

Gender Differences in Diabetes Attitudes and Adherence

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This study focused on three questions: Is there a difference in men's and women's diabetes attitudes? Do health professionals give different recommendations to men and women? Is there a difference between men and women in care adherence?

A total of 1201 patients with diabetes were surveyed; 65% of these patients were women. Differences in diabetes attitudes (three of seven attitudes) were most evident between men and women with insulin-dependent diabetes mellitus (IDDM). No differences were found in the attitudes of men and women with non-insulin-dependent diabetes mellitus (NIDDM) using insulin, and only one attitude was different for patients with NIDDM not using insulin.

Few differences were observed in the recommendations given by health professionals to men and women. Gender differences in adherence to the components of self-care also were minimal.

These findings may indicate that there are many similarities in the reactions of men and women who have been diagnosed with diabetes.

Research¹⁻⁶ indicates that men and women have different attitudes and behaviors related to health care. Verbrugge¹ suggested that men and women have different illness orientations. Women are more sensitive to illnesses, more able and likely to rest during an illness, and more willing to seek medical advice. In another study,² women were found to have a greater interest and concern for health and were more likely to perceive symptoms. Women make greater use of health services and have a larger network of people with whom to discuss medical problems.³ Women also report more illnesses than men.⁴ In general, women appear to be more knowledgeable about and sensitive to the symptoms of illnesses, and seek care more frequently than men. Some of these differences may have evolved from the different roles that men and women traditionally have played within the family structure, with women having greater responsibilities for family health.

Differences between men and women with regard to their attitudes and behaviors associated with chronic disease have not received as much attention in the literature. Verbrugge⁵ found that women reported illness more frequently than men but the illnesses usually were less serious. Verbrugge also suggested that the differences between men and women were most pronounced for prolonged and mild (nonfatal) conditions. Furthermore, psychosocial factors were important in these chronic and less severe diseases. A study⁶ of patients with heart disease revealed that women report more symptoms than men and the symptoms reported are of greater intensity. However, men's and women's adherence to heart disease management recommendations differed only in exercise behavior; men adhered more than women. Green⁴ reported a similar finding in a study of the self-care of common illnesses. In this study, men and women differed in terms of reporting illnesses, but their treatment behavior was similar once their condition was diagnosed.

Diabetes is a chronic disease for which self-care is crucial for disease management. The impact of diabetes on a patient's lifestyle can be dramatic, and self-care recommendations often require substantial time and effort from the patient.⁷ Not surprisingly, low adherence to the different components of a diabetes regimen (eg, blood testing, foot inspection, and diet) has been reported.⁸ Although

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demographic variables such as gender have been thought to have little impact on diabetes self-management,⁹ it is reasonable to assume that the perception of diabetes and adherence to diabetes self-care might differ between men and women given the different societal roles of men and women and the behavior modification required for effective management of diabetes. Two major theories of health behavior, the health belief model¹⁰ and the theory of reasoned action,¹¹ emphasize the importance of health attitudes and beliefs in health behavior. The theory of reasoned action maintains that a patient's intention to behave a certain way is the best predictor of subsequent health behavior. Furthermore, patients' intentions are influenced by their attitude about the behavior and the attitudes toward the behavior of the people whom the patient views as important. For example, a patient's attitude and the attitudes of people important to the patient (eg, their spouse or physician) toward following a diabetic diet would influence that patient's intention to maintain a diet. In addition, the degree to which patients intend to follow their diet is the best predictor of the degree to which they actually follow the diet.

The relationship of diabetes attitudes and self-reported adherence has been explored in a previous study.¹² Patients who reported high adherence levels had more favorable attitudes toward diabetes. If substantial differences had been found for men and women in attitudes regarding diabetes and self-care behavior, different gender-based management recommendations and educational efforts would have been indicated. Alternatively, men and women may react similarly in both attitude and behavior once their diabetes has been diagnosed. If this is the case, management recommendations and educational efforts would be more similar.

The focus of this study was to determine if men and women with diabetes differ in their attitudes and self-reported adherence to care recommendations. Also investigated in this study was whether health professionals provided different recommendations to men and women which might account for differences in their attitudes and behavior.

This study focused on three questions: 1) Are there differences in the attitudes toward diabetes between men and women with diabetes? 2) Are there differences in the recommendations given by health professionals to men and women for the self-treatment of diabetes? and 3) Are there differences between men and women in self-reported adherence to diabetes self-care recommendations?

Methods

Study Participants Surveys containing the revised Diabetes Attitude Scale were mailed to 1054 patients who had attended the University of Michigan diabetes clinic. The survey was returned by 419 patients for a return rate of 40%. The survey also was sent to 1003 patients receiving a monthly diabetes newsletter from the Michigan Diabetes Research and Training Center (MDRTC). Patients in this sample returned 823 surveys for a return rate of 82%. The higher return rate of the second sample may be due to an increased sense of social obligation related to the fact that these respondents received a monthly diabetes newsletter from the MDRTC. The overall combined return rate was 60%.

Forty surveys were dropped from the analyses because the patients did not meet the age criterion (age ≥ 16 years). A total sample of 1202 patients were used in the analysis.

To determine whether a patient had insulin-dependent diabetes mellitus (IDDM) or non-insulin-dependent diabetes mellitus (NIDDM), a formula developed by Davis, Hess, and Hiss¹³ was applied. This formula uses age of onset, insulin use, and percent of ideal body weight, and has an accuracy rate of 93% compared with the stimulated C-peptide test for classifying diabetes type.

The Revised Diabetes Attitude Scale Patient attitudes were measured using a version of the Diabetes Attitude Scale (DAS) revised especially for use with patients. The original DAS focused on the attitudes of healthcare professionals and was developed by a national panel of 17 diabetes experts using a Delphi process.^{14,15} This initial version contained 50 statements for which respondents indicated their extent of agreement using a 5-point Likert-type scale. The scale ranged from strong agreement through neutrality to strong disagreement.

The responses of 1071 healthcare professionals were used to determine the psychometric properties of the questionnaire; detailed results are reported elsewhere.^{14,15} Eight factors were identified representing attitudes toward 1) the need for special training in the treatment of diabetes, 2) the importance of blood glucose control in minimizing the complications of diabetes, 3) the role of the patient in diabetes self-care and management, 4) patients' commitment to controlling their disease, 5) the importance of a team approach to diabetes care, 6) the seriousness of non-insulin-dependent diabetes mellitus (NIDDM), 7) the difficulties of treating diabetes, and 8) the efficacy of outpatient education.

Most of the original 50 DAS items were rewritten in less technical language so the scale would be appropriate for patient populations. Only nine of the items remained unchanged. Two groups of healthcare professionals then were randomly selected to evaluate the scales. One group was sent the original DAS while the other group received the revised version. The subsequent comparison of each group's responses indicated that the revision process had changed the psychometric properties of the scale and the revised DAS would have to be viewed as a new attitude measure.¹⁶ Given the two populations (providers and patients) it is not surprising that different factor structures emerged from the analysis. Patients are more likely to focus on how diabetes has an impact on their lives, while healthcare professionals tend to focus on the difficulties of treating patients with diabetes.

The psychometric properties of the DAS again were evaluated using responses from a sample of 1202 patients. Seven factors were identified: 1) the need for special training for healthcare professionals who treat diabetes, 2) the importance of patient compliance with medical advice, 3) the seriousness of non-insulin-dependent diabetes, 4) the importance of blood glucose control in reducing diabetic complications, 5) the impact of diabetes on patients' lives, 6) the role of patient autonomy, and 7) the importance of a team approach to diabetes care.¹⁷ Each of the seven factors demonstrated reliability with a Chronbach's alpha greater than 60.¹⁷ Content validity was assured through the use of a Delphi process for item construction and selection. Construct

validity was demonstrated in a previous study¹² in which diabetes attitudes represented by the scales were logically related to self-reported adherence. The following subscales resulted from this analysis.

- DAS Subscale 1 Special Training:** the attitude that healthcare professionals need special training to care for persons with diabetes. Sample item: "In general, I believe that healthcare professionals who treat people with diabetes should be trained to communicate well with their patients."
- DAS Subscale 2 Patient Compliance:** the attitude that patients should do what they are told to do by healthcare professionals. Sample item: "In general, I believe that people who do not follow their recommended diabetes treatment don't really care about controlling their diabetes."
- DAS Subscale 3 Seriousness of NIDDM:** the attitude that NIDDM is a serious disease. Sample item: "In general, I believe that non-insulin-dependent diabetes is a less serious disease than insulin-dependent diabetes."
- DAS Subscale 4 Control/Complications:** the perception of a relationship between high blood glucose levels and the development of the complications of diabetes. Sample item: "In general, I believe that good blood control will reduce the long-term complications of diabetes."
- DAS Subscale 5 Impact of Diabetes:** the attitude that diabetes has a significant negative impact on the patient's life. Sample item: "In general, I believe that diabetes affects almost every part of a diabetic person's life."
- DAS Subscale 6 Patient Autonomy:** the attitude that the patient should be the primary decision-maker regarding the daily self-care of diabetes. Sample item: "In general, I believe that the important decisions regarding daily diabetes care should be made by the person with diabetes."
- DAS Subscale 7 Team Care:** the attitude that nurses and dietitians are needed in the care of diabetes. Sample item: "In general, I believe that doctors do not need help from nurses and dietitians to treat patients with diabetes."

Self-Care Recommendations of Healthcare Professionals

To determine what recommendations healthcare professionals were making, patients were asked if they were told to follow a diabetic diet, exercise, test blood glucose, inspect their feet, carry diabetic identification, carry sweets (insulin users), and record self-monitoring results.

Self-Reported Adherence Adherence patterns for nine self-care behaviors were determined by asking patients how often they followed the recommended behaviors. Because patients' general adherence patterns were of interest, their

responses were classified as either indicating adherence or nonadherence. Patients who responded that they "Usually" or "Always" followed the recommendations were considered to be adherent. Patients who responded "Never," "Rarely," or "Sometimes" were considered to be nonadherent. The following self-care behaviors were analyzed: 1) taking insulin as directed, 2) taking diabetes pills as directed, 3) following a diabetic diet, 4) exercising, 5) testing blood glucose, 6) inspecting feet, 7) carrying diabetic identification, 8) carrying sweets (insulin users), and 9) recording test results.

Overall Health Rating Each patient was asked to respond to the question, "How would you rate your overall health?" Responses were based on a 5-point scale ranging from 1=Poor to 5=Excellent.

Statistical Methods Demographic differences by gender were determined by Chi-square analyses for nominal- and ordinal-scaled variables, and by *t*-tests for interval-scaled variables. Gender differences in the DAS subscales overall and by diabetes type and treatment were determined by *t*-tests.

The self-care recommendations of the healthcare professionals were examined to determine whether men and women were advised differently. Chi-square tests were performed to determine differences.

Adherence to the nine self-care behaviors was determined only if the self-care behavior was recommended to a patient by a healthcare professional. Patients had to be using insulin to be considered adherent or nonadherent to the self-care behavior of carrying sweets. To determine gender differences in self-care adherence, Likelihood Ratio Chi-square tests were performed.

For each advised self-care recommendation, the patient's self-reported rating of overall health was compared within gender between patients who were considered adherent and those who were considered nonadherent. *T*-tests were performed to determine differences.

Results

Men and women differed on several demographic measures. As shown in Table 1, men were more likely to have at least some college experience (61% for men vs 49% for women). Women, however, were more likely to have attended a diabetes education program (78% for women vs 72% for men). Women also were more likely to have a family history of diabetes (65% for women vs 55% for men). Diabetes type and duration of diabetes did not differ between men and women.

This population did not find diabetes much of a hindrance in their normal daily activities as reflected in their responses to the question, "How often does your diabetes prevent you from doing normal daily activities?" (overall mean=1.78, range=1 [Never] to 5 [Frequently]). Men reported diabetes as less of a hindrance in such activities than did women (1.67 for men vs 1.83 for women). Men also rated their overall health higher (overall mean 3.24 for men vs 3.11 for women, range=1 [Poor] to 5 [Excellent]). Men and women did not differ in their self-rated understanding of diabetes and its treatment (3.69 for men vs 3.70 for women).

Table 1. Characteristics of Patients by Gender

Characteristic	Women	Men
n	775	426
Type of diabetes, %		
IDDM	34	35
NIDDM using insulin	40	34
NIDDM not using insulin	26	31
Mean duration of diabetes, y	12.8	11.9
Mean age, y	50	52
Family history of diabetes, %	65*	55
Some college or more, %	49*	61
Attended diabetes education program, %	78 [†]	72
Mean response concerning understanding of diabetes [‡]	3.70	3.69
Mean response concerning relationship between diabetes and daily activities [§]	1.83 [†]	1.67
Mean response concerning overall health [¶]	3.11 [†]	3.24

* $P < .01$.[†] $P < .05$.[‡]Response to question, "How would you rate your understanding of diabetes and its treatment?"; 1=Poor to 5=Excellent.[§]Response to question, "How often does your diabetes prevent you from doing normal daily activities?"; 1=Never to 5=Frequently.[¶]Response to question, "How would you rate your overall health?"; 1=Poor to 5=Excellent.**Table 2. Scores on Diabetes Attitude Subscales**

		n [†]	Diabetes Attitude Subscales*						
			Special Training	Patient Compliance	Seriousness of NIDDM	Control/Complications	Impact of Diabetes	Patient Autonomy	Team Care
Overall	Women	775	4.28 (.41)	3.49 (.66)	3.52 (.79)	4.24 (.55)	4.16 (.61)	3.60 (.69)	4.18 (.52)
	Men	426	4.28 (.38)	3.62 (.58) [‡]	3.33 (.85) [‡]	4.25 (.49)	4.02 (.63) [‡]	3.59 (.67)	4.13 (.48)
IDDM	Women	261	4.31 (.41)	3.21 (.66)	3.59 (.78)	4.30 (.61)	4.32 (.61)	3.83 (.67)	4.17 (.54)
	Men	149	4.24 (.36)	3.36 (.56) [§]	3.26 (.83) [‡]	4.28 (.50)	4.14 (.66) [‡]	3.82 (.63)	4.08 (.45)
NIDDM (using insulin)	Women	301	4.31 (.39)	3.64 (.60)	3.51 (.75)	4.25 (.50)	4.13 (.58)	3.51 (.68)	4.18 (.49)
	Men	144	4.33 (.37)	3.74 (.55)	3.45 (.90)	4.28 (.45)	4.03 (.60)	3.45 (.71)	4.17 (.48)
NIDDM (not using insulin)	Women	195	4.22 (.42)	3.62 (.60)	3.48 (.83)	4.17 (.54)	3.98 (.61)	3.42 (.68)	4.16 (.55)
	Men	128	4.25 (.39)	3.76 (.55) [§]	3.32 (.82)	4.17 (.50)	3.89 (.60)	3.47 (.60)	4.14 (.51)

*Subscale scores ranged from 1=Strongly Disagree to 5=Strongly Agree.

[†]Totals vary for each subscale due to missing data.[‡]Differences between women and men $P < .01$.[§]Differences between women and men $P < .05$.

Diabetes Attitude Subscales The seven diabetes attitude subscales were examined by gender, diabetes type, and treatment. Subscale scores ranged from 1=Strongly Disagree to 5=Strongly Agree. The DAS subscale means are shown by gender, diabetes type, and treatment in Table 2. Overall, men and women differed on three attitude subscales: patient compliance, seriousness of NIDDM, and impact of diabetes. Men were more likely than women to agree that patients should do what they are told to do by health professionals. Women were more likely to view NIDDM as a serious disease and to agree that diabetes has a significant negative impact on the patient's life.

When the diabetes attitudes of men and women were examined by diabetes type and treatment, distinct differences

between types emerged. Differences between men with IDDM and women with IDDM existed for the diabetes attitude subscales concerning patient compliance, the seriousness of NIDDM, and the impact of diabetes. No gender differences were indicated for patients with NIDDM using insulin. For patients with NIDDM not using insulin, men and women differed only on the diabetes attitude subscale concerning patient compliance.

Advice Regarding Self-Care Recommendations The seven self-care recommendations and the percentage of patients reporting they were advised of these recommendations by a health professional are shown in Table 3. For the patients with IDDM, no gender differences were observed in

Table 3. Diabetes Self-Care Recommendations by Gender, Diabetes Type, and Treatment

		n*	Recommendations % Reported						Carry Sweets (Insulin Users)	Record Test Results [†]
			Follow Diabetic Diet	Exercise	Test Blood for Glucose	Inspect Feet	Carry Diabetic IDs			
IDDM	Women	261	98	91	98	91	92	95	98	
	Men	149	100	94	99	96	94	94	96	
NIDDM (using insulin)	Women	301	100	93	98	96	90	92	95 [‡]	
	Men	144	99	93	99	94	90	89	90	
NIDDM (not using insulin)	Women	195	99	88	78	77	55	—	68	
	Men	128	98	96 [§]	86	80	57	—	74	

*Totals vary for each self-care recommendation due to missing data.

[†]Patients told to test blood for glucose.

[‡]Differences between women and men $P \leq .05$.

[§]Differences between women and men $P < .01$.

Table 4. Patient Adherence to Self-Care Recommendations by Gender, Diabetes Type, and Treatment

		Advised Self-Care Behaviors* % Adherence [†]								
		Take Insulin as Instructed	Take Diabetes Pills as Instructed	Follow Diabetes Diet	Exercise	Test Blood for Glucose	Inspect Feet	Carry Diabetic IDs	Carry Sweets (Insulin Users)	Record Test Results
Overall	Women	97	98	72	53	77	79	84	88	75
	Men	97	99	76	64 [‡]	71 [§]	76	83	76 [‡]	72
IDDM	Women	94	—	71	56	77	74	83	88	73
	Men	97	—	71	62	64 [‡]	69	85	71 [‡]	67
NIDDM (using insulin)	Women	99	—	76	50	77	81	87	89	78
	Men	97	—	79	64 [§]	77	81	87	82 [§]	78
NIDDM (not using insulin)	Women	—	98	68	51	77	83	80	—	70
	Men	—	99	77	68 [‡]	70	78	74	—	72

*Includes only patients who were advised of the specific self-care behaviors.

[†]Patients who responded as "always" or "usually" adhering to the advised self-care behaviors.

[‡]Differences between women and men $P < .01$.

[§]Differences between women and men $P < .05$.

what patients reported they were advised. Among patients with NIDDM using insulin and told to test their blood glucose levels, women were more likely to be told to record the test results (95% for women vs 90% for men). The only difference for patients with NIDDM not using insulin concerned exercising. More men reported that they were told to exercise than did women (96% for men vs 88% for women).

Self-Reported Adherence Patterns Self-reported adherence patterns for nine self-care behaviors are presented in Table 4 by gender, diabetes type, and treatment. In the overall comparisons, men and women differed in the self-reported adherence areas of exercise, testing blood glucose, and carrying sweets (for insulin users). Self-reported adherence to exercising was higher for men than women, while women were more likely to report adherence to blood testing and carrying sweets.

Among patients with IDDM, men and women differed in testing blood glucose and carrying sweets; women with IDDM had higher self-reported adherence. For patients with NIDDM, men were more likely to report adherence to exercising. For patients with NIDDM using insulin, women reported higher adherence in carrying sweets.

Self-Reported Adherence and Rating of Overall Health

The self-reported, overall health ratings for adherent patients and nonadherent patients to recommended self-care behaviors are presented by gender in Table 5. Two self-care behaviors were dropped for this analysis because the majority of the patients reported adherence; 97% of patients reported taking insulin as instructed and 99% of patients reported taking diabetes pills as instructed. For the remaining self-care behaviors, women who reported adhering to a recommendation rated their overall health higher than women who

Table 5. Rating of Overall Health by Gender and Patient Adherence to Advised Self-Care Behaviors

		Advised Self-Care Behaviors*						
		Mean (SD)						
		Follow Diabetic Diet	Exercise	Test Blood for Glucose	Inspect Feet	Carry Diabetic IDs	Carry Sweets (Insulin Users)	Record Test Results
Women	Adherent [†]	3.27 (.93) [‡]	3.34 (.91) [‡]	3.20 (.96) [‡]	3.16 (.96)	3.18 (.98) [‡]	3.23 (.96) [‡]	3.24 (.98) [‡]
	Nonadherent	2.75 (.90)	2.90 (.96)	2.88 (.93)	2.99 (1.03)	2.84 (.96)	2.60 (1.12)	2.87 (.91)
Men	Adherent [†]	3.30 (.91)	3.36 (.98) [‡]	3.24 (.96)	3.20 (.88)	3.20 (.91)	3.33 (.94)	3.23 (.95)
	Nonadherent	3.09 (1.00)	2.99 (.78)	3.25 (.92)	3.30 (1.07)	3.31 (.91)	3.15 (.93)	3.37 (.91)

*Includes only patients who were advised of the specific self-care behaviors. Because less than 5% reported they did not take their insulin or diabetes pills as instructed, these two self-care behaviors were dropped from the analyses.

[†]Patients who responded they "always" or "usually" adhered to the advised self-care behaviors.

[‡]Differences between adherent patients and nonadherent patients $P < .01$.

reported not adhering for six behaviors. The only self-care behavior for which no difference was indicated was foot inspection.

The pattern for the men was different. Men who reported adhering to exercise recommendations rated their overall health higher than men that reported not adhering. No differences were indicated for the other six self-care behaviors.

Conclusions

Two factors limit the generalizations that can be made from this study. First is the question of the accuracy of self-reports by patients, and second is the fact that the population was a convenience sample. These two factors may have contributed to the high percentages of reported adherence to the nine self-care components. The self-reported adherences to the nine self-care behaviors are higher than adherence patterns reported elsewhere.⁸ However, the relative levels of adherence between men and women in this study are more important than the absolute percentages. We assume that any self-report bias or any bias due to the convenience sample influenced both men and women equally. We have no indication that either factor had greater impact on one gender over the other, although this occurrence is possible.

Despite these two limitations, the results offer some insight into the diabetes attitudes and adherence behaviors of men and women. Because the significant differences in attitudes and adherence between men and women can be attributed to differences within a specific diabetes type, the discussion will be limited to the differences within types of diabetes. The first question this study focused on was attitudinal differences between men and women. For patients with IDDM, men and women differed on three of the seven attitude subscales. Men were more likely to agree that patients should do what they are told and less likely to agree that diabetes has a significant negative impact on a patient's life. Women with IDDM were more likely to consider NIDDM a serious disease.

The second question concerned the self-care recommendations given by healthcare professionals. Few differences were observed in the recommendations given to men and the recommendations given to women. No differences were found for the patients with IDDM. For patients with NIDDM using insulin and told to test their blood for glucose, women

were more likely to have been told to record test results, although the percentage being told was high for both sexes (95% for women vs 90% for men). For patients with NIDDM not using insulin, men were told to exercise more often than women.

The third question being investigated in this study was whether men and women differed in self-reported adherence. Again, few differences surfaced between men and women. For patients with IDDM, only two of nine self-care adherence behaviors were significantly different. Men with IDDM were less likely to be adherent in blood testing and carrying sweets. Men with NIDDM using insulin were less likely to adhere to carrying sweets, but more likely to adhere to exercising. Men with NIDDM not using insulin also were more likely to adhere to exercising.

Gender differences in diabetes attitudes were most evident in patients with IDDM. The attitudes of men with IDDM suggest that they are more passive than women in their diabetes care. This more passive stance of men with IDDM also is suggested in their lower adherence in recording blood tests and carrying sweets.

The similarities that were observed were more striking than the differences. Men and women expressed very similar attitudes and self-reported adherence behaviors. No differences were found by diabetes type and treatment for the subscales of special training, control and complications, patient autonomy, and team care. This pattern also emerged for patient adherence; no difference was found by diabetes type and treatment for six self-care behaviors (taking insulin as instructed, taking pills as instructed, following a diabetic diet, inspecting feet, carrying diabetic IDs, and recording test results). The self-care recommendations given by healthcare professionals were, for the most part, the same for both men and women.

Two areas in which men and women differed were the general health rating and the impact of diabetes on normal daily activities. Similar to the heart disease patients in Sharpe, Clark, and Janz study,⁶ the men in this study rated their overall health higher and found their illness less of a hindrance than the women. These findings are consistent with previous research that suggests that men are less likely to report illness and are less sensitive to the symptoms of illness. These notions also were supported by the self-reported

health status of patients who reported being adherent to self-care recommendations compared with patients who reported being nonadherent. For most self-care behaviors, women who considered themselves adherent reported better overall health than women who were nonadherent. There was little difference in the reported overall health of adherent and nonadherent men.

The similarity in adherence patterns of men and women and in the self-care recommendations given to men and women supports the findings of the Sharpe, Clark, and Janz study⁶ concerning heart disease management. The findings in this study also tend to agree with Green's findings⁴ that men and women react similarly once they have been diagnosed with diabetes. Although this study did not identify a need for distinct educational efforts for men and women, there probably are other areas in which significant differences exist between men and women with diabetes, particularly given the significant variation in the roles of many men and women. Because diabetes and its care affects so many areas of a person's life, men and women are likely to have different educational needs just as one would also expect to find different educational needs among people of different age groups and cultures. Such a difference was suggested, for example, by the different exercise adherence patterns of men and women with NIDDM. Other studies¹⁸ have found similar or related differences (eg, older men have been found to be more active than older women). As such, efforts should be made by educators to discover these differences. To determine and address the differing impact of diabetes on men and women, participants in diabetes education programs should be asked about their concerns about diabetes and how the self-care components affect their lives. Strategies then could be discussed and plans could be designed to address these personal concerns.

Finally, this study was not able to examine the impact of a health advisor's profession and gender on patient behavior. For example, does the profession of the provider (MD, RN, RD, etc) influence the importance attached to the message or does the gender of the professional have an impact on how advice is perceived? These questions should be addressed in future diabetes education research.

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