

Health, Life, and Automobile Insurance Characteristics in Adults With IDDM

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Objective: To determine whether people with insulin-dependent diabetes mellitus (IDDM) were compromised in their access to insurance. **Research Design and Methods:** A case-control study of 158 people with IDDM and 158 nondiabetic siblings matched for age and sex was conducted to evaluate the health, life, and automobile insurance characteristics and history of people with IDDM. **Results:** Health insurance coverage (yes/no) among the IDDM and sibling control subjects was similar. More than 90% of the IDDM and control respondents had insurance through a private third-party source, and this insurance did not differ by type of plan, coverage, or premium. However, Medicare coverage was more common among the IDDM subjects and was associated with the presence of severe diabetic complications. IDDM subjects were also more likely to have been denied a health insurance policy by an insurer than were the control subjects (23 vs. 1%, $P < 0.001$). Similarly, there was no difference between the IDDM and sibling control subjects in the number who had a life or automobile insurance policy. However, life and automobile insurance refusal was much more frequent among the IDDM respondents, more so for life (55 vs. 0%, $P < 0.001$) than for automobile (12 vs. 4%, $P < 0.05$) insurance. **Conclusions:** These results suggest that access to insurance is severely compromised for people with IDDM. Although most of those with IDDM are able to find some form of insurance, it is evident that on average they must go to extra lengths to find it. These data and a changing insurance environment

emphasize the need to reexamine, as a society, the importance of insurance for people with chronic disease, particularly IDDM. *Diabetes Care* 14:318–24, 1991

Health, life, and automobile insurance programs are considered an economic necessity for the average person because they greatly reduce the financial risk of health-care costs and unanticipated events. Insurance coverage is even more important for individuals with insulin-dependent diabetes mellitus (IDDM) because of their increased use of medical services (1–3), increased mortality (4,5), and risk for diabetic complications. Yet, it is precisely these factors that provide the basis for insurance companies to limit the access to or coverage of their plans. Therefore, it is often suggested that the insurance environment for the individual with IDDM is harsh (6,7). However, the actual insurance experience of the IDDM population remains relatively undefined.

The health insurance traits of the diabetic population have been largely described in only two scientific reports (8,9). Both found that ~9 of 10 individuals with diabetes had some type of health insurance coverage; a figure similar to the experience of the general population. The cost and coverage of private plans was also comparable (8). Another smaller volunteer survey found a similar rate of coverage among diabetic respondents, but nearly 25% had been turned down for a health insurance policy (10).

Life and automobile insurance experiences in the diabetic population have not been widely surveyed. Frier et al. (11) surveyed patients attending a clinic and found

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that 81% had life insurance coverage and 79% had automobile insurance coverage. Moreover, 28% of the respondents had been denied a life insurance policy and 9.5% an auto insurance policy. There were no comparative data presented for the general population.

The major limitation of these reports (8–11) is their focus on diabetes in general. They do not distinguish the experience associated with IDDM, particularly juvenile-onset IDDM. This is important because most individuals with IDDM develop diabetes before they apply for insurance. Their experience probably is considerably different from people who develop diabetes at an older age where the majority have established insurance policies long before diabetes appears. Therefore, this study examined the insurance experiences of a well-defined cohort of young adult IDDM subjects and a matched group of sibling control subjects.

RESEARCH DESIGN AND METHODS

The study population was identified from a cohort of 723 people enrolled in the Children's Hospital of Pittsburgh Insulin-Dependent Diabetes Mellitus Registry and diagnosed as diabetic during 1950–64 (4,12). This registry is a listing of all patients who were 1) <17 yr of age at diagnosis of IDDM, 2) discharged from the hospital on insulin therapy, and 3) seen at Children's Hospital at diagnosis or within 1 yr of diagnosis. The descriptive characteristics of the patients listed in the Children's Hospital registry from 1965 to 80 are similar to the characteristics of those patients in the population-based Allegheny County IDDM Registry (12) during the same period. Thus, the Children's Hospital cohort is probably representative of newly diagnosed IDDM subjects in 1950–64.

During 1981, the 723 individuals were asked to complete a medical survey to assess mortality, morbidity, family history of diabetes, and family structure. Data were obtained from 93% ($n = 671$) of the cohort (4). In 1984, a case-control study was initiated to investigate the influence of diabetes on the life-style of individuals with IDDM. IDDM subjects were identified from the cohort who completed the medical survey and were eligible for this study by reason of being alive, 21 yr of age by November 1984, and having a living nondiabetic sibling of the same sex and age (± 5 yr). The matched siblings, who also had to be at least 21 yr of age, were asked to participate in the study as control subjects.

Social parameters, including insurance, employment, disability, and driving experiences, were then assessed by questionnaire. Inquiries on the insurance experience of IDDM and control subjects focused on policies applied for or obtained during adulthood. Questions related to health insurance dealt with the current possession of a policy (yes/no), source of the policy (private/government), type of plan (group/individual), type of coverage (basic/major medical/both/health maintenance organization), cost of the plan (premium to the

individual), insurance refusal, and increased premiums. Most questions were adapted from the Health Interview Survey (13) and an American Diabetes Association survey (14). All questions were assessed cross-sectionally except for insurance refusal. Health insurance refusal was retrospectively defined by the question, "Has your application for health insurance ever been turned down? Yes/No."

Probes on life and automobile insurance were patterned after those for health insurance. Life insurance inquiries focused on the current possession of a policy, type of plan (group or individual), insurance refusal, and increased premiums. Automobile insurance inquiries focused on current possession, insurance refusal, and higher premiums. More detailed information on the type of coverage and premiums for life and auto insurance were not solicited from the IDDM and control subjects because of the large array of policies available.

Survey data were obtained from 87% ($n = 158$ pairs) of the 181 case-control pairs who fulfilled the eligibility criteria. Ninety-three percent ($n = 169$) of the IDDM subjects and 89% of the control subjects responded. Fifty-six percent of the IDDM and control subjects were males and 98% were white. The mean \pm SD age of the IDDM and control populations was 33.1 ± 4.9 yr, for control subjects it was 33.4 ± 5.8 yr. The mean duration of diabetes in the IDDM subjects was 25.6 yr (range 20–35 yr).

Matched-pair analyses employing the McNemar's test (15) and Student's paired t test (16) were used to evaluate the differences in health, life, and automobile insurance coverage between the matched pairs. Unpaired tests were conducted to evaluate household income and disability status differences due to the small number of pairs available for analysis. Student's t test and χ^2 -test were used to univariately compare the characteristics of the insured and uninsured in both the IDDM and control subjects. Multiple logistic regression analyses were conducted with the BMDP statistical package (17) to multivariately evaluate what factors contributed to the lack of insurance among the IDDM and control subjects. Variables included in the logistic models were selected because of their suggested association with insurance coverage in the univariate analyses and literature.

RESULTS

HEALTH INSURANCE

Prevalence. There was no difference between the percentage of IDDM subjects and sibling control subjects who maintained a current health insurance policy (94 vs. 89%, respectively, $n = 156$ pairs) (Fig. 1). Health insurance prevalence did not differ significantly between the IDDM and control subjects across the categories of sex, age (21–34 yr, 35–49 yr), household income (\$0–10,000, \$10,000–20,000, and +\$20,000), or disability status (yes/no).

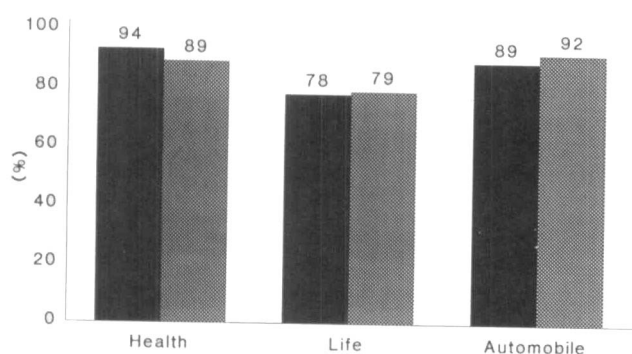


FIG. 1. Health, life, and automobile insurance prevalence among insulin-dependent diabetic (solid bars) subjects and nondiabetic sibling control subjects (hatched bars).

Overall, 11 IDDM participants (7%) were uninsured. Sex (male, $P = 0.04$) and marital status (not married: including never married, divorced, or separated individuals, $P = 0.08$) were related to this lack of coverage. However, when these variables were included in a logistic regression model together with age, income, and working status (yes/no; yes/disabled), only sex remained a strong independent factor. Men were more likely to be uninsured than women (odds ratio [OR] 8.8, 95% confidence intervals [CI] 0.96–82.4, $P = 0.055$). Among the sibling control subjects, 17 (11%) were uninsured. Sex (male), low household income ($< \$20,000$), and limitations in work activity were all independent predictors for the lack of insurance.

Policy characteristics. Among the IDDM and control subjects with health insurance ($n = 131$ pairs), coverage from private sources appeared to be similar, whereas coverage from government sources, Medicare in particular, was noticeably higher for the IDDM subjects (Table 1). Ninety-two percent of the IDDM subjects and 94% of the control subjects had coverage from a private source. Among the pairs with private coverage ($n = 113$), no differences were apparent in type of policy, type of coverage, or annual premium of the plan.

It is not totally unexpected that the private insurance coverage of the IDDM subjects was so similar to the control subjects. Most had group policies through an employer. However, some questions still remain over the cost and coverage of individual policies for the IDDM population. This could not be adequately evaluated here because of the small number who had individual policies.

Distinct patterns were noted between the case-control pairs in coverage from government sources. IDDM subjects were much more likely to have Medicare coverage than their siblings (15.3 vs. 1.5%, $P < 0.001$). All of the IDDM respondents with Medicare coverage reported one or more severe complications of diabetes (54% kidney failure, 46% blindness). Most received disability payments from Social Security (88%) and held an additional private insurance policy (75%) as well. IDDM subjects were also more likely to have Medicaid coverage than control subjects (3.8 vs. 0%, respectively),

but this trend only approached statistical significance ($P = 0.06$). Those with IDDM were less likely to have other government health insurance coverages, such as military-affiliated coverage, than control subjects (1.5 vs. 6.1%, respectively, $P = 0.10$).

Health insurance denial. Of particular importance was that the IDDM subjects were much more likely to have been denied a health insurance policy at some point in their adult lives than were the sibling control subjects (23 vs. 1%, respectively, $P < 0.001$, $n = 142$ pairs) (Fig. 2). Diabetes was reported as the reason for refusal by 72% of the IDDM subjects. A specific diabetic complication (6%) and high risk (19%) were the remaining reasons for refusal. Health insurance denial was also markedly higher among the nondisabled IDDM subjects when compared with the nondisabled siblings (17 vs. 2%, respectively, $P = 0.002$, $n = 90$ pairs) suggesting that the denial differences were independent of work disability. We have previously shown that diabetes complications were highly correlated with work disability in this cohort (18). However, both disability and the type of policy held (group or individual) were measured cross-sectionally and not at the time of application. Thus, it was not possible to fully evaluate the influence of these factors on insurance denial.

LIFE INSURANCE

Prevalence. There was no difference between IDDM and control subjects in life insurance coverage (78 vs. 79%, respectively, $n = 156$) (Fig. 1). The number of people with insurance was similar between the IDDM and control subjects across all demographic categories, including sex, age, household income ($\$0$ – $\$20,000$, + $\$20,000$), and disability status. Duration of diabetes

TABLE 1
Policy characteristics of insulin-dependent diabetic (IDDM) subjects and sibling control subjects with health insurance

Insurance	<i>n</i>	IDDM (%)	Sibling (%)	<i>P</i>
Medicare	131	15.3	1.5	<0.001
Medicaid	131	3.8	0.0	0.063
Government (Champus)	131	1.5	6.1	0.109
Private Policy	131	91.6	93.9	0.630
Group plan	113	88.5	93.8	0.238
Individual plan	113	11.5	8.0	0.503
Coverage				
Basic	110	12.7	10.0	0.629
Major medical	110	29.1	25.5	0.617
Basic + major medical	110	52.7	55.5	0.775
HMO/PPO	110	6.2	11.5	0.238
Insurance premium (\$)	90	440 ± 633	397 ± 768	0.666

Values are means ± SD.

PPO, preferred provider organization.

and insulin dosages being taken were not related to the possession of a life insurance plan.

Twenty-three percent ($n = 39$) of the 169 IDDM respondents did not have any life insurance. Income (low, $P = 0.05$), marital status (single, $P = 0.06$), and working status (not working, $P = 0.002$) were associated with this lack of coverage. When these variables and sex were evaluated in a multivariate model, only working status remained significant. IDDM subjects who were not working were three times more likely to be uninsured than those who were at work (OR 3.23, 95% CI 1.16–8.95, $P = 0.02$). By definition, those not working included the unemployed, homemakers, or students. The relationship of disability was also considered in the model but was not significant. Siblings who were not married ($P = 0.03$) and poor ($< \$20,000$; $P = 0.07$) were more likely to have no insurance. However, the significance of these variables disappeared when they were evaluated in a multivariate model.

Policy characteristics. The type of policy held by the pairs with insurance ($n = 99$) was also examined. There was no difference in the number of people with a group plan (IDDM, 55%; control subjects, 53%). However, fewer IDDM subjects ($n = 64$) than control subjects reported that they had an individual plan (65 vs. 80%, respectively, $P = 0.025$). Information on the type of life insurance (term, whole life), the extent of coverage, and the cost of premiums for life insurance were not available for analysis.

Several IDDM subjects reported paying higher than normal premiums for life insurance because of their health. When asked, "Are you paying higher rates for your life insurance because of a health-related problem?" 24% responded affirmatively. Diabetes was mentioned by all as the relevant condition. The higher premiums were mostly confined to individual plans. Thirty-five percent of the IDDM subjects with an individual plan ($n = 28$) reported paying higher rates, whereas only 3% of the IDDM subjects with a group policy ($n = 1$) reported similarly.

Life insurance denial. The IDDM subjects were also in a disadvantaged position when applying for life insurance. Overall, 55% of the IDDM subjects had been denied life insurance, compared with none of the sibling control subjects ($P < 0.001$) (Fig. 2). Diabetes was the reason for refusal reported by 78% of the respondents. The presence of complications (4%) and high risk (15%) were the other major reasons for refusal reported. A similar pattern of refusal was also present among the nondisabled IDDM and control subjects (52 vs. 0%, respectively, $P < 0.001$) indicating that work disability was not a major factor in the denial differences. Again, because insurance denial was measured cumulatively, the influence of duration, insulin dosage being taken, and type of plan could not be directly assessed.

AUTOMOBILE INSURANCE

Prevalence. The presence of automobile insurance coverage was similar between the IDDM and sibling control

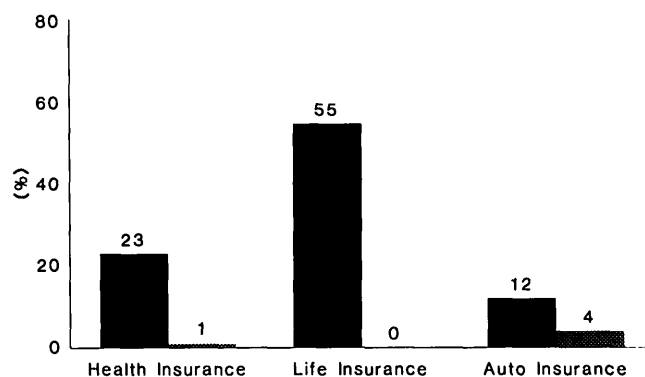


FIG. 2. Health, life, and automobile insurance denial among insulin-dependent diabetic (solid bars) subjects and nondiabetic sibling control subjects (hatched bars).

subjects who had a valid drivers license (89 vs. 92%, respectively, $n = 134$ pairs) (Fig. 1). Again, there was no difference in coverage between the two groups by age, sex, income ($\$0$ – $\$20,000$, $+\$20,000$), or disability status categories. Motor vehicle accident history (within the last year) was also not associated with the prevalence of coverage.

Traits of the uninsured motorists were subsequently examined. Eleven percent ($n = 16$) of all licensed IDDM respondents were uninsured. Age (young, $P = 0.02$), income (low, $P < 0.001$), marital status (not married, $P = 0.005$), and disability status (disabled, $P < 0.001$) were all associated with the absence of coverage. When evaluated multivariately with sex as an additional variable, only disability status remained as an independent factor. Those disabled in work activity were nearly six times more likely to be uninsured than those currently working (OR 5.97, 95% CI 1.66–21.5, $P = 0.006$). Among the control subjects, sex (male) and low income were independently associated with the absence of insurance.

Auto insurance denial. Diabetes was also related to automobile insurance refusal, with more IDDM than control subjects being denied a policy (12 vs. 4%, respectively, $P = 0.04$, $n = 138$ pairs) (Fig. 2). Reasons for refusal reported by the IDDM subjects were diabetes ($n = 12$), accident history ($n = 2$), and supplying incorrect information on an application ($n = 1$). Among the sibling control subjects, the reasons for refusal included accident history ($n = 3$), traffic violations ($n = 2$), and having a relative with diabetes ($n = 1$).

However, the role of diabetes in automobile insurance refusal did not appear to be as powerful as that for health and life insurance. Although higher, insurance denial among the nondisabled IDDM subjects was not significantly different from that of their matched siblings (10.2 vs. 4.5%, respectively, $P = 0.23$, $n = 88$ pairs), suggesting that work-limiting diabetes complications may have a large influence on the access to insurance. Motor vehicle accident history could also be a factor in the refusal patterns but was not included in the analysis.

because accidents and car insurance refusal were measured over different time frames.

CONCLUSIONS

The results show that the prevalence of health, life, and automobile insurance was similar between the IDDM subjects and their sibling control subjects. Factors characterizing those without insurance were also fairly similar among the IDDM and control subjects. However, major differences in the access to insurance were clearly apparent. Insurance applications, particularly health and life insurance, were denied more frequently among the IDDM subjects and appeared to be strongly related to the mere presence of diabetes. This would suggest that the access to insurance is severely compromised for the IDDM population and, subsequently, the individual with IDDM has to devote more time and energy to acquire insurance than would normally be expected.

The rates of health and automobile insurance refusal seen in this study were very close to the rates noted in two earlier studies (10,11). However, these studies did not focus entirely on an IDDM cohort and provided no data on the application history of the nondiabetic population. Life insurance refusal was nearly two times higher in this study.

No previous studies have specifically examined health insurance issues in the IDDM population as well. This study confirms the results of two studies on the overall diabetes population (8,9) in that 1) people with diabetes had a similar prevalence of health insurance coverage as those without diabetes, and 2) the use of government insurance was increased among the diabetic cohort. However, the use of private plans by the IDDM subjects in this study was much higher than that for the diabetic population in the earlier studies. Differences in the composition of the sample population in this study and those of the earlier studies may explain the discrepancy. The findings of Taylor (8) and Drury et al. (9) were based on the insurance patterns of IDDM and non-insulin-dependent diabetes mellitus respondents together. The sample in this study was also primarily white, young, and of a higher socioeconomic level than that found in the general population samples of the National Health Interview Survey and the National Medical Care Expenditure Survey.

The high rate of Medicare coverage among the IDDM respondents was the primary reason why government insurance sources were used more often by the IDDM subjects. Severe disability related to kidney disease and blindness appeared to be the factor(s) that enabled the IDDM subjects to fulfill the eligibility criteria for the Medicare program. We have shown previously that severe disability in work activity was much more common among the IDDM subjects than their sibling control subjects (18).

The most common source of health insurance coverage in this study and in the United States was through

group plans at places of employment (19). Group plans typically extend similar coverages and premiums to all employees irrespective of their health status. In this sense, group plans are the policies of choice for someone with diabetes. However, the access to individual plans for someone with IDDM remains undefined. Because insurance policies often have experience-rated premiums (i.e., premiums that are based on previous patterns of health-care use), it is likely that people with IDDM face more restrictions with individual plans (e.g., limited access, higher premiums, or limited coverage).

Previous studies on the life insurance experience of those with diabetes have been few. Life insurance in the past was not available to those with diabetes at any cost (20,21). Reviews (6,7,22) and another study (11) suggest that the large majority are able to obtain life insurance but that almost all people with IDDM have to pay higher rates for their individual life-insurance policies. The results from this study corroborate these views. More than 75% of the IDDM subjects had life insurance coverage. However, people with IDDM were less likely to have coverage through an individual policy than the nondiabetic control subjects. Of those who did have an individual policy, many reported paying higher premiums.

Recommendations for evaluating the life insurance application of an individual with diabetes have been proposed from the results of a 20-yr follow-up study of mortality in a cohort of insured and uninsured diabetic subjects (23,24). This study found that the type of diabetes, duration, control, insulin dosage being taken, and the presence of complications (and its precursors) were all associated with increased mortality. Moreover, the age at onset of diabetes, particularly juvenile-onset diabetes, was the strongest factor related to mortality. This prompted the conclusion, in part, that "the juvenile diabetic is a poor insurance risk and should be underwritten with caution, if at all" (24).

Not unexpectedly, the findings from our study suggest that the presence of juvenile-onset IDDM may be the only evaluative standard considered by insurers. However, recent reports suggest that considering an application on the basis of IDDM alone may be overly strict. Studies of well-defined IDDM populations (4,5) have noted distinct differences in mortality among those with diabetes, particularly with regard to the presence or absence of proteinuria (25) and smoking status (26). Data from the Framingham cohort also show that men with diabetes at high risk for cardiovascular events can be identified. Men free from hypertension, smoking, and hypercholesterolemia have a markedly lower risk than men with one or more of these factors (27,28). Thus, mortality risks differ substantially by subgroup within the IDDM population. As such, standards to evaluate the insurability of an individual with IDDM in the 1990s should be refined to include additional risk factors for mortality.

The role of diabetes in automobile insurance coverage did not appear to be as large as that seen for health and

life insurance. Although there was a significantly higher refusal rate among the IDDM subjects, this rate could be explained to some extent by the presence of severe health conditions. The question remains as to why diabetes should have any influence on automobile insurance at all.

Historically, much argument has centered around the role of medical factors in motor vehicle accidents. It is often thought that individuals with IDDM are at an increased risk for traffic accidents because of their increased risk for hypoglycemic reactions, visual impairment, and cardiovascular complications. However, studies evaluating the risk for accidents in the IDDM population are not common or conclusive (29). In this cohort, IDDM was not an important factor in motor vehicle accidents among men but was among women (30). With limited and relatively inconclusive data on the motor vehicle accident experience of the IDDM population, application denial based solely on diabetes is unwarranted and discriminatory.

Evidence clearly suggests that access to insurance is compromised among individuals with IDDM and that the current practice regarding IDDM by some insurers is outdated and discriminatory. However, rapid increases in health-care and litigation costs over the last decade have led the insurance industry to become more restrictive in the coverages and premiums of their policies. This would suggest that the insurance experience of the IDDM population will become even more difficult. It may soon be time to reexamine, as a society, the role of insurance for individuals with chronic disease, particularly IDDM.

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