Competing Demands for Time and Self-Care Behaviors, Processes of Care, and Intermediate Outcomes Among People With Diabetes

Translating Research Into Action for Diabetes (TRIAD)

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OBJECTIVE—To determine whether competing demands for time affect diabetes self-care behaviors, processes of care, and intermediate outcomes.

RESEARCH DESIGN AND METHODS—We used survey and medical record data from 5,478 participants in Translating Research Into Action for Diabetes (TRIAD) and hierarchical regression models to examine the cross-sectional associations between competing demands for time and diabetes outcomes, including self-management, processes of care, and intermediate health outcomes.

RESULTS—Fifty-two percent of participants reported no competing demands, 7% reported caregiving responsibilities only, 36% reported employment responsibilities only, and 6% reported both caregiving and employment responsibilities. For both women and men, employment responsibilities (with or without caregiving responsibilities) were associated with lower rates of diabetes self-care behaviors, worse processes of care, and, in men, worse HbA_{1c}.

CONCLUSIONS—Accommodations for competing demands for time may promote self-management and improve the processes and outcomes of care for employed adults with diabetes.

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Diabetes self-management entails a complex set of health behaviors. For people living with young children or dependent adults and for those who work outside the home, caregiving responsibilities and/or expectations in the workplace may be barriers to self-management (1).

We conducted a cross-sectional analysis using data from Translating Research Into Action for Diabetes (TRIAD), a multicenter prospective observational study of diabetes care in managed care, to assess whether there are associations between competing demands for time and diabetes self-care behaviors, processes of care, and intermediate health outcomes.

RESEARCH DESIGN AND METHODS

Study population

TRIAD has been described in detail elsewhere (2). In 2000–2001 and 2002–2003, surveys were administered by computer-assisted telephone interview or in writing by mail. Medical records were reviewed by centrally trained reviewers. We included participants who had survey and medical record data at both baseline and follow-up (N = 5,478). Characteristics of the study population were similar to those of the entire TRIAD population (N = 11,927) (Supplementary Data).

Outcomes

Outcomes included three dichotomized self-management measures (physical activity, daily foot care, and daily self-monitoring of blood glucose), seven dichotomized processes of care (aspirin advise or use, eye exam, foot exam, HbA_{1c}, influenza immunization, cholesterol, and proteinuria testing), and three intermediate outcomes (HbA_{1c}, systolic blood pressure, and LDL-cholesterol). We also assessed the unweighted sum of the seven dichotomized processes of care as a continuous variable (range of scores 0–7) (3).

Independent variables

Patients were classified into four mutually exclusive groups: caregiving responsibilities only, employment responsibilities only, both, and neither. Indicators for each of the first three groups were included in multivariable regression models with "neither" as the reference group. Respondents were considered to have caregiving responsibilities if they were primarily responsible for a child <7 years of age or a household member who required special care and to have employment responsibilities if they worked ≥32 h per week (4) or

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≥16 but <32 h but made decisions in the workplace or supervised others.

Analyses were adjusted for age, race/ethnicity, education, income, duration of diabetes, diabetes treatment, health status, spouse employment, and spouse education.

Statistical analysis

We multiply imputed missing values for dependent and independent variables (IVEware, Ann Arbor, MI). Five imputed datasets were used to estimate multivariable regression models while accounting for clustering of patients at the health plan/provider group level. We constructed linear regression models for continuous outcomes and logistic models for dichotomous outcomes and calculated predicted probabilities with 95% CIs (Table 1). Adjusted models were run separately for men and women.

Table 1—*Multivariate linear and logistic regression models stratified by sex* (N = *5,478*)

	Competing demands/independent variables*			
	Neither caregiving nor employment responsibilities (Reference)	Caregiving only	Employment responsibilities only	Both caregiving and employment responsibilities
Women (*N* = 2,874)				
Self-care behaviors				
Physical activity (vigorous vs. none/little)	0.43 (0.41–0.45)	0.48 (0.42–0.54)	0.44 (0.40–0.48)	0.47 (0.37–0.57)
Foot self-care performed	0.65 (0.63–0.67)	0.63 (0.57–0.69)	0.61 (0.57–0.65)	0.60 (0.50–0.70)
Self-monitoring blood glucose (does not adjust for treatment)				
Oral medication only	0.47 (0.45–0.49)	0.50 (0.42–0.58)	0.43 (0.37–0.49)	0.46 (0.34–0.58)
Insulin users	0.72 (0.70–0.74)	0.75 (0.63–0.87)	0.65 (0.57–0.73)	0.57 (0.41–0.73)†
Processes of care				
Aspirin advised/taking	0.63 (0.61–0.65)	0.63 (0.57–0.69)	0.59 (0.55–0.69)†	0.53 (0.45–0.61)†
Dilated eye exam performed	0.80 (0.78–0.82)	0.78 (0.72–0.84)	0.79 (0.75–0.83)	0.75 (0.67–0.83)
Foot exam performed	0.85 (0.83–0.87)	0.87 (0.81–0.93)	0.84 (0.80–0.88)	0.83 (0.77–0.89)
Glycemic control assessed	0.86 (0.84–0.88)	0.85 (0.79–0.91)	0.82 (0.78–0.86)†	0.84 (0.76–0.92)
Influenza immunization	0.72 (0.70–0.74)	0.70 (0.64–0.76)	0.66 (0.62–0.70)†	0.65 (0.57–0.73)
LDL assessed	0.74 (0.72–0.76)	0.70 (0.64–0.76)	0.71 (0.67–0.75)	0.70 (0.62–0.78)
Proteinuria assessed	0.82 (0.80–0.84)	0.78 (0.72–0.84)	0.82 (0.78–0.86)	0.78 (0.70–0.86)
Unweighted sum of seven processes of care	5.41 (5.35–5.47)	5.32 (5.12–5.52)	5.24 (5.12–5.36)†	5.10 (4.85–5.35)†
Intermediate outcomes				
HbA_{1c}	7.86 (7.80–7.92)	8.17 (7.92–8.42)†	7.96 (7.82–8.10)	8.16 (7.85–8.47)
Systolic blood pressure	136 (135–137)	136 (133–139)	136 (134–138)	137 (134–140)
LDL	112 (111–113)	112 (107–117)	114 (111–117)	113 (107–119)
Men (*N* = 2,604)				
Self-care behaviors				
Physical activity (vigorous vs. none/little)	0.49 (0.47–0.51)	0.54 (0.44–0.64)	0.47 (0.43–0.51)	0.47 (0.37–0.57)
Foot self-care performed	0.58 (0.56–0.60)	0.61 (0.49–0.73)	0.53 (0.49–0.57)†	0.50 (0.40–0.60)
Self-monitoring blood glucose (does not adjust for treatment)				
Oral medication only	0.38 (0.36–0.40)	0.39 (0.27–0.51)	0.33 (0.29–0.37)†	0.31 (0.21–0.41)
Insulin users	0.69 (0.65–0.73)	0.73 (0.59–0.87)	0.67 (0.59–0.75)	0.68 (0.52–0.84)
Processes of care				
Aspirin advised/taking	0.67 (0.62–0.78)	0.70 (0.62–0.78)	0.65 (0.61–0.69)	0.60 (0.50–0.70)
Dilated eye exam performed	0.77 (0.75–0.79)	0.73 (0.63–0.83)	0.75 (0.71–0.79)	0.73 (0.65–0.81)
Foot exam performed	0.85 (0.83–0.87)	0.83 (0.75–0.91)	0.83 (0.79–0.87)	0.85 (0.77–0.93)
Glycemic control assessed	0.86 (0.84–0.88)	0.86 (0.80–0.92)	0.85 (0.81–0.89)	0.82 (0.74–0.90)
Influenza immunization	0.71 (0.69–0.73)	0.65 (0.57–0.73)	0.65 (0.61–0.69)†	0.59 (0.5 –0.67)†
LDL assessed	0.76 (0.74–0.78)	0.77 (0.69–0.85)	0.74 (0.70–0.78)	0.70 (0.60–0.80)
Proteinuria assessed	0.82 (0.80–0.84)	0.82 (0.74–0.90)	0.80 (0.76–0.84)	0.79 (0.71–0.87)
Unweighted sum of seven processes of care	5.44 (5.38–5.50)	5.37 (5.10–5.64)	5.27 (5.15–5.39)†	5.09 (4.82–5.36)†
Intermediate outcomes				
HbA_{1c}	7.81 (7.73–7.89)	8.16 (7.85–8.47)†	7.98 (7.84–8.12)†	8.32 (7.97–8.67)†
Systolic blood pressure	134 (133–135)	133 (130–136)	133 (131–135)	132 (128–136)
LDL	106 (105–107)	104 (97–111)	108 (105–110)	110 (104–116)

Predicted probabilities and 95% CIs are shown. *Adjusted for age, race/ethnicity, education, income, time since diabetes diagnosis, diabetes treatment, health status, spouse employment, spouse education, and provider group. †*P* value < 0.05.

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Analyses were performed using SAS (version 9.1.3 SP 4; Cary, NC) and SUDAAN (version 10.0; Research Triangle Park, NC).

RESULTS—Patient characteristics are shown in Supplementary Data 2. When compared with patients who had neither caregiving nor employment responsibilities, those with employment responsibilities (with or without caregiving) had lower levels of self-care and poorer processes of care.

Among women, employment responsibilities were associated with lower rates of aspirin being advised or taken (59 vs. 63%; $P = 0.018$), glycemic control being assessed (82 vs. 86%; $P = 0.005$), influenza immunization (66 vs. 72%; $P = 0.001$), and fewer processes of care (5.2 vs. 5.4 processes; $P = 0.002$). Both employment responsibilities and caregiving in women were associated with less self-monitoring of blood glucose among insulin users (57 vs. 72%; $P = 0.031$), lower rates of aspirin use (53 vs. 63%; $P = 0.013$), and fewer processes of care (5.1 vs. 5.4; $P = 0.012$). In women, caregiving only was associated with a higher mean HbA_{1c} (8.2 vs. 7.9%; $P = 0.020$).

Among men, employment responsibilities were associated with lower rates of foot care (53 vs. 58%; $P = 0.003$), less self-monitoring of blood glucose for oral medication users (33 vs. 38%; $P = 0.020$), lower rates of influenza immunization (65 vs. 71%; $P = 0.0002$), and fewer processes of care (5.3 vs. 5.4; $P = 0.001$). Both employment responsibilities and caregiving were associated with lower rates of influenza immunization (59 vs. 71%; $P = 0.003$) and fewer processes of care (5.1 vs. 5.4; $P = 0.017$). In men, mean HbA_{1c} was lowest in the reference group (neither caregiving nor employment responsibilities, 7.8%) and higher in the three comparison groups (caregiving only, 8.2%, $P = 0.028$; employment only, 8.0%, $P = 0.008$; and both caregiving and employment, 8.3%, $P = 0.003$).

CONCLUSIONS—In both women and men with diabetes, employment, with or without caregiving responsibilities, was associated with lower levels of diabetes self-management, poorer processes of care, and, in men, worse HbA_{1c}. Previous studies have found no association between caregiving responsibilities and preventive health care (5–7). We found a consistent trend between competing demands and intermediate outcomes, namely, higher HbA_{1c} levels, in both men and women.

Caregiving responsibilities fall disproportionately on women (8,9), especially African American women (1,10,11), and the elderly who care for their spouses (7,12). Higher-income patients may purchase formal assistance (either for caregiving or other household responsibilities), thereby attenuating any potential association between caregiving responsibilities and receipt of preventive health measures.

We found strong and consistent relationships between employment responsibilities and fewer processes of care. Previous studies have shown higher attrition rates in diabetes self-management education classes for the employed compared with the unemployed or retired (13,14). Employment demands may be qualitatively different from caregiving demands, and less accommodating to the requirements of diabetes care.

Limitations of our study are that all participants were enrolled in managed care health plans. Results may be different for people without insurance. We did not assess formal or informal support. Such support may reduce any associations between competing demands for time and diabetes care and have biased our results to the null. We measured only two aspects of employment responsibilities: time and decision making/supervision. We did not assess work flexibility. Finally, there is the possibility of spurious significant results as a result of multiple comparisons.

Future studies should focus on broader population groups, examine formal or informal support, and determine whether expanded access to medical care for employed people improves processes or outcomes.

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L.N.M. researched data and wrote the manuscript. C.K., S.L.E., and W.H.H. reviewed and edited the manuscript and contributed to discussion. A.J.K. and G.L.B. reviewed and edited the manuscript. A.F.B. reviewed and edited the manuscript and contributed to discussion.

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