Relationships Among Social Support, Diabetes Outcomes, and Morale for Older Men and Women

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The present study examined (a) whether a diabetes-specific measure of social support is more highly related to diabetes outcomes than is a general measure of social support, (b) if the relationship between social support and diabetes outcomes is different for men and women, and (c) if self-care behavior and metabolic control influences morale among older adults with diabetes. Study participants were 191 community-dwelling volunteers (81 men, 110 women) over the age of 60 with non-insulin-dependent diabetes mellitus. For men, social support specific to one's regimen affected metabolic control indirectly by increasing self-care behavior. For women, neither diabetes-specific nor general support was related to self-care behavior nor was self-care behavior related to metabolic control. For women, only high levels of overall support were associated with higher levels of morale. For men, higher levels of morale were found for those who were married and perceived high levels of available support, and for those who were in better metabolic control. These latter findings suggest that reciprocal relationships between psychosocial variables and health outcomes should be considered.

The relationship between social support and health outcomes has received considerable attention and reflects a variety of disciplines, including epidemiology (e.g., Berkman, 1985), psychology (e.g.,

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Antonucci, 1985a; Cohen & Syme, 1985; DeVellis & DeVellis, 1983; Sarason, Sarason, & Pierce, 1990), behavioral medicine (e.g., Gentry & Kobasa, 1984), and public health (e.g., Israel & Rounds, 1987). Social support is thought to have an impact on each of the stages of illness, including onset, use of health services, adherence to medical regimens, recovery, rehabilitation, and adaptation to illness (Levy, 1985; Wallston, Alagna, DeVellis, & DeVellis, 1983). Research has examined the direct effects of support on overall physical and mental health and the indirect or buffering effects of support during times of stress.

The relationships among social support, regimen adherence, self-care behavior, and illness outcomes for individuals with specific chronic illnesses, including diabetes, have also received attention. Diabetes self-management entails behavioral components (e.g., maintaining optimal body weight and exercising regularly) that may be influenced by one's social network. Psychosocial factors (including social support) most likely affect metabolic control indirectly through their influence on adherence and self-care behaviors (Schafer, Russell, Glasgow, McCaul, & Dreher, 1983). Long-term blood glucose regulation (metabolic control) is typically used as an outcome measure and is assessed by determining glycosylated hemoglobin (GHb). Relevant research in which the relationship between social support, adherence, self-care behaviors, and metabolic control is assessed, however, yields contradictory findings. On one hand, positive effects of support on adherence and self-care behavior have been reported in several studies (e.g., Connell, Storandt, & Lichty, 1991; Shenkel, Rogers, Perfetto, & Levin, 1985-1986; Wilson et al., 1986), whereas no association has been reported in others (e.g., Connell, O'Sullivan, Fisher, & Storandt, 1988; Schafer et al., 1983). Schafer, McCaul, and Glasgow (1986) reported a significant relationship between support and adherence, but only for behaviors intended to be

helpful but perceived as having a negative impact (e.g., family criticizing or nagging). In the case of diabetes control, positive relationships between support and GHb have been reported (e.g., Schwartz, Springer, Flaherty, & Kiani, 1986), as has no relationship (Connell et al., 1991; Schafer et al., 1983; Wilson et al., 1986), and a negative relationship for men (Kaplan & Hartwell, 1987).

Both the general literature and the literature specific to chronic illness acknowledge the lack of agreement concerning the conceptualization of social support. In the studies described previously, support has been operationally defined as the perception that support is available if needed (Connell et al., 1988; Feinstein, 1989; Schwartz et al., 1986; Wilson et al., 1986), the frequency of both supportive and nonsupportive behaviors directed toward individuals with diabetes by family members (Glasgow & Toobert, 1988; Glasgow et al., 1989; Schafer et al., 1983; Schafer et al., 1986); social network size and satisfaction with one's social support (Kaplan & Hartwell, 1987), and social normative expectations for regimen adherence (Shenkel et al., 1985-1986). The interchangeable use of the term *social support* for these conceptually distinct measures adds to the difficulty in interpreting the vast array of findings reported in relevant research.

Additionally, older adults have not been included in much of the empirical research on the psychosocial aspects of diabetes (for an exception, see Jenny, 1984). Several factors make the inclusion of older adults in investigations of the psychosocial context of diabetes especially warranted, including (a) increased incidence and prevalence of diabetes with age, particularly non-insulin-dependent diabetes mellitus (NIDDM;[1] Wingard, Sinsheimer, Barrett-Connor, & McPhillips, 1990); and (b) physiological factors that accompany aging and accelerate complications of the disease and influence self-management and metabolic control (e.g., coexisting chronic illnesses and changes in metabolism; Minaker, 1990).

Three issues addressed in recent research have guided the present study. The first is whether diabetes-specific or general measures of social support are more highly related to diabetes outcomes (e.g., Glasgow & Toobert, 1988). Individuals who perceive a sufficient amount of overall support from family members and friends may not necessarily be able to rely on supportive others in their efforts to

manage their diabetes. For example, an older woman may share a very close relationship with her spouse but choose not to involve him in her efforts to lose weight or exercise regularly. Thus it may be that only supportive behaviors particular to the self-management of a chronic illness (rather than overall levels of support) share a relationship with illness outcomes.

The second issue is whether the need and desire for social support and the relationship between social support and illness outcomes is different for men than for women. The notion that women may be more oriented toward relationships, whereas men are more oriented toward individuation has framed a number of studies exploring gender differences in responsiveness to social support (for further discussion, see Chodorow, 1978; Gilligan, 1982). Empirical research in this area has yielded diverse findings, ranging from women benefiting more from social support than do men (e.g., Fisher & Bishop, 1986) to complex gender interactions in which, for example, metabolic control was positively related to social support among women, but inversely related among men (Heitzmann & Kaplan, 1984).

Although the relevant literature specific to diabetes is sparse, women in general have larger and more diverse social networks than do men (e.g., Campbell, 1980; Harris, 1975). Men turn to their wives for support, whereas women rely on their children, other family members, and friends in addition to their spouse (Antonucci, 1985b). Additionally, men frequently report having only one confidant (an individual in whom one can trust and confide), usually their spouses, whereas women are more likely to report the availability of several confidants (Babchuk, 1978-1979; Lowenthal & Haven, 1968). These gender differences in the availability of and reliance on supportive others may have serious implications for older adults because older men are more likely to remain married in later life whereas older women are more likely to outlive their spouses.

A final issue addressed is the utility of conceptualizing psychosocial factors as both predictors and outcomes of illness-related variables. Research conducted with older adults suggests that physical health contributes to morale, quality of life, and overall life satisfaction (Edwards & Klemack, 1973; Larson, 1978; Lohman, 1977; Palmore & Luikart, 1972). Specifically, diabetes control has been found to be

related to overall mental health and depression (Connell et al., 1991; Lustman, Clouse, & Carney, 1988; Simonds, 1977). In a pilot study of older retirement home residents with NIDDM, Connell (1990) discovered that morale was associated with physical symptoms of poor metabolic control (e.g., dizziness, trembling, sweating), per-ceived barriers to adherence, and health-related declines in social involvement.

The present study assessed the relationships between a multidimen-sional assessment of the perceived availability of social support, diabetes-specific social support, morale, self-care behavior, and met-abolic control in a sample of older adults with NIDDM. Gender differences in the relative contribution of general and diabetes-specific social support to the explanation of variance in self-care behavior and metabolic control were examined. Additionally, the contribution of social support, self-care behavior, and metabolic control to the expla-nation of variance in morale was explored. This study expands on a previous analysis of these data (Connell et al., 1991) in which health belief and psychosocial predictors of diabetes outcomes and depres-sion were explored. In particular, the present study examines gender differences and the impact of sex roles in later adulthood within each of the three issues that the study was designed to address.

The investigation of these relationships was facilitated by the inclusion of (a) a large sample of older adults with NIDDM, with almost equal percentages of men and women; (b) a reliable and valid multidimensional measure of perceived general availability of social support; (c) diabetes-specific measures that were developed and val-idated with adults with NIDDM; (d) a reliable and valid measure of morale that was developed for use with older adults; and (e) the inclusion of two diabetes outcome measures — self-care behavior and a physiological indicator of metabolic control (GHb).

Methods

PARTICIPANTS AND PROCEDURES

Volunteer participants were recruited from a large metropolitan area by press releases in the local newspaper and on the radio,

presentations at diabetes support group meetings, and by soliciting the support of appropriate administrative staff at local retirement homes, public and private housing complexes for older adults, and health clinics. A special effort was made to recruit Blacks because of the increased prevalence of diabetes among this group and to reflect the demographic composition of the metropolitan area from which the sample was drawn.

A total of 191 community-dwelling adults (81 men, 110 women) over the age of 60 ($M = 70.3$, $SD = 6.7$) with NIDDM participated in the study. Equal percentages of men and women (85 individuals, or 45% of the sample, respectively) were taking insulin as hypoglycemic medication to control their disease. The remaining 21 participants (10% of the sample), were not using insulin or taking pills to control their illness. On average, the participants had diabetes for almost 14 years ($M = 13.9$, $SD = 10.6$). Years of education ranged from 4 to 23 ($M = 12.7$, $SD = 3.2$). Over half of the sample was female (59%) and married (53%); 14% of the sample was Black.

In-depth interviews were conducted in the participant's home. Approximately 90% of the participants agreed to have their blood sugar level tested. Due to scheduling difficulties in arranging to have a blood sample collected, GHb results were available for 154 individuals (81% of the total sample). Demographic variables did not differ significantly between the subsamples of participants who did and did not complete a blood test (e.g., age, education, race, or marital status).

MEASURES

Metabolic control. A GHb assessment was used to evaluate blood glucose regulation. For individuals with diabetes, GHb levels are virtually normal if blood glucose is optimally regulated over a 6- to 8-week period. If blood glucose level has not been optimally controlled, however, GHb levels are elevated (see Fisher, Delamater, Bertleson, & Kirkley, 1982). With some variation by laboratories and specific assay used, GHb percentage for individuals who do not have diabetes is generally less than 6.3%. For the present setting, individuals with diabetes whose values were less than 8% were considered

to be in excellent control; 8.1% to 11.3% in good control; 11.4% to 13.2% in fair control, and 13.3% and over in poor control.

Self-Care Behavior. This subscale and the measures of desired and received diabetes support are comprised of items from the Diabetes Care Profile, a multimeasure assessment of an individual's adaptation to diabetes (Hess, Davis, & Van Harrison, 1986). The 6-item Self-Care Behavior index assesses the extent to which an individual engages in self-care behavior, including following a diet, exercising, blood glucose monitoring, and foot care. High scorers report higher levels of self-care behavior than do low scorers. Cronbach's alpha for this scale was .67.

Morale. The 17-item version of the Philadelphia Geriatric Center Morale Scale (Lawton, 1975), developed for use with older adults, was used to assess overall life satisfaction. High scores indicate higher levels of morale. Cronbach's alpha for the scale was .73.

Demographic variables. Marital status, race, and housing type were dummy coded (0, 1) with 0 assigned to unmarried individuals, Blacks, and senior housing (vs. community-dwelling) residents.[2]

Health background variables. Comorbidity refers to the total number of selected chronic illnesses and conditions that a participant reported on a medical checklist. Possible scores ranged from 0 to 19. Chronic illnesses included high (and low) blood pressure, arthritis, asthma, heart disease, arrhythmia, heart bypass, pacemaker, angina, heart attack, cancer, stroke, osteoporosis, bronchitis, emphysema, Parkinson's disease, epilepsy, hypothyroid condition, and hyperthyroid condition.[3] Treatment type was dummy coded (0, 1) with 0 assigned to participants using insulin to control their disease and 1 to those taking oral hypoglycemic agents and to those not currently under medical treatment for their diabetes.[4]

Social support—general. The Social Provisions Scale (SPS; Russell & Cutrona, 1984), designed for use with older adults, was chosen to assess the perceived availability of social support. In addi-

tion to a 24-item summary score, six 4-item subscales include the following: attachment ("I feel a strong emotional bond with at least one other person"); social integration ("I feel part of a group who shares my attitudes and beliefs"); reassurance of worth ("I have relationships where my competence and skills are recognized"); reliable alliance ("There are people I can count on in an emergency"); guidance ("There is someone I could talk to about important decisions in my life"); and opportunity to provide nurturance ("There are people who depend on me for help"). High scores indicate higher levels of each dimension and of overall perceived availability of social support. Cronbach's alpha for the summary score was .91, and .57, .66, .58, .81, .85, and .84 for each of the subscales, respectively.

Diabetes-Specific Support—Desired. As previously noted, this and the measure of received support are subscales of the Diabetes Care Profile (Davis, Hess, Van Harrison, & Hiss, 1987). This 5-item subscale assesses the extent to which individuals desire assistance from their social networks in the form of tangible and emotional support related to the management of their diabetes. Items assess whether help is desired from family and friends with taking medication, foot care, following their meal plan, glucose testing, and getting enough physical activity. High scorers desire more support than do low scorers. Cronbach's alpha for this scale was .76.

Diabetes-Specific Support—Received. This is a 5-item subscale that assesses the extent to which an individual receives diabetes-specific support from their social network, including assistance with medication taking, foot care, following a meal plan, glucose testing, and getting enough physical activity. Items for this scale directly parallel the Diabetes-Specific Support—Desired subscale. High scorers receive more support than do low scorers. Cronbach's alpha was .82.

Results

As a preliminary step, gender differences in demographic and health background variables, diabetes-specific social support, dimensions of perceived general social support, morale, self-care behavior,

and GHb were compared (see Table 1). Women in the sample were significantly older and reported fewer years of education and greater comorbidity (more chronic illnesses) than did men (all p's < .05). Chi-square analyses indicated that women were significantly more likely to be single and Black and to live in senior housing sites than were the men in the sample (all p's < .01).

As can be seen in Table 1, men and women did not differ significantly in the amount of received or desired diabetes-specific social support. Women, however, perceived significantly less attachment, social integration, opportunity to provide nurturance, and general social support than did the men in the sample (all p's < .05). Morale, self-care behavior, and GHb did not differ significantly for men and women.

Because significantly more men in the sample were married than women (80.2% vs. 32.7%, respectively), Gender × Marital Status interactions were examined for all major study variables. Analysis of variance results indicated no significant interactions (all p's > .25). In addition to the four significant main effects by gender that were described previously, two significant main effects by marital status were also found (all p's < .005). Married individuals reported higher levels of self-care behavior and a greater opportunity to provide nurturance than did unmarried individuals.

Demographic, health background variables, diabetes-specific support, the perceived availability of general support, and morale were correlated with self-care behavior and GHb, as depicted in Table 2. For men, having completed more years of education and using insulin are associated with higher levels of self-care behavior (all p's < .01). For women, being younger, married, Black, residing in the community, and taking insulin were associated with higher levels of self-care behavior (all p's < .01). Race was associated with GHb for men and women (both p's < .05), indicating that Whites have lower GHb scores than do Blacks, indicating better metabolic control.[5] Having completed more years of education and taking insulin are associated with better metabolic control for women (both p's < .05).

The pattern of relationships among the social support variables, morale, and self-care behavior differed for men and women. In fact, only desired diabetes-specific social support was significantly related

Table 1
Comparison of Demographic Variables, Diabetes-Specific Support,
Perceived General Support, Morale, and Diabetes Outcomes for Men and Women

Variable	Men (N = 81)		Women (N = 110)		t	p
	Mean	SD	Mean	SD		
Age	68.2	5.1	71.9	7.3	−4.1	< .0001
Years of education	13.7	3.0	11.8	3.0	4.3	< .0001
Comorbidity	3.2	2.1	3.8	2.1	−2.0	.045
Diabetes-specific support						
Received	11.8	4.7	11.8	5.3	0.1	.924
Desired	10.7	4.0	10.6	4.3	0.1	.907
Perceived support-general						
Attachment	13.1	2.1	12.4	2.0	2.1	.034
Social integration	13.0	1.8	12.4	1.7	2.6	.011
Reliable alliance	13.4	2.3	13.0	2.0	1.3	.213
Guidance	13.2	2.2	12.7	1.8	1.8	.086
Reassurance of worth	12.9	1.8	12.4	2.2	1.5	.139
Opportunity for nurturance	12.8	2.2	11.3	2.5	4.4	< .0001
Summary score	78.4	9.5	74.2	8.9	3.1	.002
Morale	13.4	4.5	12.6	5.4	1.2	.244
Self-care behavior	12.0	7.1	12.4	6.3	−0.4	.689
GHb	10.3	2.6	9.9	2.9	0.9	.341

Note. High scores for each of the constructs indicate a greater level of the dimension than low scores. Higher levels of GHb are associated with poorer metabolic control than are lower levels.

to self-care behavior for both men and women. Received diabetes-specific social support and the perceived availability of social integration were significantly related to self-care behavior for men only (both p's < .05). In addition to desired diabetes-specific social support, the perceived availability of the opportunity for nurturance was significantly correlated with self-care behavior for women (all p's < .05).

Patterns of relationships between the social support variables and morale and GHb also differed for men and women. For men, desired diabetes-specific support was positively associated with GHb; the opportunity for nurturance, morale, and self-care behavior were negatively related to GHb. For women, receiving diabetes-specific support was positively associated with GHb. Of the perceived availability of support scales, social integration, reliable alliance, and the summary score were negatively related to GHb.

Table 2
Correlations Between Demographic Variables, Diabetes-Specific Support, Perceived General Support, and Morale and Self-Care Behavior and Metabolic Control (GHb) for Men and Women

| | Self-care behavior | | GHb | |
Variable	Men (N = 80)	Women (N = 110)	Men (N = 65)	Women (N = 86)
Demographic variables				
Age	−.09	−.34***	−.14	−.06
Marital status	.06	.26**	.04	−.06
Years of education	.26**	−.05	−.09	−.22*
Race	.02	−.22**	−.23*	−.33***
Housing type	−.08	.49***	.06	.05
Comorbidity	−.01	−.002	−.12	−.14
Treatment type	−.25**	−.40***	−.18	−.27**
Diabetes-specific social support				
Received	.45***	.15	−.08	.24**
Desired	.32**	.17*	.25*	.12
Perceived social support-general				
Attachment	.06	.02	−.09	−.04
Social integration	.19*	−.02	−.07	−.21*
Reliable alliance	.08	.01	−.08	−.19*
Guidance	.17	−.10	−.13	−.15
Reassurance of worth	−.04	.01	−.04	−.12
Opportunity for nurturance	.09	.27**	−.21*	−.17
Summary score	.12	.11	−.14	−.20*
Morale	−.01	.02	−.24*	−.03
Self-care behavior			−.20*	.11

Note. High scores for each of the constructs indicate a greater level of the dimension than do low scores. Higher levels of GHb are associated with poorer metabolic control than are lower levels. Age, years of education, and comorbidity (number of chronic illnesses) are continuous variables, with higher scores associated with higher levels of the indicator. Marital status, race, housing type, and treatment type are dummy coded, with 0 assigned to unmarried individuals, Blacks, senior housing residents (vs. community dwelling), and individuals using insulin (vs. pills) to control their illness. The negative coefficient between treatment type and self-care behavior for men, for example, indicates that men using insulin report better self-care behavior than do men who take pills to control their illness.
*p < .05; **p < .01; ***p < .001.

Hierarchical multiple-regression analyses were conducted to predict levels of self-care behavior, GHb, and morale by entering demographic and health background variables first, followed by the diabetes-specific and the general support measure. The same model was tested separately for each of the three outcome measures for men and for

women. Self-care behavior was entered as a predictor of metabolic control (not vice versa) and self-care behavior and metabolic control were entered as predictors of morale (not vice versa).

The demographic variables entered in the first step included marital status, race, and housing type; health background variables included comorbidity and treatment type. Variables entered in the second step included received diabetes-specific social support[6] and the summary score of the perceived availability of support scale.[7]

Predicting self-care behavior. For men, demographic and health background variables did not account for a significant amount of variance in self-care behavior (R^2 = .066; see Table 3). Only received diabetes-specific social support explained a significant amount of variance in self-care behavior (R^2, full model = .246). Demographic and health background variables (specifically, race, housing type, and treatment type) accounted for a total of 36% of the variance in self-care behavior for women (R^2, full model = .368). Neither of the social support variables explained a significant portion of variance over and above the demographic and health belief variables (F change = .793, p = .445).

Predicting GHb. None of the demographic or health background variables explained a significant amount of variance in GHb for men (R^2 = .079). Self-care behavior explained a significant amount of variance in GHb (R^2, full model = .145). For women, only race explained a significant portion of variance in GHb (R^2, full model = .224).

Predicting morale. Of the demographic and health background variables, only treatment type explained a significant amount of variance in morale for men. GHb also explained a significant amount of variance (R^2, full model = .225). For women, the demographic and health background variables did not explain a significant amount of variance in morale (R^2 = .052). The perceived availability of support was a highly significant predictor of morale (R^2, full model = .219).

Summary of results. Men perceived greater overall social support, but not diabetes-specific support, than did women. Bivariate analyses indicated that receiving and wanting diabetes-specific social support

Table 3

Results of Hierarchical Multiple Regression Analyses to Predict Self-Care Behavior, Metabolic Control (GHb), and Morale From Demographic and Health Background Variables, Diabetes-Specific Support, and Perceived General Support for Men and Women

	Outcome measures					
	Self-care behavior		GHb		Morale	
	Men (N = 79)	Women (N = 109)	Men (N = 65)	Women (N = 86)	Men (N = 65)	Women (N = 86)
Predictor variables	Beta[a]	Beta	Beta	Beta	Beta	Beta
Demographic/health background						
Marital status	.029	.136	.040	-.076	.207	-.089
Race	.037	-.224**	-.195	-.246*	-.062	-.032
Housing type	-.145	.372****	.004	.086	.048	.094
Comorbidity	-.029	.002	-.126	-.186	.179	-.074
Treatment type	-.162	-.214**	-.175	-.161	-.276*	.133
Diabetes-specific social support-received	.412***	.048	-.039	.129	.030	.067
Perceived social support-summary score	.142	.087	-.030	-.171	.227	.427***
Self-care behavior	—	—	-.273*	-.016	-.197	-.096
GHb	—	—	—	—	-.286*	.053
Multiple R^2	.246	.368	.145	.224	.225	.219

Note. High scores for each of the constructs indicate a greater level of the dimension than do low scores. Higher levels of GHb are associated with poorer metabolic control than are lower levels. Age, years of education, and comorbidity (number of chronic illnesses) are continuous variables, with higher scores associated with higher levels of the indicator. Marital status, race, housing type, and treatment type are dummy coded, with 0 assigned to unmarried individuals, Blacks, senior housing residents (vs. community dwelling), and individuals using insulin (vs. pills) to control their illness.

a. Table entries are standardized coefficients (betas).

*p < .05; **p < .01; ***p < .001; ****p < .0001.

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and perceiving high levels of social integration with network members was related to higher levels of self-care behavior for men. For women, wanting diabetes-specific social support and the opportunity for nurturing others was associated with high levels of self-care behavior. For men, wanting diabetes-specific social support was associated with poor metabolic control. Better control was associated with the opportunity to nurture others, morale, and self-care behavior. For women, receiving diabetes-specific social support was associated with poorer metabolic control. The perception that overall social support, reliable alliance, and social involvement is available was associated with better metabolic control.

Results from the hierarchical multiple regression analyses indicate that, for men, (a) diabetes-specific social support was related to higher levels of self-care behavior; (b) self-care behavior was related to better metabolic control; and (c) using insulin and better metabolic control were associated with higher levels of morale. For women, (a) being Black, living in the community (vs. senior housing sites), and using insulin were associated with higher levels of self-care behavior; (b) being Black was associated with poorer metabolic control; and (c) the perceived availability of general social support was related to higher levels of morale.

Discussion

The purpose of the present study was to determine (a) whether a diabetes-specific measure of social support is more highly related to diabetes outcomes than is a general measure of social support, (b) if the relationship between social support and diabetes outcomes is different for men and women, and (c) if self-care behavior and metabolic control influences morale among older adults with diabetes. For men, results from this study support the contention that social support specific to one's diabetes regimen affects metabolic control indirectly by increasing self-care behavior. For women, neither diabetes-specific nor general support was related to self-care behavior nor was self-care behavior related to metabolic control. These findings are in contrast to those reported in previous research in which satisfaction with support was reported to be associated with better

metabolic control for women but poorer metabolic control for men (Heitzmann & Kaplan, 1984), and the availability of general support was associated with adherence and control, but only for men (Feinstein, 1989). Several unique features of the present study make it difficult to interpret these contradictory findings: (a) the present sample includes only older adults (vs. predominantly middle-aged adults in the other two studies); (b) measures of both diabetes-specific and the general perceived availability of support were included (vs. only one type of support measure); and (c) the impact of social support on diabetes outcomes was assessed after demographic and health background characteristics were controlled (vs. bivariate correlational analyses). That is, the methodological and statistical differences between this and the previous studies may partly account for the different substantive findings. At the same time, however, the inconsistencies between our findings and those from the previous research point toward the need for additional multivariate and multidimensional research on the psychosocial context of diabetes with both younger and older adults.

As indicated in the introduction, women are considered to be more oriented toward social support than are men. The social conditions that determine orientation toward social support, however, vary considerably among men and women. Thus the generalization that women will be more oriented toward social support than will men is unrealistically broad (Greeno & Maccoby, 1986; Luria, 1986). The present findings support this critical view. As noted, measures of diabetes-specific and of more general social support were associated with self-care behavior, GHb, and morale among men and women. In particular, it is striking that among the largest correlations were those linking the social support measures to self-care behavior for men. The proposition that social support is important for older women but not for older men is strongly disconfirmed in the current data set.

Although the generalization that social support is important for one sex but not for the other appears naive, interesting gender differences emerge, particularly from the regression analyses. For women, general social support is the only significant predictor of morale, but is highly so, accounting for 22% of the variance. In contrast, the diabetes-specific measure of social support was only indirectly predictive of

morale among men. For men, diabetes-specific social support was related to self-care behavior, which was related to metabolic control, which was related to morale. Thus, for men, diabetes-specific social support shares an indirect relationship with morale, whereas for women, a direct relationship between overall support and morale was discovered. For women, social support may be evaluated positively and have a close link with morale. For men, social support may be more valued as a means to other ends, including positive diabetes outcomes.

An unexpected finding was that the men perceived greater levels of overall support (specifically attachment and social integration) than did women. Other researchers have concluded that older women maintain more well-developed, diverse, and extensive networks of support than do men (e.g., Antonucci, 1985b; Campbell, 1980; Veroff, Douvan, & Kulka, 1981). The higher levels of perceived support among men may be due, in part, to the fact that over three fourths of the men in the sample were married, whereas two thirds of the women were widowed, divorced, separated, or never married. Previous research indicates that older married adults report greater levels of social support than do unmarried adults (e.g., Wineberger, Hiner, & Tierney, 1987), and marriage is associated with greater health and well-being, in part, due to the mutual support shared in marriage (Antonucci, Akiyama, & Adelmann, 1990). Additionally, more husbands than wives report having appreciative, affirming, affectionate, and reciprocating spouses (Vanfossen, 1981); men receive more support related to their self-management behaviors from their wives than women receive from their husbands (e.g., Feinstein, 1989); and married men are less likely to engage in high-risk health behaviors than are unmarried men (Antonucci et al., 1990; Wingard, 1984). Data from this study indicate that married participants reported higher levels of self-care behavior and a greater opportunity to provide support to others than do unmarried participants. Thus being married (especially for men) may provide a supportive context in which regimen activities related to diabetes management are encouraged.[8]

Men and women do not differ in the amount of assistance with their diabetes regimen that they receive or desire from their family and friends (e.g., help with following a meal plan). Bivariate analyses

indicated, however, that both desiring and receiving assistance with regimen activities is much more highly related to self-care behavior for men than for women. For women, support related to one's diabetes self-management offered by network members may not have a uniformly positive impact on self-care behavior. To increase our understanding of the differences between men and women in the impact of support on diabetes outcomes, an assessment of how satisfied the recipient is with the support received from one's significant others is recommended. Additionally, the type, amount, and providers of support, and whether the support was desired should be determined. Support intended to be helpful but perceived as nagging or interference should not be expected to increase self-care behavior (e.g., Schafer et al., 1986), nor should support perceived to be inadequate to meet one's needs (e.g., offered too infrequently or the wrong type of support) be expected to result in positive health outcomes (e.g., Beck, 1987).

Bivariate analyses indicate that diabetes-specific social support was related to GHb, but not in the expected direction. For men, desiring support with regimen activities was associated with poor metabolic control; for women, receiving assistance was associated with poor metabolic control. Older adults may request and receive more assistance with the self-management of their diabetes as the symptoms and complications of their illness progress. If this is the case, a negative rather than a positive relationship between support and metabolic control should be anticipated.

A multidimensional assessment of social support allows for an understanding of which aspect of social support is most highly related to a specific health outcome (Cohen, Mermelstein, Kamar, & Hoberman, 1985). As suggested recently, research is needed on the relationship between different dimensions of social support and diabetes self-management (Goodall & Halford, 1991). In the present study, different components of the perceived availability of social support were significantly related to self-care behavior and to metabolic control for men and women. Men who perceived themselves to be part of a group that engaged in mutual social activities (social integration) reported higher self-care behaviors than did those who do not feel socially integrated. Women who perceived that other people were dependent

on them for their well-being and care (opportunity to provide nurturance) reported higher levels of self-care behavior than did those who perceived less opportunity to nurture others. The opportunity to provide nurturance was also related to metabolic control for men. For women, feeling part of group and as competent and skilled (reassurance of worth) is associated with better metabolic control. Older adults who continue with or find substitutes for those social activities and relationships that provide satisfaction (e.g., social integration via the role of worker, opportunities for nurturance via the role of parent and friend), may have a more positive outlook that is associated with a willingness to engage in self-care behavior.

Several conclusions are noteworthy: (a) reliance on a summary score instead of the conceptually varied components may have obscured some subtle differences in the relationships between support and diabetes outcomes for men and women; (b) supportive behavior typically referred to as emotional support, marked by intimacy, an emotional bond or a close relationship, was not associated with diabetes outcomes; (c) support based on providing information and advice was not associated with diabetes outcomes; but (d) feeling needed by and offering support to others is associated with positive diabetes outcomes (see Pearlin, 1985, for a discussion of helping norms in the context of social roles and Connell & D'Augelli, 1990, for a discussion of the contribution of personality characteristics, including affiliation and nurturance, to the relationship between support and perceived physical health).

In the discussion thus far, self-care behavior and metabolic control were considered as outcome measures. In the third model tested in this study, self-care behavior and metabolic control were considered as independent variables hypothesized to influence morale. Women who reported higher levels of overall support reported higher levels of morale; self-care behavior and metabolic control were not related to morale. For men, however, higher levels of morale were found for those who were married and taking insulin to control their diabetes, for those who perceived high levels of available support, and for those who were in better metabolic control.[9] These findings suggest the utility of considering: (a) reciprocal relationships between psychosocial variables and health outcomes (i.e., individuals who report low

levels of morale may not be motivated to watch their diet, resulting in poor metabolic control and even lower morale), and (b) a variety of psychosocial outcomes of diabetes management and control (e.g., depression, quality of life, life satisfaction). In a previous examination of the data used for the present study, it was discovered that the emotional impact of diabetes (e.g., on self-esteem or life satisfaction), perceived barriers to self-care behavior (e.g., being too busy), and metabolic control were significantly related to depression (Connell et al., 1991). These psychosocial "endpoints" may be more important markers for older adults than a physiological indicator of diabetes control, an assessment of how closely one follows a regimen prescribed by a physician, or a summary of self-care behavior.

Interpretation and generalization of the results of this study should be made with caution. Because the focus of these analyses was on differences by gender, samples included 81 men and 110 women. Although the sample size was relatively large in comparison with other relevant studies, the ratio of participants to predictor variables was below 10 for the models for men that included GHb. Replication with a larger sample of middle-aged and other adults is recommended. Additionally, a larger percentage of non-White individuals is needed to adequately interpret the race differences discovered in the present study; particularly the better self-care behavior but poorer metabolic control among Black women. A sample more widely varied in age would permit a more thorough examination of the effects of age on the process of social support and illness outcomes. Ideally, a longitudinal design would be adopted and psychosocial variables and health outcomes would be assessed at more than one point in time to determine the direction of causal influence and change over time.

With these limitations in mind, results from this study suggest that both gender and marital status differences should be considered when attempting to decipher the complex relationship between psychosocial variables and illness outcomes among older adults. Receiving help from family and friends with one's self-care activities is generally hypothesized to result in improved illness outcomes. Findings from this study support this relationship, but only for men. For women, demographic and health background characteristics share a much stronger relationship with diabetes outcomes. Additionally, results

indicate that emotional, tangible, and informational support were not as highly related to illness outcomes as was being needed by and being able to offer support to others. Thus older adults who are unmarried, do not have a close social network, and/or do not have a mutually supportive relationship with their spouse may be at high risk for self-management problems and poor illness outcomes.

The determination that the relationship between social support, health, and well-being is elusive has led some researchers to conclude that findings from the relevant research are mixed and inconclusive. A multivariate approach, however, demonstrates that social support is important to the health and well-being of older adults, but its precise role may vary by gender, race, marital status, illness characteristics, and point in the life span of the older adults who need assistance and those network members who provide support. Thus the question is not whether support is important, but rather for whom, from whom, and under what circumstances various types of support can be expected to influence health and well-being.

NOTES

1. Non-insulin-dependent diabetes mellitus (NIDDM) results from insulin resistance; insulin-dependent diabetes mellitus (IDDM) results from insulin deficiency (Wysocki, Green, & Huxtable, 1989). Treatment for individuals with NIDDM may include insulin, oral hypoglyce-mic agents, and/or a combination of diet and exercise. Exogenous insulin is prescribed for individuals with IDDM (see Kaplan & Hartwell, 1987, for a summary of the prevalence and psychosocial context of NIDDM).

2. Marital status was selected instead of coresidence (living alone or with others) for two reasons. First, a body of literature and several of the studies cited in the article provide a context for examining the general and illness-related support in the context of the role of spouse. Additionally, the vast majority of individuals who were not living with a spouse lived alone. Only 25 individuals (13% of the total sample) lived with someone other than or in addition to a spouse. Because data were not collected on the relationship of these coresidents, marital status was selected as a predictor variable in the regression analyses. Race was included as a predictor variable because previous research suggests that Blacks have higher GHb values than do Whites. Thus, by including race as a predictor variable in the regression models, the association between the other predictor and outcome measures could be assessed independently of the effects of race. Housing type was dichotomized into community dwelling (own home or apartment) and senior housing (public and private housing complexes for older adults) because results of a pilot phase of the present study indicated that residents of senior housing reported higher levels of adherence and fewer symptoms of poor metabolic control than a sample of community-dwelling older adults.

3. This comorbidity index is a crude quantitative indicator of the extent of other chronic illnesses and conditions that participants have in addition to diabetes. Although the assumption is made that the number of illnesses is negatively associated with diabetes outcomes and morale, it is not suggested that each illness should be treated as equivalent. A more sensitive assessment of the perceived severity of and impact on functional abilities of various chronic illnesses was not available in the present data but is recommended for future research.

4. It has been suggested that failure to differentiate between individuals who use insulin and oral hypoglycemic agents to control their disease may obscure important differences between the two groups (e.g., Davis, Hess, Van Harrison, & Hiss, 1987). Thus 0 is assigned to participants using insulin to control their disease (45 individuals, or 44.5% of the sample) and 1 to those using oral agents (85 individuals) and to those that do not use insulin or pills (21 individuals, or 11% of the sample). This decision was made because insulin represents the most intensive treatment for diabetes (and serves as the referent category), typically prescribed only after a combination of diet and exercise and then pills are not sufficient for diabetes control.

5. GHb scores for White men and women and Black men and women were 10.2, 9.5, 13.1, and 12.0, respectively. High scores indicate poorer metabolic control. In other words, White women were in the best metabolic control, followed by White men and Black women. Black men were in the poorest metabolic control.

6. Because the Desired and Received Diabetes-Specific Social Support subscales were significantly intercorrelated ($r = .59, p < .0001$), only one was entered as a predictor variable in the hierarchical multiple regression analyses — the Received Diabetes-Specific Social Support subscale. To assess the potential impact of this decision, all analyses were run separately using the Desired Diabetes-Specific subscale instead of the Received subscale. No significant differences were discovered between the two versions of the analyses (in terms of which predictors of self-care behavior and control were significant) or in the total amount of variance explained.

7. Each of the six Social Provisions Scale (SPS) subscales were highly intercorrelated (r's range from .27 to .83), resulting in the potential for a high degree of multicollinearity. Additionally, due to the small subsample sizes when the models are run for men ($n = 81$) and women ($n = 110$) separately, entering several or all of the subscales would result in an inadequate ratio of participants to predictor variables. Therefore, the SPS summary score was selected for entry into the hierarchical multiple regression analyses. To assess the potential impact of including only the summary score as a measure of the perceived availability of social support, all analyses were run separately using each subscale instead of the SPS summary score. No significant differences were discovered between the seven versions of the analyses in terms of which variables were significant predictors of self-care behavior and control or in the total amount of variance explained.

8. Manne and Zautra (1989), however, emphasize that it is dangerous to make assumptions about the quality of a social tie simply on the knowledge of its existence. Spouse criticism, for example, has been associated with failures to adapt to regimen demands (Manne & Zautra, 1989).

9. These results are in contrast to those reported in a pilot study conducted with a sample of 77 retirement home residents with NIDDM (Connell, 1990). In that study, the perceived availability of support was not a significant predictor of morale. Differences between the two studies can be explained, in part, by the demographic and housing type differences between the two samples — the pilot sample was significantly older ($M = 77$), more likely to be female (80%) and unmarried (88%), and all were retirement home residents. Gender differences were not explored in this pilot study due to the small number of men included in the sample.

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