & Pinquart (2005)	African American, Hispanic/Latino	Depressive symptoms (CES-D), PAC	Overall physical health	No	Minimal
Spurlock (2005)	African American	Spiritual well-being (SWBS), burden (ZBI)	N/A	No	Moderate
Sleath, Thorpe, Landerman, Doyle, & Clipp (2005)	African American	Depressive symptoms (CES-D)	N/A	No	Low

Table 2. Continued

Study	Group compared to white caregivers	Measures of psychological well-being outcomes	Measures of physical well-being outcomes	Population-based	Potential bias
Wilcox, Bopp, Wilson, Fulk, & Hand (2005)	African American	Global stress (PSS), subjective burden (SCB)	Systolic blood pressure, diastolic blood pressure, salivary cortisol (Coat-A-Count; Diagnostic Products Corporation, Los Angeles, CA)	No	Moderate
McCallum et al. (2006)	African American	Depressive symptoms (CES-D), global stress (PSS)	Salivary cortisol (Salivette; Sarstedt Co., Rommelsdorf, Germany)	No	Low
Gallagher-Thompson et al. (2006)	Hispanic/Latino	Depressive symptoms (CES-D), global stress (PSS)	Salivary cortisol (Salivette; Sarstedt Co., Rommelsdorf, Germany)	No	Moderate
Belle et al. (2006)	African American, Hispanic/Latino	Depressive symptoms (CES-D), caregiver bother (RMBPC)	N/A	No	Minimal
Rabinowitz & Gallagher-Thompson (2007)	Hispanic/Latino	N/A	Hypertension, heart conditions, diabetes, chronic lung disease, cancer, stroke, dizziness, headache, gastrointestinal problems	No	Minimal
Kim et al. (2007)	African American	Depression (CES-D), psychopathology symptoms (GSI), subjective burden (ZBI)	Subjective physical health, systolic blood pressure, diastolic blood pressure, heart rate	Yes	Low
Roth, Ackerman, Okonkwo, & Burgio (2008)	African American, Hispanic/Latino	Depressive symptoms (CES-D)	N/A	No	Minimal
Mitrani, Vaughan, McCabe, & Feaster (2008)	Hispanic/Latino	Depressive symptoms (CES-D)[a], anxiety (SAI), distress (composite of depression and anxiety)	N/A	No	Low
Gallagher-Thompson, Gray, Dupart, Jimenez, & Thompson (2008)	Hispanic/Latino	Depressive symptoms (CES-D), global stress (PSS), caregiver bother (RMBPC)	N/A	No	Low
Montoro-Rodriguez and Gallagher-Thompson (2009)	Hispanic/Latino	Burden, self-efficacy (Revised Scale for Caregiving Self-Efficacy)	N/A	No	Minimal

Table 2. Continued

Study	Group compared to white caregivers	Measures of psychological well-being outcomes	Measures of physical well-being outcomes	Population-based	Potential bias
Montoro-Rodriguez, Kosloski, Kercher and Montgomery (2009)	African American, Hispanic/Latino	Depressive symptoms (CES-D)	Self-rated health	No	Moderate
Hilgeman et al. (2009)	African American, Hispanic/Latino	Subjective stress, intrapsychic stress, negative psychological outcomes	N/A	No	Minimal
Skarupski, McCann, Bienias, & Evans (2009)	African American	Depressive symptoms (CES-D), burden (Burden), satisfaction (Satisfaction), positive affect (Positive Affect Scale)	N/A	No	Low
Merritt, McCallum, & Fritsch (2011)	African American	Depressive symptoms (CES-D), global stress (PSS), caregiver bother (RMBPC)	Salivary cortisol (Salivette; Sarstedt Co., Rommelsdorf, Germany)	No	Moderate
Joling et al. (2012)	African American	Depressive symptoms (CES-D)	N/A	No	Minimal
Bekhet (2015)	African American	Perceived burden (Zarit Burden Scale), positive cognitions (DCS), symptoms subscale (SQ), anxiety (SQ), somatic symptoms (SQ), depression (SQ), hostility (SQ), psychological well-being (SQ)	Overall physical health	No	Moderate
Cho, Ory, & Stevens (2016)	African American, Hispanic/Latino	Positive aspects of caregiving	N/A	No	Minimal
Badana et al. (2019)	African American	Emotional stress	Physical strain, health status	Yes	Low
Cothran et al. (2017)	African American	Subject burden (Subjective Caregiver Burden Scale), depressive symptoms (CES-D), positive affect (Positive and Negative Affect Scale)	N/A	No	Low
Armstrong, Gitlin, Parisi, Roth, & Gross (2018)	African American	Depressive symptoms (CES-D), burden	N/A	No	Minimal
Chiriboga, Park, Gilbert, Molinari, & Barnes (2019)	African American, Hispanic/Latino	Perceived burden (ZBI)	N/A	No	Minimal

Note: If the outcome measure name is not specified, the measure was developed and used in study. CES-D = Center for Epidemiological Studies—Depression scale; CMI = Cornell Medical Index; CSI = Caregiver Strain Index; GDS = Geriatric Depression scale; LSI = life satisfaction index; MD = motivational distortion; PAC = positive aspects of caregiving; PSS = Perceived Stress Scale; RMBPC = Revised Memory and Behavior Problem Checklist; SCB = Screen for Caregiving Burden; STAI = State-Trait Anxiety Inventory; ZBI = Zarit Burden Index.

[a] Outcome was not included in meta-analysis due to not containing independent data (i.e., data were used in other papers with larger sample sizes; see Methods section for further explanation).

Table 3. Meta-Analysis Random-Effect Estimates for Psychological/Emotional and Physical Health Outcomes Compared to White Caregivers

	African American					Hispanic/Latino				
Type of analysis	No. of studies (effects)	Estimate	95% CI	*p*-value	I^2	No. of studies (effects)	Estimate	95% CI	*p*-value	I^2
Total										
Overall	30 (115)	−0.179	−0.230, −0.128	<.001	79.9%	16 (44)	0.015	−0.067, 0.096	.726	87.0%
Psychological	30 (86)	−0.226	−0.264, −0.189	<.001	81.1%	16 (29)	−0.032	−0.092, 0.028	.294	91.7%
Physical	14 (29)	0.018	−0.045, 0.081	.581	81.7%	4 (15)	0.124	0.037, 0.211	.005	90.8%
Population-based studies										
Overall	2 (10)	0.025	−0.134, 0.183	.762	0.0%	—	—	—	—	—
Psychological	2 (4)	−0.222	−0.426, −0.019	.033	0.0%	—	—	—	—	—
Physical	2 (6)	0.187	0.038, 0.337	.014	88.3%	—	—	—	—	—
Convenience sample										
Overall	28 (105)	−0.186	−0.238, −0.133	<.001	80.6%	16 (44)	0.015	−0.067, 0.096	.726	87.0%
Psychological	27 (82)	−0.213	−0.252, −0.174	<.001	81.0%	16 (29)	−0.032	−0.092, 0.028	.294	91.7%
Physical	12 (23)	0.002	−0.066, 0.070	.951	77.7%	4 (15)	0.124	0.037, 0.211	.005	90.8%
Minimal-bias studies										
Overall	11 (31)	−0.203	−0.265, −0.142	<.001	85.7%	10 (26)	−0.077	−0.189, 0.034	.173	91.6%
Psychological	10 (27)	−0.210	−0.259, −0.160	<.001	88.1%	10 (16)	−0.134	−0.209, −0.058	.001	94.4%
Physical	3 (4)	−0.132	−0.239, −0.024	.016	51.1%	2 (10)	−0.024	−0.138, 0.089	.673	92.8%
Low-bias studies										
Overall	11 (47)	−0.187	−0.256, −0.118	<.001	75.8%	4 (10)	0.144	0.010, 0.279	.036	24.1%
Psychological	11 (34)	−0.215	−0.286, −0.144	<.001	70.2%	4 (10)	0.144	0.010, 0.279	.036	24.1%
Physical	5 (13)	0.003	−0.110, 0.117	.953	85.3%	0 (0)	—	—	—	—
Moderate-bias studies										
Overall	8 (37)	−0.067	−0.300, 0.166	.575	79.5%	2 (8)	0.284	0.144, 0.424	<.001	55.8%
Psychological	8 (25)	−0.222	−0.322, −0.122	<.001	74.9%	2 (3)	0.223	0.089, 0.358	.001	0.0%
Physical	6 (12)	0.229	0.125, 0.333	<.001	69.0%	2 (5)	0.350	0.215, 0.484	<.001	83.8%

Note: CI = confidence interval.

Table 4. Appraisals, Depression, and Other Psychological Health Outcomes

	African American					Hispanic/Latino				
Type of analysis	No. of studies (effects)	Estimate	95% CI	*p*-value	I^2	No. of studies (effects)	Estimate	95% CI	*p*-value	I^2
Total										
Appraisal[a]	25 (43)	−0.209	−0.261, −0.156	<.001	80.6%	10 (17)	−0.339	−0.421, −0.257	<.001	86.4%
Depression	19 (19)	−0.176	−0.226, −0.127	<.001	72.6%	8 (8)	0.240	0.164, 0.316	<.001	52.5%
Other	13 (25)	−0.178	−0.250, −0.105	<.001	43.2%	3 (4)	0.008	−0.196, 0.212	.936	62.6%
Population-based studies										
Appraisal	2 (3)	−0.182	−0.371, 0.007	.060	0.0%	—	—	—	—	—
Depression	1 (1)	−0.249	−0.564, 0.067	.122	—	—	—	—	—	—
Other	1 (1)	−0.244	−0.559, 0.071	.130	—	—	—	—	—	—
Convenience sample										
Appraisal	23 (40)	−0.210	−0.265, −0.155	<.001	82.1%	10 (17)	−0.339	−0.421, −0.257	<.001	86.4%
Depression	18 (18)	−0.175	−0.225, −0.125	<.001	74.0%	8 (8)	0.240	0.164, 0.316	<.001	52.5%
Other	12 (24)	−0.174	−0.249, −0.100	<.001	47.3%	3 (4)	0.008	−0.196, 0.212	.936	62.6%
Minimal-bias studies										
Appraisal	8 (10)	−0.232	−0.305, −0.158	<.001	89.4%	6 (10)	−0.397	−0.483, −0.310	<.001	90.1%
Depression	6 (6)	−0.137	−0.208, −0.066	<.001	77.9%	3 (3)	0.213	0.092, 0.334	.001	56.3%
Other	4 (11)	−0.228	−0.328, −0.129	<.001	29.6%	2 (7)	−0.046	−0.272, 0.180	.691	0.0%
Low-bias studies										
Appraisal	10 (22)	−0.169	−0.247, −0.091	<.001	69.9%	3 (6)	−0.079	−0.317, 0.159	.515	39.1%
Depression	7 (7)	−0.206	−0.292, −0.119	<.001	67.3%	3 (3)	0.286	0.148, 0.423	<.001	74.5%
Other	6 (6)	−0.144	−0.266, −0.023	.020	0.0%	1 (1)	0.409	0.032, 0.787	.034	—
Moderate-bias studies										
Appraisal	7 (11)	−0.175	−0.332, −0.018	.029	78.6%	1 (1)	0.147	−0.642, 0.936	.715	—
Depression	6 (6)	−0.200	−0.309, −0.092	<.001	78.7%	2 (2)	0.231	0.095, 0.366	.001	19.6%
Other	3 (8)	−0.092	−0.295, 0.111	.376	85.3%	0 (0)	—	—	—	—

Note: CI = confidence interval.

[a] Includes one effect for physical strain, which is categorized as a physical health outcome as well as an appraisal.

Badana et al. (2019), which we categorized as a measure of appraisal due to the subjective assessment of strain.

African American caregivers had lower depression and better appraisals than white caregivers in convenience sample studies as well as studies at all levels of potential bias ($ps < .05$). Two population-based studies included the appraisal outcome (three effects: physical strain and emotional stress from Badana et al. (2019); burden from Kim et al. (2007), with results indicating nonsignificantly better appraisals for African American caregivers ($p = .06$), and only one population-based study included depression (one effect from Kim et al.), which showed no difference between African American and white caregivers.

Overall, Hispanic/Latino caregivers had higher depression than white caregivers, an effect that held across studies with all levels of potential bias. Although Hispanic/Latino caregivers also had better appraisals than white caregivers in the overall analysis ($p < .001$) and among studies with minimal levels of bias ($p < .001$), no differences were observed among studies with low or moderate levels of bias.

Discussion

In the present study, we provide an updated systematic review and meta-analysis from Pinquart and Sörensen (2005) on race differences in dementia caregivers, with a focus solely on dementia caregiving, and only on physical and psychological well-being. We found that African American dementia caregivers had better psychological well-being than white dementia caregivers, with small effect sizes (approximately $d = 0.20$ standard deviation units) observed in both convenience samples ($d = -0.213$; 95% CI: −0.252, −0.174) and population-based studies ($d = -0.222$; 95% CI: −0.426, −0.019). Results for population-based studies were particularly interesting because neither of the studies (Badana et al., 2019; Kim et al., 2007) reported significant differences, but the combined effects were significant in our analyses. This difference was also found on measures of both depression and appraisal, though the effect for depression was not significant in population-based studies. We found that Hispanic/Latino dementia caregivers had worse physical well-being than white dementia caregivers, an effect that was attenuated in studies with minimal potential bias.

Our meta-analysis confirmed findings from previous studies showing that African American caregivers have better measures of psychological well-being than white caregivers, corroborating findings from Pinquart and Sörensen (2005), with our analyses focusing only on dementia caregivers. Although our study did not explore mechanisms behind the difference in well-being, several studies have proposed potential explanations. Factors contributing to this difference may include higher levels of religiosity and familism. In a qualitative study, Epps, Rose, and Lopez (2019) found that African American primary caregivers of dementia patients are supported by a network of family members that extend beyond the dyad. This additional source of support provided by the family structure may explain the better health outcomes that they experience. Furthermore, Dilworth-Anderson, Brummett, Goodwin, Williams, Williams, & Siegler (2005) found that African American caregivers scored higher on the Cultural Justifications for Caregiving Scale (CJCS) compared with white caregivers, suggesting that African Americans provide care due to interdependence of family and community members as well as reciprocity expected within families.

Interestingly, the effect for physical well-being in comparisons between African American dementia caregivers and white dementia caregivers was different at each level of bias. Only our findings from the moderate-bias studies corroborated findings from previous studies showing worse physical well-being in African Americans (Kim et al., 2007). Among minimal-bias studies, African American dementia caregivers had better physical well-being compared with white dementia caregivers. This discrepancy among studies shows that high risk of bias in a research study may lead to significant associations being obscured, or even reversed. These issues are complicated in that African American caregivers are less likely to be spouse caregivers than whites, and African American caregivers are often younger than white caregivers (Badana et al., 2019). Another important issue is that African Americans report lower self-rated health than whites in the general population (Assari, Lankarani, & Burgard, 2016). In one of the few studies to compare African American and white caregivers and noncaregivers, Haley and colleagues (1995) found that African American caregivers and noncaregivers reported poorer self-rated health than white caregivers and noncaregivers. Going forward, developing protocols with minimal or low risk of potential bias, controlling for demographic factors, and inclusion of noncaregiving controls could improve our understanding of the true association between the race/ethnicity of dementia caregivers and their physical well-being.

Previous studies have found worse physical well-being for Hispanic/Latino dementia caregivers compared with white dementia caregivers (Gallagher-Thompson et al., 2006), which we confirmed in our overall analysis as well as studies with minimal bias. Caregiving has previously been found to have very small effects on physical well-being (Pinquart & Sörensen, 2003); so, this difference is likely explained by factors outside of caregiving such as a lack of access to health care, poor insurance, or racial or ethnic discrimination (Williams & Wilson, 2001). Although we did not find differences between Hispanic/Latino dementia caregivers and white dementia caregivers in overall psychological well-being, we found that the former group has higher levels of depression across studies with all levels of bias in our meta-analysis. This is corroborated by evidence that Hispanic/Latino caregivers are at higher risk of depression than non-Hispanic white caregivers (Dilworth-Anderson et al., 2002; Harwood et al., 1998; Janevic &

Connell, 2001). Pinquart and Sörensen (2005) attributed this phenomenon to care recipients' greater behavior problems, poorer relationship quality with the care recipient, and lower levels of formal support usage. Montoro-Rodriguez and Gallagher-Thompson (2009) found higher usage of avoidance strategies among Latina dementia caregivers compared with white dementia caregivers, which has been linked to subsequent anxiety and depression (Fisher & Lieberman, 1996). As such, Hispanic/Latino caregivers may benefit from intervention on this aspect of coping through strategies such as cognitive-behavioral therapy, which has previously been found to be efficacious for reducing depressive symptoms in Hispanic/Latino dementia caregiver populations (Gallagher-Thompson & Coon, 2007).

In comparisons between Hispanic/Latino dementia caregivers and white dementia caregivers, psychological well-being was significantly better for the Hispanic/Latino group in minimal-bias studies but worse in low-bias and moderate-bias studies, leading to a null effect overall. This may be due to several reasons. First, there were fewer studies and effects, which may yield measures of association that are not necessarily representative. Furthermore, Hispanic/Latinos consist of a heterogeneous group with subgroups including Cuban Americans, Mexican Americans, etc., all of whom experience unique health-related challenges that may not be generalizable to the entire group. In most studies included in the meta-analysis with comparisons between Hispanic/Latino caregivers and white caregivers, information about the former's country or countries of origin was not reported. If there were significant effects in either direction, the heterogeneity within this group may have led to those effects being obscured.

Only two population-based studies were identified in this systematic review and we were unable to definitively conclude whether selection bias in recruiting minority caregivers leads to biased comparisons with white dementia caregivers. Interestingly, although African American dementia caregivers had better psychological well-being compared with white dementia caregivers in both population-based and convenience sample studies, the effect for depression was attenuated in population-based studies. Based on our hypothesis, this may show that what could be predominantly clinical populations for white dementia caregivers in convenience samples led to worse psychological well-being than what is representative of this population of caregivers. However, only one effect for depression was extracted from Kim and colleagues (2007) among the population-based studies. Although it would have been ideal to conduct stratified analyses for different measures of psychological well-being in addition to depression and appraisals (e.g., anxiety), there was an insufficient number of effects for most other measures and they were often not well-defined constructs (e.g., positive cognition or positive affect). More population-based studies on differences in dementia caregiver health and well-being are needed to better understand whether this trend for depression applies to other measures of psychological well-being.

There are several limitations to our study. We focused on extracting effects on health-related outcomes and appraisal, but not all effects may be due to caregiving and many may be attributable to baseline health status of each group. We tried to remove all duplicate outcomes across multiple papers from the same studies (e.g., the REACH I and II studies), but it was sometimes unclear whether multiple papers analyzed the same data from the same study. We excluded some articles because the analysis methods used in the original paper did not provide sufficient data for our analyses. For example, a population-based study by Knight et al. (2007) was excluded because caregiver data were not reported separately from noncaregiver data. We were unable to include comparisons between Asian American caregivers and white caregivers because only one eligible study was identified. Despite these limitations, the present study provides important information about differences in psychological and physical well-being of African American and Hispanic/Latino dementia caregivers compared with white dementia caregivers, accounting for methodological rigor and sampling strategies employed across 38 studies.

There are two key methodological improvements needed to further our understanding of the impact of dementia caregiving across multiple racial/ethnic groups. First, more population-based studies that oversample or focus on minority groups are needed. There are noteworthy examples in the existing literature including the National Health and Aging Trends and National Study of Caregiving studies, both of which oversampled African Americans (Kasper, Freedman, & Spillman, 2016), and the Hispanic-EPESE study (Hahn, Kim, & Chiriboga, 2011). Future studies should use population-based samples of culturally distinct subgroups of Hispanic/Latino, Asian, and American Indian caregivers, accounting for factors such as country of origin and tribe. For example, differences have been found between Americans of Cuban, Mexican, and Puerto-Rican descent in physical and mental health (Ai, Carretta, & Aisenberg, 2017) as well as between dementia caregivers from diverse American Indian tribes (Martindale-Adams et al., 2017). Second, there is a great need for community-based studies that can provide information on unique cultural groups in given communities. In particular, studies should aim to assess the physical and psychological well-being of understudied groups, such as Asian American and American Indian caregivers, in order to understand the challenges they face in this role. In such studies, researchers should aim to recruit caregivers from these groups by identifying and forming relationships with community leaders, conducting direct outreach, providing opportunities for community involvement and feedback in the research study, and communicating how these communities might benefit from the research. More information is also needed about caregiver recruitment methods and whether these methods differ by group when multiple racial or ethnic groups are included in the analysis.

Previous research on dementia caregiver intervention has generally supported the idea that culturally diverse caregivers share many common stressors (e.g., managing ADL and behavioral problems, work and family strains) but that interventions should be adapted to be culturally appropriate to diverse groups (Gallagher-Thompson et al., 2003). In some instances, such as intervention for American Indian dementia caregivers, interventions must be more specifically tailored to address variability in local or tribal customs and resources (Martindale-Adams et al., 2017). Our finding that African American caregivers have better psychological well-being compared with white caregivers does not mean that African American dementia caregivers do not need intervention. For example, African American caregivers may have better psychological well-being compared with white caregivers, but mixed results for measures of physical well-being may indicate that they need more resources in other domains of caregiving such as health care utilization. Researchers carrying out interventions should take into account the fact that African American caregivers provide care with fewer financial resources and may face issues related to accessibility and affordability of health care resources. An increased focus on topics such as education, skill training, and faith-based resources may be appropriate (Gallagher-Thompson et al., 2003), especially given the evidence that faith-based interventions benefit African American caregivers (Iris, Berman, & Stein, 2014).

In summary, future research should aim to identify and analyze specific domains of needs of diverse caregivers in order to provide more targeted supports and services. As the burden of dementia grows nationally and worldwide, our understanding of the health and well-being of dementia caregivers is key to providing adequate resources for this group in the coming years.

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Conflict of Interest

None reported.

References

Adams, B., Aranda, M. P., Kemp, B., & Takagi, K. (2002). Ethnic and gender differences in distress among Anglo American, African American, Japanese American, and Mexican American spousal caregivers of persons with dementia. *Journal of Clinical Geropsychology*, 8(4), 279–301. doi:10.1023/A:1019627323558

Ai, A. L., Carretta, H. J., & Aisenberg, E. (2017). Cultural strengths of Latino-American subgroups: Differential associations with their self-rated mental and physical health. *Journal of Cross-Cultural Psychology*, **48**(9), 1349–1368. doi:10.1177/0022022117723528

Alzheimer's Association. (2019). 2019 Alzheimer's disease facts and figures. *Alzheimer's & Dementia*, **15**(3), 321–387. doi:10.1016/j.jalz.2019.01.010

Apesoa-Varano, E. C., Tang-Feldman, Y., Reinhard, S. C., Choula, R., & Young, H. M. (2015). Multi-cultural caregiving and caregiver interventions: A look back and a call for future action. *Generations*, **39**(4), 39–48.

Aranda, M. P., & Knight, B. G. (1997). The influence of ethnicity and culture on the caregiver stress and coping process: A sociocultural review and analysis. *The Gerontologist*, **37**, 342–354. doi:10.1093/geront/37.3.342

Armstrong, N. M., Gitlin, L. N., Parisi, J. M., Roth, D. L., & Gross, A. L. (2018). Association of physical functioning of persons with dementia with caregiver burden and depression in dementia caregivers: An integrative data analysis. *Aging & Mental Health*, **22**, 1–8. doi:10.1080/13607863.2018.1441263

Assari, S., Lankarani, M. M., & Burgard, S. (2016). Black-white difference in long-term predictive power of self-rated health on all-cause mortality in United States. *Annals of Epidemiology*, **26**, 106–114. doi:10.1016/j.annepidem.2015.11.006

Badana, A. N. S., Marino, V., & Haley, W. E. (2019). Racial differences in caregiving: Variation by relationship type and dementia care status. *Journal of Aging and Health*, **31**, 925–946. doi:10.1177/0898264317743611

Bekhet, A. K. (2015). Resourcefulness in African American and Caucasian American caregivers of persons with dementia: Associations with perceived burden, depression, anxiety, positive cognitions, and psychological well-being. *Perspectives in Psychiatric Care*, **51**, 285–294. doi:10.1111/ppc.12095

Belle, S. H., Burgio, L., Burns, R., Coon, D., Czaja, S. J., Gallagher-Thompson, D.,…Zhang, S.; Resources for Enhancing Alzheimer's Caregiver Health (REACH) II Investigators. (2006). Enhancing the quality of life of dementia caregivers from different ethnic or racial groups: A randomized, controlled trial. *Annals of Internal Medicine*, **145**, 727–738. doi:10.7326/0003-4819-145-10-200611210-00005

Capistrant, B. D. (2016). Caregiving for older adults and the caregivers' health: An epidemiologic review. *Current Epidemiology Reports*, **3**, 72–78. doi:10.1007/s40471-016-0064-x

Chiriboga, D. A., Park, N. S., Gilbert, K., Molinari, V. A., & Barnes, M. (2019). Cognitive and functional status of persons newly enrolled at dementia-specific adult day centers and burden of their caregivers. *Innovation in Aging*, **3**, igz013. doi:10.1093/geroni/igz013

Cho, J., Ory, M. G., & Stevens, A. B. (2016). Socioecological factors and positive aspects of caregiving: Findings from the REACH II intervention. *Aging & Mental Health*, **20**, 1190–1201. doi:10.1080/13607863.2015.1068739

Coon, D. W., Rubert, M., Solano, N., Mausbach, B., Kraemer, H., Arguëlles, T.,…Gallagher-Thompson, D. (2004). Well-being, appraisal, and coping in Latina and Caucasian female dementia caregivers: Findings from the REACH study. *Aging & Mental Health*, **8**, 330–345. doi:10.1080/13607860410001709683

Cothran, F. A., Paun, O., Barnes, L. L., Epps, F., Schoeny, M., & Farran, C. J. (2017). Comparing the effect of a moderate physical activity intervention on the mental health outcomes of African American and Caucasian dementia family caregivers: A secondary data analysis. *Issues in Mental Health Nursing*, **38**, 996–1004. doi:10.1080/01612840.2017.1364807

Cox, C. (1995). Comparing the experiences of black and white caregivers of dementia patients. *Social Work*, **40**, 343–349. doi:10.1093/sw/40.3.343

DerSimonian, R., & Laird, N. (1986). Meta-analysis in clinical trials. *Control Clin Trials*, **7**, 177–188. doi:10.1016/0197-2456(86)90046-2

Dilworth-Anderson, P., & Anderson, N. B. (1994). Dementia caregiving in blacks: A contextual approach to research. In E. Light, G. Niederehe, & B. D. Lebowitz (Eds.), *Stress effects on family caregivers of Alzheimer's patients: Research and interventions* (pp. 385–409). New York: Springer Publishing Co.

Dilworth-Anderson, P., Brummett, B. H., Goodwin, P., Williams, S. W., Williams, R. B., & Siegler, I. C. (2005). Effect of Race on Cultural Justifications for Caregiving. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, **60**, S257–S262. doi:10.1093/geronb/60.5.S257

Dilworth-Anderson, P., Williams, I. C., & Gibson, B. E. (2002). Issues of race, ethnicity, and culture in caregiving research: A 20-year review (1980-2000). *The Gerontologist*, **42**, 237–272. doi:10.1093/geront/42.2.237

Diwan, S., Hougham, G. W., & Sachs, G. A. (2004). Strain experienced by caregivers of dementia patients receiving palliative care: Findings from the Palliative Excellence in Alzheimer Care Efforts (PEACE) Program. *Journal of Palliative Medicine*, **7**, 797–807. doi:10.1089/jpm.2004.7.797

Epps, F., Rose, K. M., & Lopez, R. P. (2019). Who's your family?: African American caregivers of older adults with dementia. *Research in Gerontological Nursing*, **12**, 20–26. doi:10.3928/19404921-20181212-04

Farran, C. J., Miller, B. H., Kaufman, J. E., & Davis, L. (1997). Race, finding meaning, and caregiver distress. *Journal of Aging and Health*, **9**, 316–333. doi:10.1177/089826439700900303

Ferraro, K., & Farmer, M. (1996). Double jeopardy, aging as a leveler, or persistent health inequality? A longitudinal analysis of White and Black Americans. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, **51B**, S319–328. doi:10.1093/geronb/51b.6.s319

Fisher, L., & Lieberman, M. A. (1996). The effects of family context on adult offspring of patients with Alzheimer's disease; A longitudinal study. *Journal of Family Psychology*, **10**, 180–191.

Gallagher-Thompson, D., & Coon, D. W. (2007). Evidence-based psychological treatments for distress in family caregivers of older adults. *Psychology and Aging*, **22**, 37–51. doi:10.1037/0882-7974.22.1.37

Gallagher-Thompson, D., Gray, H. L., Dupart, T., Jimenez, D., & Thompson, L. W. (2008). Effectiveness of cognitive/behavioral small group intervention for reduction of depression and stress in non-Hispanic white and Hispanic/Latino women dementia family caregivers: Outcomes and mediators of change. *Journal of Rational-Emotive and Cognitive-Behavior Therapy*, **26**, 286–303. doi:10.1007/s10942-008-0087-4

Gallagher-Thompson, D., Shurgot, G. R., Rider, K., Gray, H. L., McKibbin, C. L., Kraemer, H. C.,…Thompson, L. W. (2006). Ethnicity, stress, and cortisol function in Hispanic and non-Hispanic white women: A preliminary study of family dementia caregivers and noncaregivers. *The American Journal of Geriatric Psychiatry*, **14**, 334–342. doi:10.1097/01.JGP.0000206485.73618.87

Gallagher-Thompson, D., Solano, N., Coon, D., & Areán, P. (2003). Recruitment and retention of Latino dementia family caregivers in intervention research: Issues to face, lessons to learn. *The Gerontologist*, **43**(1), 45–51. doi:10.1093/geront/43.1.45

Hahn, E. A., Kim, G., & Chiriboga, D. A. (2011). Acculturation and depressive symptoms among Mexican American elders new to the caregiving role: Results from the Hispanic-EPESE. *Journal of Aging and Health*, **23**(3), 417–432. doi:10.1177/0898264310380454

Haley, W. E., Gitlin, L. N., Wisniewski, S. R., Mahoney, D. F., Coon, D. W., Winter, L.,…Ory, M. (2004). Well-being, appraisal, and coping in African-American and Caucasian dementia caregivers: Findings from the REACH study. *Aging & Mental Health*, **8**, 316–329. doi:10.1080/13607860410001728998

Haley, W. E., Roth, D. L., Coleton, M. I., Ford, G. R., West, C. A., Collins, R. P., & Isobe, T. L. (1996). Appraisal, coping, and social support as mediators of well-being in black and white family caregivers of patients with Alzheimer's disease. *Journal of Consulting and Clinical Psychology*, **64**, 121–129. doi:10.1037//0022-006x.64.1.121

Haley, W. E., West, C. A., Wadley, V. G., Ford, G. R., White, F. A., Barrett, J. J.,…Roth, D. L. (1995). Psychological, social, and health impact of caregiving: A comparison of black and white dementia family caregivers and noncaregivers. *Psychology and Aging*, **10**, 540–552. doi:10.1037/0882-7974.10.4.540

Harris, R., Bradburn, M., Deeks, J., Harbord, R., Altman, D., & Sterne, J. (2008). Metan: Fixed- and random-effects meta-analysis. *Stata Journal*, **8**(1), 3–28. doi:10.1177/1536867x0800800102

Harwood, D. G., Barker, W. W., Cantillon, M., Loewenstein, D. A., Ownby, R., & Duara, R. (1998). Depressive symptomatology in first-degree family caregivers of Alzheimer disease patients: A cross-ethnic comparison. *Alzheimer Disease and Associated Disorders*, **12**, 340–346. doi:10.1097/00002093-199812000-00015

Hilgeman, M. M., Durkin, D. W., Sun, F., DeCoster, J., Allen, R. S., Gallagher-Thompson, D., & Burgio, L. D. (2009). Testing a theoretical model of the stress process in Alzheimer's caregivers with race as a moderator. *The Gerontologist*, **49**, 248–261. doi:10.1093/geront/gnp015

Hinrichsen, G. A., & Ramirez, M. (1992). Black and white dementia caregivers: A comparison of their adaptation, adjustment, and service utilization. *The Gerontologist*, **32**(3), 375–381. doi:10.1093/geront/32.3.375

Iris, M., Berman, R. L., & Stein, S. (2014). Developing a faith-based caregiver support partnership. *Journal of Gerontological Social Work*, **57**, 728–749. doi:10.1080/01634372.2014.898007

Janevic, M. R., & Connell, C. M. (2001). Racial, ethnic, and cultural differences in the dementia caregiving experience: Recent findings. *The Gerontologist*, **41**, 334–347. doi:10.1093/geront/41.3.334

Joling, K. J., Smit, F., van Marwijk, H. W., van der Horst, H. E., Scheltens, P., Schulz, R., & van Hout, H. P. (2012). Identifying target groups for the prevention of depression among caregivers of dementia patients. *International Psychogeriatrics*, **24**, 298–306. doi:10.1017/S1041610211001633

Kasper, J. D., Freedman, V. A., & Spillman, B. C. (2016). *National study of caregiving user guide*. Baltimore, MD: Johns Hopkins University School of Public Health. Retrieved from www.nhats.org.

Kim, J. H., Knight, B. G., & Longmire, C. V. (2007). The role of familism in stress and coping processes among African American and White dementia caregivers: Effects on mental and physical health. *Health Psychology*, **26**, 564–576. doi:10.1037/0278-6133.26.5.564

Knight, B. G., Longmire, C. V., Dave, J., Kim, J. H., & David, S. (2007): Mental health and physical health of family caregivers for persons with dementia: A comparison of African American and white caregivers. *Aging & Mental Health*, **11**, 538–546. doi:10.1080/13607860601086561

Kontopantelis, E., & Reeves, D. (2015). METAEFF: Stata module to perform effect sizes calculations for meta-analyses. *EconPapers*. Retrieved from https://EconPapers.repec.org/RePEc:boc:bocode:s457072.

Lawton, M. P., Rajagopal, D., Brody, E., & Kleban, M. H. (1992). The dynamics of caregiving for a demented elder among black and white families. *Journal of Gerontology*, **47**, S156–S164. doi:10.1093/geronj/47.4.s156

Macera, C. A., Eaker, E. D., Goslar, P. W., Deandrade, S. J., Williamson, J. S., Cornman, C., & Jannarone, R. J. (1992). Ethnic differences in the burden of caregiving. *American Journal of Alzheimer's Disease*. **September/October**, 4–7. doi:10.1177/153331759200700503

Martindale-Adams, J., Tah, T., Finke, B., LaCounte, C., Higgins, B. J., & Nichols, L. O. (2017). Implementation of the REACH model of dementia caregiver support in American Indian and Alaska Native communities. *Translational Behavioral Medicine*, **7**, 427–434. doi:10.1007/s13142-017-0505-1

Mausbach, B., Coon, D. W., Cardenas, V., & Thompson, L. (2003). Religious coping among Caucasian and Latina dementia caregivers. *Aging & Mental Health*, **9**(2), 97–110.

Mausbach, B. T., Coon, D. W., Depp, C., Rabinowitz, Y. G., Wilson-Arias, E., Kraemer, H. C.,…Gallagher-Thompson, D. (2004). Ethnicity and time to institutionalization of dementia patients: A comparison of Latina and Caucasian female family caregivers. *Journal of the American Geriatrics Society*, **52**, 1077–1084. doi:10.1111/j.1532-5415.2004.52306.x

McCallum, T. J., Sorocco, K. H., & Fritsch, T. (2006). Mental health and diurnal salivary cortisol patterns among African American and European American female dementia family caregivers. *The American Journal of Geriatric Psychiatry*, **14**, 684–693. doi:10.1097/01.JGP.0000225109.85406.89

Merritt, M. M., McCallum, T. J., & Fritsch, T. (2011). How much striving is too much? John Henryism active coping predicts worse daily cortisol responses for African American but not white female dementia family caregivers. *The American Journal of Geriatric Psychiatry*, **19**, 451–460. doi:10.1097/JGP.0b013e3181eaffa4

Mitrani, V. B., Vaughan, E. L., McCabe, B. E., & Feaster, D. J. (2008). Conflict resolution and distress in dementia caregiver families: Comparison of Cubans and white non-Hispanics. *Hispanic Health Care International*, **6**, 80–88. doi:10.1891/1540-4153.6.2.80

Montoro-Rodriguez, J., & Gallagher-Thompson, D. (2009). The role of resources and appraisals in predicting burden among Latina and non-Hispanic white female caregivers: A test of an expanded socio-cultural model of stress and coping. *Aging & Mental Health*, **13**, 648–658. doi:10.1080/13607860802534658

Montoro-Rodriguez, J., Kosloski, K., Kercher, K., & Montgomery, R. J. V. (2009). The impact of social embarrassment on caregiving distress in a multicultural sample of caregivers. *Journal of Applied Gerontology*, **28**(2), 195–217. doi:10.1177/0733464808323449

Ory, M. G., Hoffman, R. R. 3rd, Yee, J. L., Tennstedt, S., & Schulz, R. (1999). Prevalence and impact of caregiving: A detailed comparison between dementia and nondementia caregivers. *The Gerontologist*, **39**, 177–185. doi:10.1093/geront/39.2.177

Pinquart, M., & Sörensen, S. (2003). Differences between caregivers and noncaregivers in psychological health and physical health: A meta-analysis. *Psychology and Aging*, **18**, 250–267. doi:10.1037/0882-7974.18.2.250

Pinquart, M., & Sörensen, S. (2005). Ethnic differences in stressors, resources, and psychological outcomes of family caregiving: A meta-analysis. *The Gerontologist*, **45**, 90–106. doi:10.1093/geront/45.1.90

Rabinowitz, Y. G., & Gallagher-Thompson, D. (2007). Health and health behaviors among female caregivers of elderly relatives with dementia: The role of ethnicity and kinship status. *Clinical Gerontologist*, **31**, 1–15. doi:10.1300/j018v31n02_01

Roff, L. L., Burgio, L. D., Gitlin, L., Nichols, L., Chaplin, W., & Hardin, J. M. (2004). Positive aspects of Alzheimer's caregiving: The role of race. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, **59**, P185–P190. doi:10.1093/geronb/59.4.p185

Roth, D. L., Ackerman, M. L., Okonkwo, O. C., & Burgio, L. D. (2008). The four-factor model of depressive symptoms in dementia caregivers: A structural equation model of ethnic differences. *Psychology and Aging*, **23**, 567–576. doi:10.1037/a0013287

Roth, D. L., Brown, S. L., Rhodes, J. D., & Haley, W. E. (2018). Reduced mortality rates among caregivers: Does family caregiving provide a stress-buffering effect? *Psychology and Aging*, **33**, 619–629. doi:10.1037/pag0000224

Roth, D. L., Sheehan, O. C., Haley, W. E., Jenny, N. S., Cushman, M., & Walston, J. D. (2019). Is family caregiving associated with inflammation or compromised immunity? A meta-analysis. *The Gerontologist*, **59**, e521–e534. doi:10.1093/geront/gnz015

Skarupski, K. A., McCann, J. J., Bienias, J. L., & Evans, D. A. (2009). Race differences in emotional adaptation of family caregivers. *Aging & Mental Health*, **13**, 715–724. doi:10.1080/13607860902845582

Sleath, B., Thorpe, J., Landerman, L. R., Doyle, M., & Clipp, E. (2005). African-American and white caregivers of older adults with dementia: Differences in depressive symptomatology and psychotropic drug use. *Journal of the American Geriatrics Society*, **53**, 397–404. doi:10.1111/j.1532-5415.2005.53155.x

Sörensen, S., & Pinquart, M. (2005). Racial and ethnic differences in the relationship of caregiving stressors, resources, and sociodemographic variables to caregiver depression and perceived physical health. *Aging & Mental Health*, **9**, 482–495. doi:10.1080/13607860500142796

Spurlock, W. R. (2005). Spiritual well-being and caregiver burden in Alzheimer's caregivers. *Geriatric Nursing (New York, N.Y.)*, **26**, 154–161. doi:10.1016/j.gerinurse.2005.03.006

StataCorp. (2019). *Stata statistical software: Release 16*. College Station, TX: StataCorp LLC.

Ware, J. E., Kosinski, M., & Keller, S. D. (1996). A 12-Item Short-Form Health Survey: Construction of scales and preliminary tests of reliability and validity. *Medical Care*, **34**, 220–233. doi:10.2307/3766749

Wilcox, S., Bopp, M., Wilson, D. K., Fulk, L. J., & Hand, G. A. (2005). Race differences in cardiovascular and cortisol responses to an interpersonal challenge in women who are family caregivers. *Ethnicity & Disease*, **15**, 17–24.

Williams, D. R., & Wilson, C. M. (2001). Race, ethnicity, and aging. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (4th ed., pp. 160–178). San Diego, CA: Academic Press.

Wisniewski, S. R., Belle, S. H., Coon, D. W., Marcus, S. M., Ory, M. G., Burgio, L. D.,…Schulz, R.; REACH Investigators. (2003). The Resources for Enhancing Alzheimer's Caregiver Health (REACH): Project design and baseline characteristics. *Psychology and Aging*, **18**, 375–384. doi:10.1037/0882-7974.18.3.375