Work Disability Among Individuals With Diabetes

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OBJECTIVE — Diabetes is rapidly increasing in prevalence among working-age adults, but little is known about the clinical characteristics that predict work disability in this population. This study assessed clinical predictors of work disability among working-age individuals with diabetes.

RESEARCH DESIGN AND METHODS — In a cohort of diabetic individuals (n = 1,642) enrolled in a large health maintenance organization, excluding homemakers and retirees, we assessed the relation of diabetes severity, chronic disease comorbidity, depressive illness, and behavioral risk factors with work disability. Three indicators of work disability were assessed: being unable to work or otherwise being unemployed; missing ≥5 days from work in the prior month; and having severe difficulty with work tasks.

RESULTS — In the study population, 19% had significant work disability: 12% were unemployed, 7% of employed subjects had missed ≥5 days from work in the prior month, and 4% of employed subjects reported having had severe difficulty with work tasks. Depressive illness, chronic disease comorbidity, and diabetes symptoms were associated with all three types of work disability. Diabetes complications predicted unemployment and overall work disability status, whereas obesity and sedentary lifestyle did not predict work disability. Among subjects experiencing both major depression and three or more diabetes complications, >50% were unemployed; of those with significant work disability, half met the criteria for major or minor depression.

CONCLUSIONS — Depressive illness was strongly associated with unemployment and problems with work performance. Disease severity indicators, including complications and chronic disease comorbidity, were associated with unemployment and overall work disability status. Effective management of work disability among diabetic patients may need to address both physical and psychological impairments.

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From 1994 to 2002, the prevalence of diabetes increased substantially among working-age adults in the U.S. (1). Individuals with diabetes are at increased risk of functional disability (2–4), miss more days from work for health reasons (5), have reduced earnings from employment (6,7), and may suffer hiring discrimination (8). National survey data have indicated that in 1987, ~25% of diabetic adults in the U.S. were unable to work for ≥6 months due to illness or disability (5). Disability in personal care has also increased among working-age adults since 1984 (9).

Results from several studies have indicated that diabetes complications are associated with increased work disability (6,8); however, other clinical characteristics that predict work disability have not been extensively studied. Functional disability among those with diabetes is associated with complications, comorbid chronic disease, diabetes symptoms, depression, obesity, low levels of exercise, increasing age, and lower educational levels; current glycemic control has not been found to predict disability (4,10–14). The types of functional disability often studied in diabetes are most prevalent among older individuals; it is not clear whether these predictors are also associated with work disability. Understanding the clinical predictors of work disability may provide insight into strategies for reducing work disability in the growing population of working-age, diabetic adults. The objective of this study was to identify factors associated with work disability among individuals with diabetes.

RESEARCH DESIGN AND METHODS

— The data reported in this study were developed through a large-scale survey of HMO enrollees with diabetes that was part of the Pathways study (15). This project was carried out by a multidisciplinary team from the Center for Health Studies of Group Health Cooperative (GHC) and the Department of Psychiatry at the University of Washington. The study protocol was reviewed and approved by institutional review boards at GHC and the University of Washington.

For this study, nine GHC primary care clinics in western Washington were selected. Subjects were identified using GHC's diabetes registry, which supports patient care (16). Patients are added to the diabetes registry based on *1*) current use of any diabetic agent; *2*) a fasting glucose ≥126 mg/dl, confirmed by a second out-of-range test within 1 year; *3*) a random plasma glucose ≥200 mg/dl, confirmed by a second test within 1 year; or *4*) a

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Abbreviations: GHC, Center for Health Studies of Group Health Cooperative; PHQ-9, Patient Health Questionnaire-9.

A table elsewhere in this issue shows conventional and Système International (SI) units and conversion factors for many substances.

hospital discharge diagnosis of diabetes at any time during GHC enrollment or two outpatient diagnoses of diabetes (16). Patients were screened by mail. A $3 gift certificate for a local store was used to encourage responses. Nonresponding individuals received two mailings and then were contacted by telephone, resulting in a 62% response rate.

Subjects were ineligible if they had been enrolled in the GHC for <6 months. For the purposes of this study, we included only those who were ≤62 years of age and identified themselves as working full or part time or as unemployed or disabled. We excluded retirees, homemakers, and students from the analyses reported in this study to limit the analyses to those who considered themselves eligible for participation in the labor force. We excluded individuals ages 62–65 years because voluntary early retirement is common in this age range. We could not differentiate those who retired early due to health problems from those who retired for other reasons.

Predictors of work disability

Subjects were asked about their age, sex, years of education, race/ethnicity, height, weight, age of onset of diabetes, and initial treatment for diabetes. They were classified as having type 1 diabetes if their diabetes onset occurred before age 30 years and insulin was the first treatment prescribed.

The Patient Health Questionnaire-9 (PHQ-9) (17–18) was used to assess depressive illness. This questionnaire yields major and minor depression diagnoses according to criteria set out in the DSM-IV (19). The PHQ-9 diagnosis has high agreement with a major depression diagnosis based on the structured interview. The criteria for major depression require the patient to have, for at least 2 weeks, five or more depressive symptoms present for >50% of the days, with at least one of these symptoms being either depressed mood or anhedonia. To meet the criteria for minor depression, patients had to have for at least 2 weeks two to four symptoms present for >50% of the days, with one of the symptoms being either depressed mood or anhedonia (19).

Automated diagnostic, pharmacy, and laboratory data were used to assess diabetes complications and glycemic control. Codes from the ICD-9 (20) for seven types of diabetes complications (retinopathy, nephropathy, neuropathy, cerebrovascular, cardiovascular, peripheral vascular, and ketoacidosis) were used to identify the presence of specific complications. This diabetes complications measure is similar to one previously validated (21). GHC's automated data on HbA_{1c} levels for the 12 months before screening were obtained. The latest HbA_{1c} level obtained prior to the completion date of the questionnaire was used (22). HbA_{1c} values were grouped as follows: <7.0, 7 to <8, 8 to <10.0, and ≥10%. Computerized pharmacy records were used to measure medical comorbidity (RxRisk model) based on prescription drug use over the prior 12 months (23). The RxRisk model has been found to be comparable with Ambulatory Care Groups model (24) in predicting total future health costs (23); it also predicts risks of hospitalization and mortality. RxRisk values were divided into quartiles. Participants were asked to report their recent level of exercise (25) as well as their height and weight. The Self-Completion Patient Outcome Instrument (26) was used to measure diabetes symptoms, including cold hands and feet, numb hands and feet, polyuria, excessive hunger, abnormal thirst, shakiness, blurred vision, feeling faint, fatigue, and pain in hands and feet. These items were rated on a Likert scale ranging from "never" to "every day." A symptom was considered present if it had been experienced at least "several days" in the previous month.

Work disability

The primary measure of work disability was the patient's report of being disabled or unemployed. Among those who were employed full or part time, we asked about the number of work days missed (defined as missing a half of a day or more) because of a health condition in the prior month. Individuals reporting ≥5 days of missed work in the prior month were classified as having significant work disability. Research has shown that self-report of work disability days over a 30-day period is valid (27–28). Respondents were also asked to rate their difficulty in day-to-day work and in completing all of their work tasks. If either of these items was rated as "severe" or "extreme/can't do," then we classified the person as having a significant work disability. These work disability items are taken from the World Health Organization's Disability Assessment Schedule II (29–30). We also used a summary measure of work disability that was positive if a respondent answered positively on any of the above-described three work disability measures.

Statistical analyses

For each of the four measures of work disability, we examined the following predictors: age, sex, education level, ethnicity, level of depressive illness (normal status or minor or major depression), most recent HbA_{1c} value, number of diabetes complications, type 1 or 2 diabetes, BMI (≤30, 30 to <35, 35 to <40, and ≥40 kg/m^2), number of diabetes symptoms, number of times per week subjects engaged in physical exercise for ≥30 min, and current smoking status. To assess gradient of effect, all predictors were entered as class variables. We estimated the relative risk of outcomes associated with each covariate using Poisson regression with a robust covariance adjustment (31). We estimated *P* values associated with parameter tests based on *Z* scores equal to the ratio of the estimated parameter value to the robust estimate of the estimate's standard error. We carried out separate analyses with the four different work disability measures. We report data as adjusted relative risks and their 95% confidence intervals. The relative risk is the ratio of the prevalence of work disability to its prevalence in the indicated reference group, after adjusting for all covariates included in the model.

RESULTS — Diabetic patients (n = 9,063) were mailed the study questionnaire. A total of 1,222 were not eligible for the study, including 444 who had already disenrolled from the GHC plan or were moving and could not be followed, 259 who had a spurious diagnosis of diabetes, 202 who were too ill to participate, 99 who had language problems or hearing impairment, 128 who were deceased, 80 who had cognitive impairment, 8 who had gestational diabetes, and 2 for other reasons. Among the 7,841 eligible patients, a total of 3,002 questionnaires were not returned. Of the 4,839 subjects who returned questionnaires (61.7% of eligible patients), 372 did not give permission for us to access their automated medical records, 253 did not have at least one HbA_{1c} test in the prior year, and 7 did not complete the PHQ-9 depression questions. We obtained data on HbA_{1c}

values and the number of diabetes complications for 4,357 (56%) of the 7,841 eligible patients. We excluded 2,429 individuals who were ≥62 years of age. Among those <62 years of age, we excluded 156 individuals who were retired, 79 homemakers, 15 students, and 53 individuals who indicated that their employment status was "other." The sample remaining for analysis included 1,642 individuals.

After obtaining approval from the institutional review boards, we examined differences in de-identified data between survey respondents and nonrespondents using automated health care data, excluding individuals who did not give permission for us to use their automated medical records data. We estimated response propensity scores (the probability of being a respondent) as a function of the following variables: age, sex, most recent HbA_{1c} value, treatment with insulin in the prior year, use of oral hypoglycemic medicines in the prior year, specialty mental health care in the prior year, a depression diagnosis in primary care or specialty care in the prior year, having filled any prescriptions for antidepressant medication in the prior year, hospitalization in the prior year, RxRisk score for the prior 12 months (omitting medications for diabetes and mental disorders), number of primary care visits in the prior year, number of specialty care visits in the prior year, whether or not the patient was on the GHC heart disease registry, and patient primary care clinic location. We predicted response or nonresponse status as a function of these variables using PROC LOGISTIC (32). Using these predictors, we estimated a response probability for each survey respondent (the response propensity score) (33). We used a weighted analysis, with weights inversely proportional to the estimated probability of response, rescaled to sum to the observed sample size (i.e., the number of survey respondents). In weighted analyses, individuals with a low probability of responding would be given a higher weight in the analysis to represent the larger number of nonrespondents with similar characteristics. We then compared weighted and unweighted analyses to see if postsurvey adjustment for factors related to nonresponse resulted in meaningful differences in survey estimates. Differences in estimates based on weighted and unweighted data were negligible, indicating that nonresponse bias was not substantial (33); thus in this study, we report analyses based on observed data.

The study sample reflected the characteristics of GHC enrollees and the population of Puget Sound, with the majority being white and having attended at least some college (Table 1). The majority of participants had type 2 diabetes, >60% had a BMI >30 kg/m^2, and 29% had optimal glycemic control (HbA_{1c} <7.0%).

Among diabetic individuals meeting eligibility criteria for this study, 11.8% reported that they were disabled or otherwise unemployed. Among those who were employed, 6.7% had missed ≥5 days from work in the prior month and 4.0% reported having had severe difficulty with work tasks. Overall, 19% of the diabetic patients included in the study indicated some type of significant work disability (Table 1).

Adjusted relative risk estimates for predictors of work disability (and confidence intervals) are shown for each of the three forms of work disability in Table 2. Depressive illness was associated with a significant increase in risk of for all three types of work disability. Diabetes symptoms strongly associated with depressive symptoms (34) and chronic disease comorbidity (RxRisk) both predicted increased risk for all three measures of work disability. Diabetes complications, type 1 status, and lower educational attainment were associated only with increased risk of unemployment. Glycemic control (as measured by HbA_{1c}) was not associated with any of the work disability measures, nor was BMI, smoking status, or exercise frequency. The predictors of the summary measure of work disability are shown in Table 3. Depression, diabetes symptoms, chronic disease comorbidity, diabetes complications, and education level were associated with overall work disability after controlling for other factors. When we examined the predictors of any of the three forms of work disability (Table 3), we found that depressive illness, complications of diabetes, chronic disease comorbidity, number of diabetes symptoms, and lower educational attainment predicted increased risk.

The combined effects of severity of depressive illness and number of diabetes complications on the prevalence of unemployment, absenteeism, and interference with work activities among the employed is shown in Table 4. For a fixed number of diabetes complications, increasing severity of depressive illness was associated with marked increases in the prevalence of work disability. Similarly, the effect of an increasing number of complications

Table 1—*Characteristics of study sample*

n	1,642
Age (years)	50.8 ± 8.2
Female	811 (49.4)
Ethnicity	
Caucasian	1,180 (73.5)
African American	181 (11.3)
Asian or Pacific Islander	188 (11.7)
Other	57 (3.6)
Education level	
Not a high school graduate	45 (2.8)
High school graduate	183 (11.2)
Some college	711 (43.6)
College graduate	379 (23.2)
Postgraduate education	313 (19.2)
Type 1 diabetes	147 (9.0)
BMI (kg/m^2)	
<30	634 (39.1)
30 to <35	414 (25.5)
35 to <40	285 (17.6)
≥40	288 (17.8)
HbA_{1c} (%)	
<7.0	482 (29.4)
7.0 to <8.0	445 (27.1)
8.0 to <10.0	490 (29.8)
≥10	225 (13.7)
Diabetes complications	
0	659 (40.1)
1	565 (34.4)
2	246 (15.0)
≥3	172 (10.5)
Comorbidity	
Lowest	743 (45.3)
2nd quartile	503 (30.6)
3rd quartile	211 (12.9)
Highest	185 (11.3)
Diabetes symptoms (out of 10)	
0–1	646 (39.7)
2–4	641 (39.4)
≥5	340 (20.9)
Times exercised ≥30 min/week	
<3	717 (44.1)
3–4	420 (25.8)
≥5	489 (30.1)
Smoked in the previous 7 days	230 (14.2)
Depressive symptoms	
Not depressed	1,243 (75.7)
Minor depression	132 (8.0)
Major depression/dysthymia	267 (16.3)
Experienced any work disability	305 (18.6)
Disabled or otherwise unemployed	194 (11.8)
Missed ≥5 work days in prior month	82 (6.7)
Had severe difficulty with work tasks	50 (4.0)

Data are means ± SD or *n* (%).

Table 2—*Relative risk estimates for disability risk factors estimated by Poisson regression for three indicators of work disability*

Risk factor (reference group)	Disabled or otherwise unemployed	Missed ≥5 days from work in the prior month	Had severe difficulty with work tasks
n	1,556	1,168	1,175
Depression (not depressed)			
Minor depression	1.70 (1.1–2.6)*	1.77 (0.9–3.6)	3.15 (1.2–8.0)*
Major depression	2.09 (1.5–2.8)†	2.84 (1.7–4.7)†	4.50 (2.3–8.7)†
Diabetes symptoms (0–1)			
2–4	1.83 (1.3–2.7)†	1.67 (0.9–3.1)	7.12 (1.7–29.8)†
≥5	2.42 (1.6–3.6)†	2.66 (1.4–5.0)†	10.3 (2.3–45.6)†
Comorbidity (1st quartile)			
2nd quartile RxRisk	1.54 (1.0–2.3)*	1.69 (1.0–2.9)	2.45 (1.1–5.3)*
3rd quartile RxRisk	1.66 (1.1–2.6)*	1.76 (0.9–3.4)	2.83 (1.2–6.8)*
4th quartile RxRisk	2.52 (1.7–3.8)†	2.39 (1.2–4.9)*	2.66 (1.0–6.9)*
Diabetes complications (0)			
1	1.19 (0.8–1.8)	1.51 (0.9–2.5)	1.02 (0.5–2.0)
2	1.54 (1.0–2.4)*	1.44 (0.8–2.7)	1.13 (0.5–2.6)
≥3	2.55 (1.7–3.8)†	1.57 (0.7–3.4)	1.04 (0.4–2.5)
Glycemic control (HbA_{1c} <7%)			
7 to <8%	0.99 (0.7–1.4)	0.87 (0.5–1.6)	1.23 (0.6–2.7)
8 to <10%	0.73 (0.5–1.0)	1.00 (0.6–1.8)	1.19 (0.6–2.5)
≥10%	0.47 (0.3–0.8)†	1.18 (0.6–2.2)	1.36 (0.6–3.1)
Type 1 vs. type 2 status (type 2)			
Type 1	1.88 (1.2–3.0)†	0.60 (0.1–2.5)	0.57 (0.1–6.2)
BMI (<30 kg/m^2)			
30 to <35	0.76 (0.5–1.1)	1.25 (0.7–2.3)	1.12 (0.5–2.6)
35 to <40	0.76 (0.5–1.1)	0.89 (0.4–1.8)	1.25 (0.5–3.4)
≥40	0.87 (0.6–1.3)	1.08 (0.6–2.0)	1.40 (0.6–3.5)
Exercise frequency (<3 times/week)			
3–4	0.98 (0.7–1.4)	1.02 (0.6–1.7)	0.84 (0.4–1.8)
≥5	1.07 (0.8–1.5)	1.23 (0.7–2.0)	1.26 (0.6–2.7)
Current smoker (No)			
Yes	1.09 (0.8–1.5)	1.31 (0.8–2.2)	1.14 (0.6–2.1)
Sex (Male)			
Female	1.06 (0.8–1.4)	1.18 (0.7–1.9)	1.23 (0.7–2.3)
Ethnicity (Caucasian)			
Asian or Pacific Islander	0.81 (0.4–1.5)	1.18 (0.6–2.4)	1.02 (0.4–2.6)
African American	1.47 (1.0–2.2)*	1.64 (0.9–2.9)	0.61 (0.2–2.0)
Other	1.40 (0.7–2.6)	1.93 (0.8–4.5)	0.51 (0.1–3.2)
Education (high school)			
Some college	0.61 (0.5–0.8)†	0.62 (0.4–1.0)	0.70 (0.3–1.5)

Data are relative risk estimates (95% CIs). Odds ratios are also adjusted for age, which was not associated with any of the work disability measures. *$P < 0.05$; †$P < 0.01$.

was generally evident among individuals at each level of depression status.

The combined effects of depressive illness and diabetes complications on the prevalence of significant work disability (unemployment, missing ≥5 days from work, or having severe difficulty with work tasks) is shown in Fig. 1. The prevalence of significant work disability increased dramatically with both increasing depressive illness and diabetes complications. Among diabetic patients with either major or minor depression or three or more complications, the prevalence of significant work disability was >20% (Fig. 1). Among those with major depression and two or more complications, the prevalence of significant work disability was >50%. Among respondents with any of the three types of work disability, 39.0% met criteria for major depression and an additional 11.2% were classified as having minor depression (data not shown).

CONCLUSIONS — Loss of work can have substantial deleterious effects, including loss of income and savings, loss of health insurance, reduced pension and

Table 3—*Relative risk estimates for any of the three forms of work disability estimated by Poisson regression for three indicators of work disability*

Risk factor (reference group)	Any of the three forms of work disability
n	1,337
Depression (not depressed)	
Minor depression	1.80 (1.3–2.5)*
Major depression	2.26 (1.8–2.8)*
Diabetes symptoms (0–1)	
2–4	1.93 (1.4–2.6)*
≥5	2.52 (1.8–3.5)*
Comorbidity (1st quartile)	
2nd quartile RxRisk	1.60 (1.2–2.1)*
3rd quartile RxRisk	1.66 (1.2–2.3)*
4th quartile RxRisk	2.25 (1.7–3.1)*
Diabetes complications (0)	
1	1.30 (1.0–1.7)
2	1.42 (1.0–1.9)†
≥3	1.92 (1.4–2.6)*
Glycemic control (HbA_{1c} <7%)	
7 to <8%	0.96 (0.7–1.2)
8 to <10%	0.87 (0.7–1.1)
≥10%	0.82 (0.6–1.1)
Type 1 vs. type 2 status (type 2)	
Type 1	1.28 (0.9–1.9)
BMI (<30 kg/m^2)	
30 to <35	0.94 (0.7–1.2)
35 to <40	0.83 (0.6–1.1)
≥40	1.01 (0.8–1.3)
Exercise frequency (<3 times/week)	
3–4	0.97 (0.8–1.2)
≥5	1.14 (0.9–1.4)
Current smoker (No)	
Yes	1.19 (0.9–1.5)
Gender (Male)	
Female	1.10 (0.9–1.4)
Ethnicity (Caucasian)	
Asian or Pacific Islander	0.90 (0.6–1.4)
African American	1.32 (1.0–1.8)
Other	1.32 (0.8–2.1)
Education (high school)	
Some college	0.66 (0.5–0.8)*

Data are relative risks (95% CIs). Odds ratios are also adjusted for age, which was not associated with overall work disability. *$P < 0.01$; †$P < 0.05$.

Table 4—*Study subjects with a work disability by depression, diabetes, and comorbidity status*

Number of diabetes complications	Not depressed	Minor depression	Major depression	All individuals
Disabled or otherwise unemployed				
0	4.4	7.4	18.6	6.5
1	6.7	14.6	18.4	9.2
2	10.6	30.4	27.9	15.5
≥3	28.1	—	51.0	35.5
All individuals	8.3	15.9	26.2	11.8
Missing ≥5 days from work in the prior month (if employed)				
0	2.6	8.7	15.8	4.5
1	5.2	8.8	19.7	7.5
2	4.6	7.7	23.1	7.7
≥3	6.0	—	38.1	13.3
All individuals	4.0	8.4	21.2	6.7
Had severe difficulty with work tasks (if employed)				
0	0.7	6.7	17.2	3.0
1	1.7	5.7	15.9	4.0
2	3.8	7.7	15.4	5.9
≥3	2.9	—	19.1	6.5
All individuals	1.6	6.3	16.7	4.0

Data are percent. Percentages with a cell sample size <10 are not reported.

social security contributions needed to secure adequate retirement income, and loss of self-esteem. We found that almost 1 in 10 HMO enrollees with diabetes who were ≤62 years of age in the study population (excluding homemakers and retirees) were work disabled or otherwise unemployed. Among those experiencing major depression, the percentage of unemployed increased to 26%, and ~50% of the work-disabled individuals experienced a major or minor depressive illness.

This cross-sectional study did not determine whether depressive illness is a cause or a consequence of work disability among diabetic patients; it is likely that it is both. Even if depression were entirely secondary to work disability, recognition and management of depression would be an important facet of addressing work disability in this population. The results of this study are generally consistent with those of prior investigations of self-reported functional disability that have found that depression is associated with interference of important life activities among diabetic patients (4,10–14).

Apart from the cross-sectional design of this study, the fact that the sample was ascertained in an HMO population is an important limitation. HMO enrollees are more likely to be a working population insured through an employer or a spouse's employer than individuals selected at random from the general population. This suggests that work disability is likely to be even more common in the general population than it was in this study sample. A study of a U.S. population sample of diabetic adults found that 25% were unable to work (5), whereas the percentage who were unable to work or otherwise unemployed in this HMO sample of diabetic patients was 12%. The survey response rate is also a concern. However, when we adjusted for a large number of factors associated with nonresponse measured using HMO information systems for all respondents, we found that survey estimates showed negligible effects, indicating that nonresponse may not have been an important source of bias in these analyses.

It is interesting that depression and diabetes symptoms were the most consistent predictors of work disability. Diabetes complications and chronic disease comorbidity were strong predictors of unemployment, but were not strong predictors of having difficulty at work or

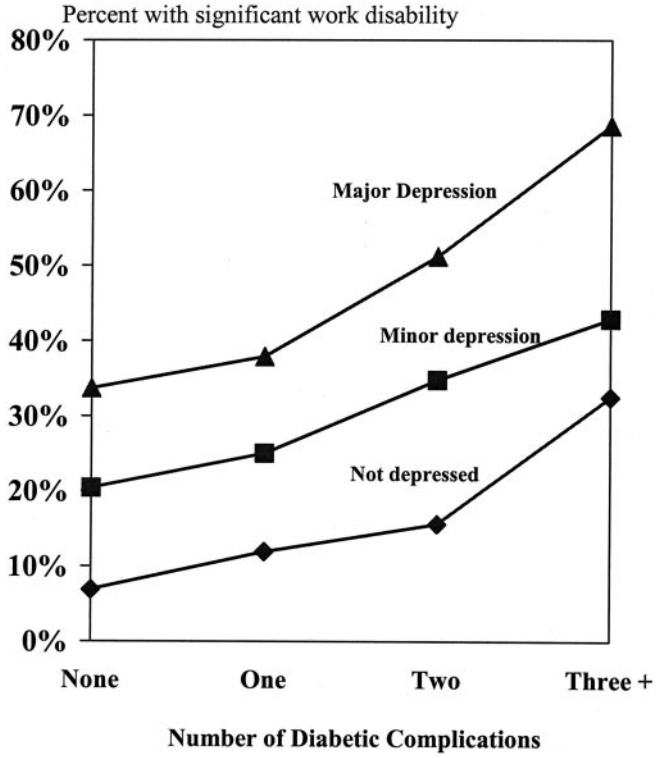

Figure 1—*Study subjects with work disability (being disabled or otherwise employed, having missed ≥5 days of work in the prior month, and/or having severe difficulty with work tasks) by number of diabetes complications and depression status.*

missing days from work among those who were employed. These results suggest that the experience of illness, including both affective distress and physical symptoms, may be an important factor in work disability.

Given the rising prevalence of diabetes among working-age adults, there is an urgent need to understand how to reduce work disability in this population. It has been estimated that >33% of individuals born in the year 2000 will develop diabetes in their lifetime (35). Diabetic patients in the U.S. who are unable to remain in the labor force may risk losing health insurance coverage, indicating the shortcomings of employment-based insurance for individuals with a major chronic disease that often causes work disability. From a societal perspective, the future viability of U.S. social insurance programs (e.g., Social Security, Medicare) depends in part on maximizing the number of individuals able and willing to continue working until ≥65 years of age (36). Maximizing the potential to sustain labor force participation to normal retirement age among the millions of diabetic patients in the U.S. is important for the well-being of both affected individuals and society at large.

Among working-age individuals with diabetes, work disability is common, particularly among those who are depressed, experience significant diabetes symptoms, have a comorbid chronic disease, and/or have multiple diabetes complications. The results of this study suggest that work disability among diabetic individuals needs to be addressed with an integrated approach that considers the physical and psychological impairments that afflict many diabetic patients.

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