

L'activité physique, les symptômes de la dépression et le soutien social chez les Afro-Américaines atteintes de diabète de type II

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Cette étude de nature descriptive et corrélationnelle visait à analyser les rapports entre l'activité physique, les symptômes de la dépression et les perceptions en matière de soutien social au sein d'un échantillon constitué de 45 Afro-Américaines d'âge moyen et avancé souffrant de diabète de type II, et qui reçoivent des soins dans l'un de trois centres de soins primaires situés dans le sud-ouest des États-Unis. Sur l'ensemble, 82 % des participantes ont indiqué qu'elles s'adonnaient à une activité physique et 88 % qu'elles jouissaient d'un degré élevé de soutien social. La prévalence des symptômes de dépression était élevée au sein de l'échantillon ($n = 15$; 30 %); on a relevé un lien entre les symptômes de dépression, le fait d'être jeune et un soutien social moindre. Ces conclusions confirment la nécessité de mener d'autres recherches sur les caractéristiques de l'activité physique, les symptômes de la dépression et le soutien social chez les Afro-Américaines atteintes de diabète de type II.

Mots clés : activité physique, dépression, soutien social, diabète, femmes

Physical Activity, Depressive Symptoms, and Social Support Among African-American Women With Type 2 Diabetes

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This descriptive–correlational study examined the associations among physical activity, depressive symptoms, and perceived social support in 45 middle-aged and older African-American women with type 2 diabetes receiving care in 1 of 3 community-based primary care centres in the southeastern United States. Of the participants, 82% reported weekly physical activity and 88% reported a high degree of social support. The prevalence of depressive symptoms was also high in the sample ($n = 15$; 30%), and depressive symptoms were associated with younger age and less social support. Further investigation of physical activity characteristics, depressive symptoms, and social support in African-American women with type 2 diabetes is warranted.

Keywords: physical activity, depression, social support, diabetes, women

Introduction

Type 2 diabetes mellitus (T2DM), with its associated morbidities, is one of the leading causes of disability and death in the United States (Borrell, Dallo, & White, 2006). Among the multiple behaviours that affect quality of life in those with diabetes, physical inactivity appears to account for a significant number of the negative outcomes associated with the disease (Morrato, Hill, Wyatt, Ghushchyan, & Sullivan, 2003). The study reported here looked at factors, including depressive symptoms and social support, associated with physical activity in African-American women with diabetes.

African-American women bear a disproportionate burden of T2DM and its complications and mortality (Liburd, 2003; Mokdad et al., 2003). Despite this disproportionate burden, little attention has been paid to the determinants of physical activity in this high-risk population. Further, physical activity is reported to be one of the most neglected aspects of the T2DM treatment regimen (Dutton, Johnson, Whitehead, Bodenlos, & Brantley, 2005) and research has found that low-income African-

American women with T2DM have lower levels of physical activity than their Caucasian counterparts (Dutton et al., 2005).

Effects of Depression on Physical Activity

Depression, which is one of the most common mental disorders among individuals with diabetes (Gavard, Lustman, & Clouse, 1993; Peyrot & Rubbin, 1997), may exacerbate the propensity towards physical inactivity and reduce other self-care behaviours (Sacco & Yanover, 2006). Few studies have examined the prevalence of depression in African Americans with T2DM (Carrington, 2006; de Groot & Lustman, 2001). Yet among patients with diabetes, the prevalence of depression is significantly greater in women (28%) than in men (18%) (Anderson, Freedland, Clouse, & Lustman, 2001) and African-American women with diabetes are reported to have more depressive symptoms than their Caucasian counterparts (Blazer, Moody-Ayers, Craft-Morgan, & Burchett, 2002; National Institute of Mental Health, 2000; Shea & Owens-Gary, 2009; Wagner, Tsimikas, Heapy, de Groot, & Abbott, 2007). Further, Gary, Crum, Cooper-Patrick, Ford, and Brancati (2000) report that 45% of African-American participants with T2DM had moderate depression (Center for Epidemiological Studies–Depression [CES-D] scores above 16) and 30% had moderately severe depression (CES-D scores above 22). In a recent study, Wagner, Abbott, Heapy, and Yong (2009) found that African Americans with diabetes had depressive symptoms that were associated with higher glucose levels, more long-term diabetes complications, and more diabetes medications; further, African-American women with diabetes reported more depressive symptoms than African-American men with diabetes.

Effects of Social Support

Research has documented that social support has a significant influence on health outcomes. A recent study found that social support plays a role in diabetes-specific quality of life and self-management practices (Tang, Brown, Funnell, & Anderson, 2008). High levels of social support have also been associated with improved physical health and more positive health behaviours in African-American women (Belgrave & Lewis, 1994; Martin, 1996). Social support may increase the probability of adherence to self-care regimens, including physical activity, and decrease the risk for depression (Chlebowy & Garvin, 2006; Devlin, Roberts, Okaya, & Xiong, 2006; Ford, Tilley, & McDonald, 1998a, 1998b; McDonald, Wykle, Misra, Suwonnaroop, & Burant, 2002). For instance, Tang et al. (2008) found that social support was associated with multiple self-care practices pertaining to diet and physical activity. Further, inadequate social support has been reported to adversely affect the motivation of patients and

reduce their efforts to stay actively involved in diabetes management (Nouwen, Gringras, Talbot, & Bouchard, 1997; Wallhagen, 1999).

The findings of recent research indicate that social undermining and low social support are related to depression in African-American women (Gant et al., 1993; Myers et al., 2002). Thus, although social support is recognized as a resource that may assist with effective stress management, we do not fully understand the role of social support in promoting physical activity and positive mental health outcomes in African-American women with T2DM.

In summary, the mechanisms by which physical activity is related to depression are unclear and there are no data on the dose effects of physical activity (Faulkner, 2009). In particular, little is known about the relationships among physical activity, depressive symptoms, and perceived social support in African-American women with T2DM. Therefore, this study examined physical activity, depressive symptoms, and perceived social support in African-American women with T2DM and explored the relationships among these variables.

Methods

Setting and Sample

This secondary data analysis examined the physical activity characteristics, depressive symptoms, and perceived social support of 45 African-American women with T2DM residing in the southeastern United States. Data were derived from a study with 57 African Americans with T2DM (Collins-McNeil, 2006) and have been reported elsewhere (Collins-McNeil, Holston, Edwards, Martin, & Benbow, 2007). Participants in that study were outpatients at three urban primary care centres in the southeastern United States. All participants were required to demonstrate written or verbal comprehension by signing or making a witnessed mark indicating consent. Individuals were excluded if they were legally blind, profoundly deaf, or cognitively impaired (confirmed by medical records) to a degree that would prevent comprehension of verbal instructions or completion of an interview. In addition, individuals were excluded if they had a history of coronary heart disease (myocardial infarction, angina pectoris) or cerebrovascular disease (stroke). The study was approved by the university institutional review board.

Procedures

Potential participants were approached by their health-care providers about taking part in the study. After these individuals volunteered and signed a consent form, face-to-face interviews were conducted by the first author and trained nurse research assistants. At the end of their inter-

view, participants received a Walmart gift card valued at \$25 as a token of appreciation.

Instruments

Four instruments were used to measure the study variables.

The Personal Health and Sociodemographic Form was used to collect date of birth, marital status, years of education, annual income, race/ethnicity, personal/family medical history, mental health history, medications, and physical activity.

The 20-item Center for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977) was used to assess depressive symptoms. The CES-D has been shown to be a reliable measure for assessing the number, types, and duration of depressive symptoms across racial, gender, and age categories (Knight, Williams, McGee, & Olaman, 1997; Radloff, 1977). Good internal consistency has been reported, with Cronbach's alpha coefficients ranging from .85 to .90 across studies (Radloff, 1977). Concurrent validity by clinical and self-report criteria has been demonstrated, as has substantial evidence of construct validity (Radloff, 1977). Scores can range from 0 to 60, with a cut-off of 16 indicating clinical depression (Jiang et al., 2003). In the present study, Cronbach's alpha was an acceptable .74.

The Medical Outcomes Survey Social Support Questionnaire (MOS-SSQ) (Sherbourne & Stewart, 1991) was used to assess social support. This widely used brief measure of perceived social support assesses the contributions of network size and four categories of support (instrumental, emotional, informational, and companionship). The instrument's 20 items are scored on a five-point Likert scale; subscale scores and total scores range from 0 to 100, with higher scores representing greater perceived social support. Criterion-related validity of the MOS-SSQ has been established through convergent correlations with loneliness ($r = -.53$ to $.69$), marital and family functioning ($r = .38$ to $.57$), and mental health ($r = .36$ to $.45$) (McDowell & Newell, 1996; Sherbourne & Stewart, 1991). In the present study, Cronbach's alpha was .88.

The Diabetes Self-Care Practices Measure (DSCPM) (Skelly, Marshall, Haughey, Davis, & Dunford, 1995) was used to assess physical activity. The DSCPM assesses self-care practices such as diet, insulin and medication administration, physical activity (exercise), home glucose monitoring, and foot care. Respondents are asked how frequently they follow these self-care practices using five responses, from *all of the time* (100%) to *never* (0%). Scoring yields an adherence score in each of the regimen areas. Physical activity (defined as *moving large muscle groups for at least 20 minutes in the last week*) was measured by self-reported frequency of the activity/week, duration of activity/week, type of activity, and

intensity (slow or brisk). The DSCPM has a test-retest reliability of 95% measured at a 2-week interval (Skelly et al., 1995).

Medical records were reviewed to obtain data on medical history or family history of coronary heart disease or cerebrovascular disease, age, and anthropometric measures: total cholesterol (TC), low-density lipids (LDL-C), high-density lipids (HDL-C), hemoglobin A1c (HbA1c), body mass index (BMI), systolic blood pressure (SBP), diastolic blood pressure (DBP), smoking status, and diabetes diagnosis.

Data Analysis

Statistical analyses were performed using SPSS version 12.0. Descriptive statistics were used to analyze means, standard deviations, medians, ranges, and proportions. The distribution of the data was determined using the Kolmogorov-Smirnov test and skewness ratio. Nonparametric statistics were used because the distribution of the data was not normal since the skewness ratio was less than -2 or greater than 2 and the Kolmogorov-Smirnov test was significant ($p \leq .05$) (Portney & Watkins, 2000). The variables selected for analysis were age, education, CES-D total score, MOS-SSQ total score, self-reported physical activity (frequency/week), age, and physiometrics: BMI, HbA1c, TC, LDL-C, HDL-C, SBP, and DBP. The variable DEPGRP was computed to categorize participants into two groups by CES-D total score — non-depressed (CES-D < 16) and depressed (CES-D ≥ 16). The Mann-Whitney U test was used to examine differences between the two groups based on total CES-D, BMI, age, education, HbA1c, and physical activity. Level of significance was set at $.05$. A post-hoc power analysis was conducted using G*Power 3.0.5 (Faul, Erdfelder, Lang, & Buchner, 2007). The power for this descriptive, correlational study ($n = 45$) was $.79$ with a moderate effect size of 0.4 . Effect size was determined by computing the coefficient of determination ($r^2 = .16$) and was based on the average correlation ($r = .4$) for the targeted variables. Although the power was less than $.80$, for a descriptive study a power of $.70$ is adequate for analyses (Pedhazur & Schmelkin, 1991).

Results

The study participants were African-American women aged 35 to 73 years ($\bar{x} = 55.94 \pm 11.95$); 88% ($n = 36$) were high-school graduates and 22.2% ($n = 10$) were college graduates; 76% ($n = 34$) were unmarried; and the majority (76%) reported annual household income less than \$25,000. The mean duration of T2DM was 8 ± 10 years and the mean HbA1c level was $8.5\% \pm 2.65$, indicative of poor glycemic control; 48% of participants ($n = 22$) had HbA1c levels above 7% (Table 1).

Variable	<i>M</i> ± <i>SD</i>	<i>Range</i>
Duration of T2DM (months)	96.62 ± 117.93	1–636
HbA1c (%)	8.5 ± 2.65	5.3–15.9
Total cholesterol (mg/dl)	191.00 ± 39.06	118–303
HDL-C (mg/dl)	47.2 ± 11.54	26–80
LDL-C (mg/dl)	116.07 ± 33.18	59–210
SBP (mm Hg)	134.35 ± 20.93	100–198
DBP (mm Hg)	77.00 ± 14.19	49–100
BMI (kg/m ²)	33.2 ± 6.9	23–50
Physical activity (days)	3.07 ± 2.06	0–7
CES-D score	9.51 ± 9.45	0–35
MOS-SQ total	85.62 ± 15.28	49–100

Approximately 60% of participants ($n = 27$) had TC levels at the upper limits of normal ($\bar{x} = 191.7 \pm 39.06$ mg/dL), with HDL-C levels ($\bar{x} = 47.20 \pm 11.54$ mg/dL) within the recommended range and LDL-C ($\bar{x} = 116.07 \pm 33.18$ mg/dL) levels exceeding the recommended goal of under 100 mg/dL. Mean BMI ($\bar{x} = 33.2 \pm 6.9$ kg/m²) met the national diagnostic criterion for Class 1 Obesity (BMI ≥ 30 –34.9 kg/m²) (National Heart Lung Blood Institute, National Institutes of Health, 2000). Approximately 29% ($n = 13$) of participants reported smoking currently (Table 1).

For social support, 68% of participants ($n = 31$) had high scores (> 80), 20% ($n = 9$) moderately high scores (60–80), and 10% ($n = 5$) moderate scores (40–60). Overall, the mean MOS-SSQ score was 85.8 + 15.3, with a median of 92.0 and a range of 60 (Table 1).

Approximately 66% ($n = 30$) of participants reported engaging in regular physical activity (moving large muscle groups for at least 20 minutes 3 or more days a week), while 16% ($n = 7$) reported physical activity only 1 to 2 days a week and 16% ($n = 7$) reported no physical activity. Approximately 76% ($n = 32$) reported doing walking exercises, 5.3% ($n = 2$) reported doing biking exercises, 5.3% ($n = 2$) reported doing sitting exercises and stretching, and 2.6% ($n = 1$) reported performing housework as a physical activity. Approximately 46% ($n = 17$) of participants described their exercise intensity as slow, while 54% ($n = 20$) reported it as brisk. For duration of physical activity, 88% of participants ($n = 37$) reported an average of 51 ± 76.75 minutes per week; for two

participants, duration of physical activity values exceeded the 75th percentile of data points.

Based on the CES-D, 67% ($n = 30$) of participants did not meet the clinical criteria for clinical depression ($CES-D < 16$; $\bar{x} = 9.5 \pm 9.5$) (Table 2). Depressive symptom scores were inversely related to age ($\rho = -.44, p = .002$) and MOS-SSQ ($\rho = -.44, p = .003$) and positively related to BMI ($\rho = .47, p = .001$) (Table 2). Participants scoring in the depressive range tended to be younger ($\bar{x} = 50 \pm 9.6$) than their non-depressed counterparts ($\bar{x} = 58 \pm 12.13$). Also, those with higher levels of MOS-SSQ tended to engage in more physical activity ($\rho = .32, p = .038$) (Table 2). There were no significant relationships noted among depressive symptoms, education, and HbA1c (Table 2).

Table 2 *Associations Among Physical Activity, Depressive Symptoms, Social Support, and Selected Sociodemographic Variables (N = 45)*

Variables	HbA1c	BMI	Depressive Symptoms	Social Support	Age	Education
Physical Activity	.026	-.086	-.179	.310*	-.086	.104
HbA1c		.007	.168	-.215	.007	-.020
BMI			.466**	-.056	-.435**	.015
Depressive Symptoms				-.438**	-.441**	.03
Social Support					.140	0.17
Age						0.06

* $p \leq 0.05$ ** $p < 0.01$

There were significant differences when participants were categorized into groups. The women with T2DM and CES-D scores under 16 (non-depressed) differed significantly from those with scores over 16 (depressed) in terms of age ($p = .0008$) and BMI ($p = .007$). Participants with CES-D scores over 16 were younger ($\bar{x} = 50 \pm 9.6$) than those with CES-D scores under 16 ($\bar{x} = 58 \pm 12$), and participants with CES-D scores over 16 had higher BMIs ($\bar{x} = 36.6 \pm 5.2$) than those with CES-D scores under 16 ($\bar{x} = 31.2 \pm 7.0$) (Table 3). The two groups did not differ significantly in education ($p = .60$), HbA1c ($p = .91$), or physical activity (.28).

	Non-depressed (n = 30)	Depressed (n = 15)
Age	58 ± 12	49.8 ± 9.6
Years of education	13 ± 3.3	12.7 ± 2
HbA1c	8.5 ± 3	8.4 ± 2.3
Total cholesterol	194.7 ± 32	185.8 ± 50.6
HDL-C	48.3 ± 11.9	45.0 ± 10.8
LDL-C	119.9 ± 28.7	108.4 ± 40.7
BMI	31.2 ± 7	36.6 ± 5
MOS-SQ	88.6 ± 14	80.2 ± 16
Physical activity (frequency)	3.3 ± 1.8	2.6 ± 2

Discussion

This study examined the relationships among physical activity, depressive symptoms, perceived social support, and selected anthropometric measures in African-American women with T2DM. We found that the women with depressive symptom scores consistent with clinical depression were more likely to be younger, heavier, and less physically active and to have lower levels of perceived social support than the other women. The women with higher levels of perceived social support tended to be more physically active and have fewer depressive symptoms. However, depressed and non-depressed women did not differ significantly in education level or HbA1c level.

Since this was a correlational study, it is unclear whether African-American women who are heavier or have less social support also tend to be depressed, or whether clinical depression leads to changes in health behaviours such as physical inactivity and withdrawal from social support. The clinical literature, as summarized in the DSM-IV-TR criteria for major depression (American Psychiatric Association [APA], 1994), would favour the latter scenario. Clinical depression is associated with hypervegetation, psychomotor retardation, reduced physical activity, and sleep disturbances, all of which result in substantial weight gain (APA, 1994). Weight gain and depressive symptoms in African Americans with chronic illness can in turn exacerbate low self-esteem, low self-worth, and self-devaluation, even to the point of increased risk for suicide (Edwards et al., submitted). Further, negative reactions to the symptoms and conse-

quences of chronic disease can increase the likelihood of a depressive episode (Edwards et al., in press) and, ultimately, poorer glycemic control (van Tilburg et al., 2001). However, prospective studies with African-American women who have T2DM are needed, to dissect this complicated set of relationships.

Many of the participants in the present study had BMIs indicative of obesity, and the prevalence of obesity is reported to be higher among African-American women (49.7%) than among Caucasian women (30.1%) (Flegal, Carroll, Ogden, & Johnson, 2002). However, the significance of obesity among African-American women with T2DM is poorly understood. Being overweight or obese clearly increases the risk for T2DM and may increase the risk for depression in these women (Blazer et al., 2002).

The participants reported that their average engagement in physical activity was less than 150 minutes per week; 44% ($n = 20$) reported brisk walking, while the majority (55%, $n = 25$) reported walking at a slow pace or no physical activity. Thus the majority of these African-American women with T2DM did not meet the American Diabetes Association (ADA) clinical recommendation of at least 150 minutes per week of *moderate-intensity aerobic physical activity* or at least 90 minutes per week of *vigorous aerobic exercise* to improve glycemic control, assist with weight maintenance, and reduce the risk for cardiovascular disease (Morrato et al., 2003). According to Banks-Wallace and Conn (2002), the lack of physical activity among African-American women may result in part from limited knowledge of ways to increase physical activity. Previous research has focused on the role of physical activity in preventing T2DM (Ekelund et al., 2005). There has been little attention given to the role of physical activity in African-American women with T2DM or at high risk for T2DM. Agurs-Collins, Kumanyika, and Adams-Campbell (1997) tested a 6-month supervised weight-loss and exercise program designed to improve diabetes management in overweight older African-Americans (predominantly women). Increased physical activity was reported at 3 months. However, at 6 months the physical activity scores did not significantly differ from baseline values. Pearte, Gary, and Brancati (2004) found that African-American women with T2DM walked significantly less than African-American men with T2DM, and that the independent predictors of a low level of physical activity were obesity, low household income, and the perception of being more active than one's counterparts. In a recent study, Misra and Lager (2008) found that physical activity was perceived as a more difficult self-management behaviour by African Americans with diabetes than by their Hispanic, Asian-Indian, and non-Hispanic Caucasian counterparts.

The present findings suggest that African-American women with T2DM should be encouraged to follow clinical recommendations for physical activity in order to improve insulin sensitivity, promote weight loss, and reduce the risk for depressive symptoms (ADA, 2008). The sample showed a relatively high rate of depressive symptoms. One third of the women reported symptoms equal to or exceeding the threshold for depression commonly accepted as clinically significant. The rate was nearly twice the reported rate of major depression (17%) among African-American and Caucasian-American primary care patients (Brown, Schulberg, Sacco, Perel, & Houck, 1999). Gary et al. (2000) report a high prevalence of depressive symptoms (30–45%) in a predominantly female (76%) sample of African-American adults with T2DM, low socio-economic status, and suboptimal metabolic control. Blazer et al., (2002) report several factors associated with comorbid depression/diabetes in a community-based sample that included African-American race, female gender, low level of education, high BMI, functional impairment, and cognitive impairment. Thus the high prevalence of depressive symptoms in the present study may be partially explained by the illness burden carried by the sample. It could also be related to the fact that the investigative team and health-care providers in the study were African American and predominantly female; the women may have been more willing to disclose their symptoms to these providers (Mahoney, Sterkenburg, Thom, & Goldschmidt, 2008; Malat & van Ryn, 2005; Somnath, Taggart, Komaromy, & Bindman, 2000; Stinson & Thurston, 2002). In a randomized controlled clinical trial, Gary, Hill-Briggs, Batts-Turner, and Brancati (2005) were successful in recruiting and retaining 542 urban African Americans with T2DM. This success may reflect the fact that the investigative team had extensive experience in recruiting African Americans and included African-American investigators and racially concordant research staff. However, the effects of using racially concordant research investigators and research staff have not been well documented in the literature and warrant further study.

According to the ADA (2008), women with significant depressive symptoms and poor self-management should be referred for mental health services. However, African-American women may have different cultural perceptions and beliefs with respect to depression and mental illness, given the pervasive stigma of mental illness in many ethnic minority communities (Bolden & Wicks, 2005; Corrigan, 2004; Gary, 2005). For example, Waite and Killian (2008) report that barriers to seeking mental health services identified by African-American women include stigma associated with mental illness, certain fervent religious beliefs, images of being strong, perceived discrimination, distrust of the medical profession, and factors such as language and literacy. Further, African-

American women may have different perceptions of overweight and obesity that are related to their culture and traditions (Beauboeuf-Lafont, 2005; Carrington, 2006; Corrigan, 2004; Gary, 2005; Jones & Ford, 2008; Waite & Killian, 2008). Thus cultural competence and the interactions of health-care providers may be pivotal in treating African-American women with T2DM who present with depressive symptoms and obesity (Wagner & Abbott, 2007).

Social support has been associated with better clinical outcomes in a number of disease states, including diabetes (Bowman, 2008; Murphy et al., 2008; Rasmussen, Dunning, & O'Connell, 2007). In the present sample, social support was inversely related to depressive symptoms and directly related to physical activity. This suggests that African-American women with T2DM who perceive greater social support may also report fewer depressive symptoms and more physical activity. In a national sample of African-American men and women (Brown & Gary, 1987; Lincoln, Chatters, & Taylor, 2005), a greater degree of social support was associated with fewer depressive symptoms. Also, Keyserling et al. (2002) found an association between social support and modestly enhanced physical activity in African-American women with T2DM. It is possible that women with more social support have lower levels of depression and consequently more energy to engage in physical activity.

Social support is a salient protective factor for African-American families (Black, Cook, Murry, & Cutrona, 2005) and is particularly important for African-American women with diabetes, since stress reduction may enhance self-regulation by increasing time for self-care (McBride et al., 2003). Irritability often accompanies depression and anxiety and may lead to a decrease in emotional and tangible support from support networks (Beach, Martin, Blum, & Roman, 1993; McBride et al., 2003) — that is, family members and friends tend to disengage from a person who demonstrates negative affect, depriving the person of social support when he or she needs it most (McBride et al., 2003). Further, Chelbowy and Garvin (2006) found that African Americans with diabetes reported less satisfaction with social support than Caucasians. Thus middle-aged African-American women with many depressive symptoms may need additional social support to make the lifestyle changes necessary for successful diabetes self-management.

Research has shown a link between physical activity and depression (Lane & Lovejoy, 2001; Mitra, Wilber, Allen, & Walker, 2005; Pollock, 2001; Stephens, 1988). Paradoxically, depressive symptoms and a low degree of physical activity have both been identified as risk factors for the development of T2DM but are also complications of T2DM. Depressive symptoms may contribute to unhealthy behaviours (e.g., physical inactivity, smoking, overeating), and unhealthy behaviours may contribute to

depressive symptoms and physical inactivity (Mitra et al., 2005). Reducing or minimizing these risk factors may decrease the risk for comorbidity and mortality in African-American women with T2DM.

Limitations

The cross-sectional nature of this analysis does not permit inferences of causality. Other limitations include the small size of the convenience sample and the limited range of demographics of the sample. Finally, self-report measures of physical activity and depressive symptoms may not be sufficiently sensitive to detect culturally defined perceptions and differences in perceived physical activity and to detect depressive symptoms among middle-aged and older African-American women.

Conclusions

Nevertheless, the low physical activity levels, prevalence of depressive symptoms, and obesity, hyperglycemia, and elevated LDL levels in this sample of middle-aged and older African-American women with T2DM are worrisome, particularly since these modifiable lifestyle factors are associated with *cardiovascular* complications of T2DM (Diabetes Control and Complications Trial Research Group, 1993; UK Prospective Diabetes Study Group, 1998). The prevalence of depressive symptoms found in this sample is a major concern, suggesting a substantial unmet need for mental health services for these women.

We recognize that African Americans tend to depend on mental health services provided in primary care settings (Das, Olfson, McCurtis, & Weissman, 2006), but in primary care settings symptoms may be less identifiable among African-Americans than among their Caucasian counterparts (Das et al., 2006; Gary et al., 2000). Middle-aged and older African-American women with T2DM and obesity may need routine depressive-symptom screening during primary care visits so that clinical and subclinical symptoms can be detected. Also, based on the recent finding of differences in the clinical presentation of depression in African-American women, clinicians may need to explore symptoms of anxiety, anger, and hostility in these women (Myers et al., 2002). Further, when seeing African-American women, clinicians may need to allow more time, inquire directly about physical activity, and have the women describe their physical activities and social support resources on their "own terms" (Cagle, Appel, Skelly, & Carter-Edwards, 2002; Jacobson, Strohecker, Compton, & Katz, 2005; Wallhagen, 1999). Clinical and prescriptive physical activity recommendations should take into account cultural preferences and the availability and quality of social support, and patients should be monitored for adherence. Qualitative descriptions of

depressive symptoms, physical activity, and perceived social support provided by patients may facilitate treatment, education, and interventions, thus helping to prevent complications of diabetes, delay morbidity, and improve quality of life.

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