

GRANDPARENTHOOD STATUS AND HEALTH OUTCOMES IN MIDLIFE AFRICAN AMERICAN WOMEN WITH TYPE 2 DIABETES

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Objective: To describe grandparenthood status and determine the relationship between grandparenthood status, metabolic control, and psychosocial factors in African American women with type 2 diabetes.

Methods: A secondary, descriptive, exploratory analysis was conducted to examine the relationship between grandparenting status, physiologic indices related to metabolic control (body mass index, hemoglobin A1c, systolic blood pressure, low-density lipoprotein cholesterol) and psychosocial factors (emotional distress and quality of life) in a sample of 109 urban midlife African American women with type 2 diabetes.

Results: Grandmothers made up 60% of the sample and were stratified into three groups on the basis of caretaking status. Grandmothers who cared for but did not live with grandchildren had the highest body mass index, hemoglobin A1c, low-density lipoprotein cholesterol, and systolic blood pressure. Caregiving grandmothers also had higher diabetes-related emotional distress scores but had better quality of life scores than did the non-caretaking grandmothers. Non-grandmothers had the lowest quality of life scores.

Conclusions: These findings suggest relationships between grandmother caretaking status and metabolic and psychosocial factors. Research is needed to further examine these relationships and implications on practice and policy decisions. (*Ethn Dis.* 2008;18:141–146)

Key Words: Grandparenthood, African American Women, Type 2 Diabetes, Psychosocial Factors, Caregiver Role

INTRODUCTION

One in four African American women >55 years of age has type 2 diabetes,¹ and the death rates due to type 2 diabetes are higher in these women than in any other racial or ethnic group²; diabetes is the second leading cause of death among African American women.³ Research has demonstrated that lower levels of blood glucose over time can diminish the incidence of macrovascular and microvascular complications in patients with both type 1 and 2 diabetes.^{4,5} In addition to a higher prevalence of diabetes, African Americans have higher hemoglobin A1c (HbA1c) than other groups,⁶ and well-functioning older adults with diabetes, particularly those with poorer glycemic control, report a higher prevalence of functional limitation than do those without diabetes.⁷

The incidence and prevalence of type 2 diabetes is expected to increase, particularly in ethnic minority groups, and a rising trend over the past 15 years has been for more grandparents to raise their grandchildren. In 2000, 5.8 million grandparents were living with their grandchildren, and 2.4 million of them had primary caretaking responsibility.⁸ The likelihood of being a grandparent raising grandchildren also varies by sex and race. Of the 5.8 million co-resident grandparents, 64% are women; 2% of White grandparents live with their grandchildren, compared with 8% of African Americans and 8% of Hispanics. However, African Americans are more likely (52%) to be primary caregivers than are Hispanics (35%).⁸ Given that 25% of African American women aged ≥ 55 years have type 2 diabetes,² many grandmothers with diabetes are likely taking care of their grandchildren.

*In 2000, 5.8 million grandparents were living with their grandchildren, and 2.4 million of them had primary caretaking responsibility.*⁸

Several studies have found that African American women are more likely to be custodial grandparents as well as widowed, divorced, or separated.^{9,10} Grandmothers who raise grandchildren alone are also more likely to face economic hardship, and in many cases they report incomes below the poverty level.^{11,12} Most women are raising their grandchildren because of a crisis or problem with the child's parent. The most commonly cited reasons among all racial and ethnic groups are substance abuse, neglect or abandonment of the child, physical or emotional abuse, incarceration, and death.^{13–15} Several studies have reported higher levels of stress among caretaking grandmothers.^{14,16–19} In a study comparing non-custodial grandparents with grandparents raising grandchildren with and without behavioral problems, researchers found a higher level of parental role strain, financial strain, and life disruption between the two groups of custodial grandparents at baseline and at six months.^{20,21} Although caring for grandchildren can be difficult, some grandmothers report improved emotional health, satisfaction, and personal development.^{15,22–24}

The caregiving role is often a barrier to self-management, especially regarding diet and lifestyle modification.²⁵ Grandmothers who raise grandchildren

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tend to eat a diet higher in fat,^{24,26} and caregiving demands and lack of resources often interfere with women's ability to keep doctor's appointments.^{22,23} Further, custodial grandmothers reported greater functional limitations and physical difficulty than did non-custodial grandmothers.^{22,24,27-29}

African American women are more likely to be primary caregivers than are other racial or ethnic groups.^{9,30} Although several studies have examined the effect of caretaking on grandparents' self-rated health perceptions and function, little is known about the effect of caregiving on specific health outcomes in African American women with type 2 diabetes. Such knowledge is imperative for healthcare providers and policy-makers to consider in order to decrease health disparities among vulnerable populations, such as ethnic minority women with diabetes. Therefore, the purpose of this secondary, descriptive, exploratory analysis was to describe grandparenthood status and determine the relationship between grandparenthood status, metabolic control, and psychosocial factors in African American women with type 2 diabetes. Given the importance of determining how caretaking affects metabolic and psychosocial factors, the following research questions were examined:

1. What is the grandparenthood status of mid-life African American women with type 2 diabetes?
2. What are the differences in physiological indices of metabolic control and psychosocial factors between non-grandmothers and grandmothers with various levels of caretaking responsibilities?

METHODS

A cross-sectional, correlational design was employed, using data collected

by mail and telephone survey on grandparenthood status and matched with baseline metabolic control and psychosocial factor data obtained from an ongoing federally funded randomized clinical trial, Self-Management Intervention of Education and Care for Black Women with Type 2 Diabetes. African American women from an urban primary center were recruited to participate, and those who met the inclusion criteria (type 2 diabetes, age 21-65 years, non-insulin taking, no serious psychiatric or medical illness, ability to read and speak English) were eligible to participate. The women represented a self-selected group of volunteers who were motivated to actively engage in a diabetes self-management intervention.

Sample and Setting

After approval from the institutional review board was obtained, all 109 African American women participating in the randomized controlled trial were invited to participate in the secondary analysis. These women had baseline data collected on physiologic indices of metabolic control (body mass index [BMI], systolic blood pressure [SBP], HbA1c, and low-density lipoprotein cholesterol [LDL-C]) and psychosocial factors (quality of life and emotional distress). The secondary analysis had no exclusion criteria. Data were collected through mail and telephone contact with the participants. Baseline data collection was conducted in the research center of a major university hospital clinic located in the community from which the study sample was drawn. Of the 109 women contacted to participate, the final sample was composed of 61 women (response rate of 56%). No significant differences were observed between women participating in the secondary analysis and those who did not on baseline demographic, physiologic, and psychosocial characteristics. Of these 61 women, 37 (61%) were grandmothers. Grandparenthood was defined as having at least

one grandchild. Grandparenthood status was defined as whether the woman lived with and/or had caretaking responsibility for her grandchildren for more than eight hours per day. Grandparenthood data were collected by mail survey in 36% ($n=38$), and by telephone survey in 22% ($n=23$). There were 18 women whose contact information had changed and were unable to be reached, and one woman who declined to participate.

Data Collection Instruments

Grandparenthood status was measured with a four question survey design based on the 2000 US Census decennial report (C2KBR-31) entitled *Grandparents Living With Grandchildren: 2000*.⁸ A panel of experts assessed the content validity of the survey that was at an eighth grade reading level as determined by the cloze method.³¹ This reading level was based on baseline demographics that showed most participants had a high school education and all had completed the eighth grade.

Quality of life was measured with the Medical Outcomes Study Short-Form-36 (SF-36). The SF-36 measures functional status in clinical practice and research, health policy evaluations, and general population surveys.³² The scale is considered a general measure of quality of life and includes 36 questions that assess six health concepts: limitations in physical activity due to health problems, limitations in social activities because of physical or emotional problems, limitations in usual role activities because of physical health problems, bodily pain, general mental health (psychological stress and well-being), limitations in usual role activities because of emotional problems, and vitality (energy and fatigue) and general health perceptions. Internal consistency (Cronbach α) reliability for the eight scales ranges from .78 to .93. Transformed scores are used; higher scores indicate higher quality of life in each subscale.³²

Emotional distress was measured with the Problem Areas in Diabetes

Table 1. Baseline characteristics according to participation in grandparent study

| | Not participated (n=48) | Participated (n=61) | P |
|-----------------------------|-------------------------|---------------------|-----|
| Demographics | | | |
| Age | 50±11 | 47±8.6 | .21 |
| Living alone | 37 (73%) | 37 (61%) | .18 |
| Working | 31 (64%) | 39 (63%) | .21 |
| Education past high school | 25 (53%) | 24 (41%) | .12 |
| Annual income < \$15,000 | 24 (50%) | 25 (47%) | .20 |
| Diabetes-related | | | |
| HbA1c | 8.0±2.0 | 8.3±2.3 | .53 |
| Current smoker | 10 (21%) | 17 (28%) | .40 |
| Weight | 211±42 | 204±38 | .31 |
| Low-density lipoproteins | 112±36 | 114±33 | .48 |
| High-density lipoproteins | 47±11 | 51±13 | .11 |
| Triglycerides | 125±68 | 147±122 | .22 |
| Systolic blood pressure | 131±17 | 135±23 | .33 |
| Diastolic blood pressure | 75±8 | 77±13 | .39 |
| Psychosocial | | | |
| Self-efficacy | 75±11 | 77±11 | .27 |
| Emotional distress | 83±31 | 84±30 | .91 |
| Role-physical | 57±45 | 63±41 | .43 |
| Bodily pain | 56±26 | 57±28 | .85 |
| Physical function | 65±29 | 68±28 | .57 |
| General health | 57±21 | 57±21 | .89 |
| Vitality | 49±21 | 50±21 | .68 |
| Social function | 71±29 | 69±27 | .42 |
| Role-emotional | 62±42 | 60±44 | .82 |
| Mental health | 62±25 | 67±21 | .22 |
| Provider support - diet | 5.1±1.8 | 4.9±1.8 | .64 |
| Provider support - exercise | 5.1±2.0 | 4.7±1.9 | .28 |
| Diabetes knowledge | 82±13 | 79±14 | .24 |
| Diabetes support | 3.3±1.5 | 3.6±1.2 | .32 |
| Somatic anxiety | 8.2±3.5 | 7.2±3.0 | .10 |

(PAID) survey. The PAID is a 20-item, five-point Likert scale in which each item represents an area of diabetes-related psychosocial distress, including worry, frustration, anger, interpersonal distress, and coping concerns. It is scored 0 to 100, and higher scores indicate greater levels of emotional distress. Concurrent validity was established between the PAID and diabetes-coping strategies (integration, avoidance-distraction, passive resignation, and tackling spirit) with significant correlations ($P<.001$).³³ The PAID has a high internal reliability coefficient of alpha .95 that was also found in the sample of African American women with diabetes from the larger parent study.

Data Collection and Analysis

Grandparent status surveys were mailed with a cover letter explaining the purpose of the study and assuring

confidentiality. A follow-up telephone call was made to women who did not return the surveys by mail within four weeks, and surveys were conducted over the telephone; consent was obtained verbally before conducting the survey. Upon receipt of the questionnaire or completion of the survey over the phone, a \$5 gift card was sent to the respondent. Grandparenthood data were double-entered into a SAS database (SAS, Inc., Cary, NC) and checked for accuracy and then merged with the metabolic control and psychosocial factor data. All analyses were conducted with SAS. Because the sample was small and nonrepresentative, participants were described with descriptive, univariate summary statistics on the response variables, and descriptive statistics and the nonparametric Kruskal-Wallis test were used to analyze differences between groups of grandparenting status. Find-

ings were considered significant at $P<.05$.

RESULTS

Sixty-one women responded to the survey; they were an average age of 47 years, and more than half were single, divorced, or widowed (62%). Most (93%) had a minimum of a high school education, and 39% also had post-secondary education. Most worked part-time or full-time outside the home (63%), and 46% reported an annual income <\$15,000.

All the women were obese, but non-grandmothers had a slightly lower average BMI than did the three groups of grandmothers, regardless of their caretaking responsibilities (Table 2). Average BMI was similar among the grandmother groups, but those who cared for but did not live with their grandchildren had the highest BMI. Glycemic control was suboptimal for all the women, but grandmothers who did not reside with or have caretaking responsibilities and the grandmothers who both lived with and cared for their grandchildren had lower average HbA1c levels than did grandmothers who cared for but did not live with their grandchildren. Cardiovascular risk among the sample was higher than recommended for those with diabetes based on average LDL-C. Non-grandmothers had the lowest average LDL-C, and as caretaking level increased, average LDL-C also increased. The highest average LDL-C was among grandmothers who cared for but did not live with their grandchildren. Blood pressure was fairly well controlled in the sample, but the two groups of caretaking grandmothers had higher average SBP than did those who did not take care of their grandchildren. Grandmothers who cared for but did not live with their grandchildren had borderline significantly higher SBP than did grandmothers who neither lived with nor cared for their grandchildren ($P=.05$) (Table 2).

Table 2. Metabolic control by grandparenthood and caretaking status among a sample of African American women with type 2 diabetes

| Status | BMI (kg/m ²) | HbA1c (%) | LDL-C (mg/dL) | SBP (mm Hg) |
|---|--------------------------|-----------|---------------|-------------|
| Non-grandmothers (n=24) | 33.1 | 8.3 | 107.3 | 136.3 |
| Do not care for or live with grandchildren (n=15) | 34.3 | 7.7 | 111.5 | 125.6 |
| Care for but do not live with (n=12) | 34.6 | 9.3 | 122.5 | 147.5* |
| Care for and live with (n=10)† | 34.1 | 7.8 | 122.3 | 131.5 |
| All women (N=61) | 33.9 | 8.3 | 113.8 | 135 |

BMI=body mass index, HbA1c=hemoglobin A1c, LDL-C=low-density lipoprotein cholesterol, SBP=systolic blood pressure.

* P=.05 compared to grandmothers who neither lived with nor cared for their grandchildren.

† Includes two grandmothers who did not have caretaking responsibilities for more than eight hours per day but who lived with their grandchildren and presumably had a lesser level of caretaking.

A high level of diabetes related emotional distress was found for the entire sample, independent of grandparenthood status. Although, no statistically significant difference in PAID scores was seen between the groups, the grandmothers who cared for but did not live with their grandchildren reported the highest level of emotional distress (Table 2). Caretaking grandmothers fared much better on quality of life measurements than did non-caretaking and the non-grandmother groups (Table 2). The grandmothers who cared for and lived with their grandchildren reported much less limitation in their physical functioning than did other grandmothers. Similarly, these grandmothers reported less limitation in their

role activities due to physical and emotional health than did non-grandmothers. The caretaking grandmothers who lived with their grandchildren also tended to have less bodily pain and greater general health and vitality than the other groups. The two groups of caretaking grandmothers also had fewer limitations in social functioning and greater mental health and emotional well-being than did non-caretaking grandmothers and non-grandmothers. In fact, the non-grandmothers scored lowest across all but one subscale, reporting the greatest level of limitation in physical functioning, usual role activities, and social activities, as well as higher bodily pain and worse general and mental health.

Table 3. Psychosocial factors by grandparenthood and caretaking status among a sample of African American women with type 2 diabetes

| Mean Psychosocial Factor Scores | Grandparenthood Status | | | | |
|---------------------------------|------------------------|------------------|--------------------|----------------|------------------------|
| | All | Non-grandmothers | Non-live, non-care | Care, non-live | Care for and live with |
| PAID | 84.1 | 84.3 | 81.7 | 87.6 | 83.0 |
| PF* | 68.0 | 62.1* | 66.7 | 65.5 | 87.8* |
| Bodily pain | 57 | 47.9 | 59.3 | 60.8 | 70.9 |
| General health | 57.1 | 51.6 | 56.9 | 58.7 | 68.8 |
| Role-PH | 63.4 | 55.4 | 58.3 | 62.5 | 90.0 |
| Role-EI | 59.8 | 47.2 | 64.4 | 60.6 | 87.5 |
| Vitality | 50.3 | 49.2 | 45.0 | 52.1 | 59.0 |
| Social-F | 66.9 | 61.5 | 61.6 | 78.1 | 73.8 |
| Mental health | 67.1 | 60.2 | 65.7 | 77.0 | 74.7 |

Note: PAID= Problem Areas in Diabetes; PF=Physical functioning; Role-E=Role emotional; Role-P=Role physical; Social-F=Social functioning.

*P=.09, HP=.14, †P=.16.

DISCUSSION

We found significant differences in SBP and several of the quality of life subscales between groups, in addition to several noteworthy trends. Contrary to expectations, custodial grandmothers with the greatest level of caretaking had the second lowest HbA1c levels, just behind grandmothers who did not live with or take care of their grandchildren. However, grandmothers who did not live with but took care of their grandchildren for more than eight hours per day tended to have much higher HbA1c levels. Custodial grandparents as well as women and older adults with diabetes have higher levels of stress and depression,^{19,25,34,35} which may lead to a higher likelihood of suboptimal control.³⁶ However, the lower HbA1c among custodial grandmothers in our study may reflect a contrasting theme in the literature that caring for grandchildren may result in improved emotional health, sense of satisfaction, and motivation.^{15,22,23} We observed minimal differences in BMI between the three grandmother groups, but those who were not grandmothers had a slightly lower BMI. Contact with grandchildren may increase the availability of high-calorie foods. Two studies found that grandmother caretakers tended to eat a diet higher in fat, which supports the high BMI and concomitant rise in LDL seen as caretaking level increased.^{24,26} The higher BMI and worse metabolic control could be attributed to caretaking demands that interfere with one's ability to keep healthcare appointments and the possibility that some grandmothers view their health as a lower priority.^{22,23}

The high level of diabetes related emotional distress among grandmother caretakers is consistent with the literature.^{16-19,25,27} This distress may be related to several factors, including higher levels of role strain due to more stressful life events, multiple caregiving, little leisure time, social isolation, and intra-family strain.^{37,38} Despite high

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stress levels, quality of life scores were highest on most subscales among grandmothers who had more contact with their grandchildren. Conversely, non-grandmothers reported the most limitations and worse overall quality of life. Some studies have documented that grandmothers have improved emotional status and satisfaction as a result of raising their grandchildren and possibly removing them from a home where they were neglected or abused.^{15,22,23,39}

CONCLUSIONS

The use of only baseline data to determine the relationship rather than values over time that may give a more accurate picture of the ongoing metabolic control and psychosocial status of caretaking grandmothers is a limitation. However, because there is a dearth of information on health outcomes in grandmother caretakers with diabetes, this exploratory study was conducted.

Further studies with larger samples that include a qualitative component focusing on the context of grandparenthood status would be valuable. A longitudinal, prospective study would help further determine the effect that grandparenthood status may have on health outcomes in women with diabetes. The findings would be strengthened by inclusion of the numerous social factors that affect caretaking grandmothers, such as what type of family support exists, what are the reasons the grandchild needs care, and whether there is ongoing fluctuation in caretak-

ing. It is also important to factor in the number, gender, and age(s) of children that are being taken care of and whether they have emotional, physical, developmental, or behavioral problems.

Our preliminary, descriptive findings indicate that African American caretaking grandmothers with diabetes, particularly those who do not reside with their grandchildren, may be at greater cardiovascular risk than their counterparts. This finding is alarming given the disproportionate number of African American women who have diabetes and who are taking care of their grandchildren. In agreement with other studies on grandmother caretakers,^{18,26} the findings reported here similarly show that grandmother caretakers have less perceived limitations and greater perceived mental health and well being which may signal a desire and motivation to take control of their physical health status as well. However, additional research is needed to determine what the health risks are in this population and what intervention would most effectively improve metabolic control and related health outcomes.

These findings have implications for practice across all populations and settings. The aging of the population compounded by rising trends of obesity, type 2 diabetes, and grandparents raising grandchildren make a strong case for further research and exploration of the impact of grandparenthood status and caretaking on women. Such information is especially valuable in areas of practice, particularly in diabetes care, where lifestyle and psychosocial issues play a crucial role in one's disease management. With many grandparents facing limited budgets and difficulty accessing medical care, healthcare providers must be cognizant to consider the context of the patient's life and how it may impact their health outcomes.

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