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Non insulin dependant diabetes mellitus metabolic control in two different health care settings in Mexico.

Original Article

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SUMMARY.

Objective. The purpose of this study was to assess health care practices and metabolic control of type II diabetics in primary and secondary care settings, attended by family practitioners, or by internal medicine and endocrinology specialists in México.

Material and methods. A cross-sectional survey was performed in Tijuana, México, with data obtained from four primary care clinics and a secondary care clinic of the Instituto Mexicano del Seguro Social. Every clinical chart with a special diabetes form from August 18th through September 18th, 1995 was reviewed.

Results. The incidence of recording fasting blood glucose was higher among the internal medicine and endocrinology specialists, whereas the incidence of recording weight was found to be higher by the family practitioners ($p < 0.05$). Age and duration of diabetes were recorded more often by the internal medicine and endocrinology

specialists. The use of insulin treatment was also found higher among internal medicine and endocrinology specialists. There were no statistical differences found between groups for mean fasting blood glucose, total cholesterol, body mass index, nor for different cutoff points used for fasting blood glucose and body mass index. The internal medicine and endocrinology specialists had recorded hypercholesterolemia more often than the family practitioners ($p < 0.05$).

Discussion. It was shown that there are differences in recording measurements and clinical outcomes between the two groups. However, the findings were not adequate with recommended criteria, or with the advanced diabetes training of the internal medicine and endocrinology specialists. The results suggest that specific diabetes guidelines with surveillance systems should be developed, according to budget availability for local sites.

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Key words: Diabetes mellitus, metabolic control, Mexican population, US-MEXICO border health issues.

RESUMEN.

Control metabólico de la diabetes mellitus no dependiente de insulina en niveles de atención médica en México.

Objetivo. El propósito de este estudio fue valorar las prácticas de atención a la salud y el control metabólico de diabéticos tipo II en servicios de atención primaria y secundaria, atendidos por especialistas de medicina familiar, medicina interna y endocrinología.

Material y métodos. Se realizó un estudio transversal en Tijuana, México, con información obtenida de cuatro clínicas de atención primaria y una clínica de atención secundaria del Instituto Mexicano del Seguro Social (IMSS). Se revisó un expediente clínico alternativamente de todos los pacientes que tenían la tarjeta especial de diabetes, desde el mes de agosto a septiembre de 1995.

Resultados. Los resultados muestran que la incidencia de registro de la glucemia en ayunas fue mayor entre médicos internistas y endocrinólogos, que la observada en los expedientes atendidos por médicos familiares ($p < 0.05$). La edad y la duración de la diabetes la registraron con más frecuencia los especialistas de segundo nivel. El tratamiento de insulina fue utilizado con mayor frecuencia por los endocrinólogos. No se observaron diferencias estadísticamente significativas en la glucemia en ayunas, colesterol total, índice de masa corporal, ni por los diferentes puntos de corte utilizados para glicemia en ayunas o para índice de masa corporal. Los especialistas de segundo nivel registraron con mayor frecuencia los resultados de colesterol ($p < 0.05$).

Discusión. No se observaron diferencias significativas en el registro de medidas antropométricas o variables clínicas entre los dos

grupos. Sin embargo, los hallazgos sugieren que las prácticas de atención no cumplen con los criterios establecidos en el IMSS o con el entrenamiento de los especialistas de segundo nivel. Los resultados sugieren que sería benéfico desarrollar protocolos de tratamiento específico y sistemas de vigilancia de acuerdo al presupuesto y disponibilidad de recursos de cada clínica.

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Palabras clave: Diabetes mellitus, control metabólico.

INTRODUCTION.

The Diabetes Control and Complications Trial Research Group (DCCT-RG), demonstrated that in insulin-dependent diabetes mellitus (IDDM), intensive management focused on lowering blood glucose concentrations to normal ranges decreases the risk of development and progression of diabetic complications by 40-75% (1,2). Additionally, in non insulin dependent diabetes mellitus (NIDDM) patients, some studies have demonstrated the efficacy of diet, weight loss, the use of sulfonylurea, metformin, and insulin to reduce hyperglycemia to near normal levels (3-6). Better metabolic control is expected from internal medicine and endocrinology specialists, since these physicians have advanced training and laboratory tests and support staff available.

In Mexico, as a result of limited funds, centralization, lack of planning and surveillance systems, recommended guidelines and monitoring for treatment and biochemical tests, is difficult to achieve at the primary care level (7,8). These limitations are also likely to cause decreased metabolic control at secondary care settings.

The purpose of this study was to assess recording of some indicators of metabolic control and metabolic control of diabetic patients in an urban primary care setting attended at primary and secondary care settings.

METHODOLOGY.

A cross-sectional analysis was performed with data obtained from four Instituto Mexicano del Seguro Social (IMSS) outpatient clinics attended by 20 family practitioners, and an outpatient clinic attended by eight internal medicine and three endocrinology specialists. From August 18 to September 18, 1995 every other patient's clinical chart with a special diabetes form (SDF), from the family practitioner group was reviewed, and all subsequent patient visits by the internal medicine and endocrinology group were also reviewed. There were 1912 patient clinical charts from the family practitioner group and 139 from the internal medicine and endocrinology specialists group that had an SDF.

The following data was obtained from the clinical charts: gender, age, weight, height, clinical course, date of last clinical appointment, fasting blood glucose (FBG), total cholesterol (TC), glycosilated hemoglobin, blood pressure, hypertension types, and dietary prescriptions and body mass index (BMI). BMI was calculated as weight in kilograms divided by height in square meters (kg/m^2). Patients younger than 30 years old, treated with insulin since diagnosis, and/or with a body mass index lower than $25 \text{ kg}/\text{m}^2$ for women and $27 \text{ kg}/\text{m}^2$ for men were excluded. Any patient charts lacking height, weight, or age records were also excluded. Descriptive statistics were conducted for all selected variables. Categories were calculated according to FBG, TC, and BMI. Differences between means were obtained from a "t" test for independent samples. FBG, TC, and the BMI were selected at designated cutoff points to test association according to physician group. Chi-square tests were performed to assess differences. Endocrinologist and internal medicine specialists were grouped together when there was no difference in clinical and biochemical variables.

The city of Tijuana, (México) has a population of approximately 990,815 inhabitants (1995, census). The IMSS clinics cover approximately 420,100 individuals or 43% of the total population,

with 344,400 potential users having clinical records. The patients are attended by family practitioners in four clinical sites with 60 offices. On the average, twenty patients are seen by those physicians per six-hour shift. All physicians in the clinics have the responsibility of registering each patient diagnosed with diabetes mellitus on a SDF.

At the primary care, in the IMSS clinics there is no access to computers or nutritional counseling. Laboratory support is available for fasting blood glucose, albumin, creatinine, total cholesterol, triglyceride, common hematologic studies, and uri analysis, but glucose tolerance tests, glycosilated hemoglobin and lipoproteins are not available.

According to the IMSS guidelines, patients with diabetes are referred to an internal medicine physician in a secondary care clinic when they meet the following criteria: clinical course of more than 15 years, FBG higher than $250 \text{ mg}/\text{dL}$; have additional diseases such as hypertension, cardiopathy, stroke, tuberculosis, kidney failure, lack of response to oral hypoglycemic or long term diabetes complications. In addition, patients are supposed to be referred to the endocrinologist with the following criteria: all insulin dependent diabetes mellitus patients, non insulin dependent diabetics with insulin resistance, those allergic to insulin, or those patients with lack of response to oral hypoglycemic. On average, 10 patients are seen by a specialist during a 6-hour shift. At the secondary IMSS care level in Tijuana, there is no access to computers. There is a dietetic department with eight staff members (two of them dietitians-nutritionists) for hospitalized patients. However, only one dietitian-nutritionist provides nutritional counseling to patients at the outpatient clinic. On average, the dietitian sees seven patients in a daily 3-hour shift. At this level, laboratory support is the same as that available for primary care level physicians, and special orders may be requested from private laboratories for tests such as lipoproteins and glycohemoglobin.

RESULTS.

The family practitioners group had clinical charts containing a FBG recording totaled 94.1%, TC 66%, and weight 98.5%. Whereas for the internal medicine and endocrinology specialists group FBG recording totaled 99% ($p < 0.01$); total cholesterol in 76% ($p < 0.02$); weight in 93% ($p < 0.0001$) (table 1). Only 5% of the family practitioners had noted any type of dietary prescription, compared to 40% of the internal medicine and endocrinology specialists. None of the patients of the family practitioners had a dietary record nor received nutrition counseling. On the other hand, 33% of the internal medicine and endocrinology patients had a dietary record and 12% had received nutrition counseling.

Table 1
Frequencies of recorded clinical variables.

Clinical Variables	Primary Care (%)	Secondary Care (%)
Glucose	94	99 *
Cholesterol	66	76 *
Blood pressure	98	98
Glycosilated		
Haemoglobin	0	29
Weight	98	93 *
Age	91	100
Treatment	91	100
Triglyceride	0	68
Body Mass Index	0	0.7
Exercise	0	12

* $p < 0.05$

A total of 932 (51.3% were excluded) patients from the family practitioner group and 50 (64% excluded) patients from the internal medicine and endocrinology specialists group were evaluated for statistical differences. This high exclusion rate was due to insufficient data in the charts. Table 2 shows selected variables and type of health care setting. Statistical differences were determined for age, duration of diabetes, and type of treatment. No significant differences for

FBG, TC and BMI were found between the groups. Tables 3 (categories according to CT, FBG, and care setting) and Table 4 (BMI according to sex and care setting) show differences between both groups at selected cutoff points.

DISCUSSION.

Our results showed that even basic clinical variables, such as age, weight, glucose, cholesterol, blood pressure, were not well recorded in either group (table 1). These findings are consistent with previous studies reported in Mexico (7,8). Additionally, the care provided to NIDDM patients did not meet the recommended guidelines established by the American Diabetes Association (9). Unfortunately, Mexico has no national nor local diabetes guidelines for neither primary nor secondary care settings.

Statistical differences found for age, duration of diabetes, and treatment (table 2), did not meet IMSS referral criteria for internal medicine physicians and endocrinologists. Furthermore, the lack of statistical differences found in FBG, TC, and BMI, suggests that the IMSS referral system is not functioning well, nor has it been monitored. Patients seen by the internal medicine and endocrinology specialists are older, had diabetes for a longer period and are being treated more frequently with insulin. However, the differences reported still do not meet the referral criteria established by IMSS.

Treatment with insulin or insulin plus sulfonylurea agents in NIDDM was higher with the internal medicine and endocrinology specialists (33%), than shown in the family practitioner group (11.5%). These data are closer to those found at a major health management organization (HMO) in California (10). However, the Californian HMO patients included primary care and specialized physicians, small medical communities, and large academic medical schools. A higher percentage, of Mexican American NIDDM patients in the US

Metabolic control of diabetes mellitus type 2 .

Table 2
Clinical variables and type of health care setting.

Clinical Variable	Primary Care		Secondary Care		p				
	Mean	SD	N	(%)		Mean	SD	N	(%)
Age (years)	55.7	11.5			56.7	9.4			< 0.05
Duration (years)	9.0	5.6			10.8	7.2			< 0.05
Sex									
Male			243	(26)			13	(26)	
Female			689	(74)			37	(74)	NS
Insulin			97	(11)			16	(33)	
Oral Hypoglycemics			748	(89)		33	(67)		<0.0001
Diet Only			0	0					
Fasting Blood Glucose (mg/dL)	185	71.8			196	95.4			NS
Total Cholesterol (mg/dL)	220	55.7			240	48.7			NS
Body mass index (kg/m ²)	31.6	4.8			31.0	3.7			NS

population, treated with insulin and self performing blood glucose tests at least once a day (11) has been reported. This suggests that treatment with insulin might be due more to physician training and

resource availability than to cultural background.

Patients in our study were younger than patients reported from the Narpes Community in Western Finland (12). However, FBG and TC in

Table 3
Categories according to cholesterol, FBG, and care settings.

Cutoff Points	Primary Care N	Care (%)	Secondary Care N	Care (%)	p
Total cholesterol (mg/dL)					
< 200	237	(39)	2	(3)	<0.0001
200-249	263	(44)	6	(13)	
>249	101	(17)	42	(84)	
Total	601		50		
Fasting Blood Glucose (mg/dL)					
< 120	169	(19)	9	(18)	NS
120-139	118	(13)	5	(10)	
140-179	212	(24)	10	(20)	
180-249	229	(25)	18	(36)	
250-299	112	(12)	2	(4)	
>299	60	(7)	6	(12)	
Total	900		50		

Table 4
Body Mass Index according to sex and health care settings.

Body Mass Index (Kg/m ²)	Primary Care N	Secondary Care N	p
Men			
27-30	108	5	NS
> 30	135	3	
Women			
27-30	189	13	NS
> 30	391	24	
Total	823	45	

the family practitioner group (220 and 185 mg/dL), and the internal medicine and endocrinology specialists group (240 and 196 mg/dL) from México were much higher than the patients from Narpes, Finland (217 mg and 256 mg/dL). Narpes, is a rural area, and their patients received treatment at the primary health care center where authors reported more than 42% with good control (122-144 mg/dL), and 51% had acceptable control (12). Those results were observed in 42 percent of patients treated by diet alone, which might indicate that even at a rural primary care center involving adequate treatment good metabolic control could be obtained.

The patients in the present study were found to be older with a longer duration of diabetes reported than those from a diabetes clinic in Salmiya, in the urban area of Hawally Goverantore, Kuwait (13). However, the mean BMI between the Kuwait populations was similar with 31.8 Kg/m² and 28.5 kg/m² in women and men respectively. The Kuwait diabetes clinic (13) had more patients with diet alone prescribed (23.7%), while none of those seen at the IMSS Tijuana clinics had been prescribed diet as the sole treatment.

The use of insulin treatment in the Tijuana groups is much lower and TC levels are higher than those patients studied at the primary care level from 8 Michigan communities in 1981 and 1991 (14). The Michigan community study found that insulin treatment decreased from 52 to 39%. However,

patients had been involved in diabetes education, including glucose self-monitoring and diet instruction from dietitians (14).

It was expected that patients seen by internal medicine and endocrinology specialists in Tijuana would be more likely to meet the recommended quality criteria and achieve better metabolic control, but the findings did not show this to be true. Our results are consistent with those reported from the Medical Outcome Study of different systems and specialists in three states of the USA (15-17). In that study, the authors suggested that there was no evidence to show adverse quality of care for moderately ill patients with diabetes when treated by general practitioners. The only statistically significant clinical sign and laboratory measurement found was seen in the frequency of foot ulcers, which improved among the patients of endocrinologists (15-17). Another cross-sectional study based on Medicare claims from primary care practices in the USA describes that general practitioners are less likely to meet recommended guideline criteria than internists (18).

In our study, the patients registered with glycosilated hemoglobin and diet counseling were more prevalent in the EIMS group. This could be attributed to the availability of glycohemoglobin tests and having a dietitian available. However, by recommended standards (ADA, 1993), glycosilated hemoglobin was under registered in 71% of the patients, and the availability of the dietitian was

insufficient.

Our results suggest that there are gaps in meeting the diabetes treatment practice guidelines in México. Additionally, the lack of nutritional counseling and diabetes education should be examined to promote improved treatment. The results also suggest the need of developing basic clinical diabetes guidelines according to the budget of each individual institution and community, including internal and external monitoring and evaluation. Finally, diabetes guidelines at the primary care level in developing countries such as Mexico should include hiring a specialist in nutrition counseling and diabetes education since these measures have proven to be cost-effective (19).

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Metabolic control of diabetes mellitus type 2 .

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A Jiménez-Cruz, M Bacardí-Gascon, A Peña-Valdovinos, R Leyva-Pacheco.

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