

Social support, family functionality and glycemic control of diabetic patients type 2

Apoio social, funcionalidade familiar e controle glicêmico de pacientes diabéticos tipo 2

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ABSTRACT: *Objectives:* To evaluate the perception of social support and family functionality by patients with type 2 diabetes mellitus (DM2) treated at the endocrinology clinic of a university hospital, as well as to verify associations with glycemic control and clinical-demographic variables. *Methods:* Observational and transversal study, with structured interviews with patients with DM2 in outpatient treatment. Social support was assessed through the Medical Outcome Study (MOS) scale and family functionality by the Smilkstein Family Apgar. *Results:* A total of 160 patients with a mean age of 55.7 ± 11 years, 76% women and 54.4% of the C class were evaluated. The perception of social support was positive, especially in the affective dimension, but in men and material dimension was higher than in women ($p=0.02$). There was a difference in this perception among patients with hyperglycemia and normoglycemia only in the information dimension ($p=0.04$). Family function was related to age ($p=0.03$) and sex ($p=0.02$). There was no correlation between social support and family functionality with the variables time of diagnosis, type of treatment, body mass index, duration of follow-up, intervals between returns and economy class. *Conclusions:* The perception of social support and family functionality was positive, especially among men and the elderly, but was related to glycemia only in the information dimension. It is important to consider sex, age, family and information provision to offer Type 2 diabetic patients an approach that allows them to better cope with the disease.

Keywords: Diabetes mellitus; Social support; Family relations.

RESUMO: *Objetivos:* Avaliar a percepção de apoio social e funcionalidade familiar por pacientes com diabetes mellitus tipo 2 (DM2) atendidos no ambulatório de endocrinologia de um hospital universitário, assim como verificar associações com controle glicêmico e variáveis clínico-demográficas. *Métodos:* Estudo observacional e transversal, com entrevistas estruturadas com pacientes com DM2 em tratamento ambulatorial. O apoio social foi avaliado através da escala do *Medical Outcome Study* (MOS) e a funcionalidade familiar pelo Apgar de Família de Smilkstein. *Resultados:* Avaliaram-se 160 pacientes com média de idade de $55,7 \pm 11$ anos, 76% mulheres e 54,4% da classe C. A percepção de apoio social foi positiva, sobretudo na dimensão afetiva, porém nos homens e idosos a dimensão material foi maior que nas mulheres ($p=0,02$). Houve diferença nesta percepção entre os pacientes com hiperglicemia e normoglicemia apenas na dimensão de informação ($p=0,04$). Funcionalidade familiar relacionou-se com idade ($p=0,037$) e sexo ($p=0,02$). Não se observou correlação entre apoio social e funcionalidade familiar com as variáveis tempo de diagnóstico, tipo de tratamento, índice de massa corporal, duração do acompanhamento, intervalos entre os retornos e classe econômica. *Conclusões:* A percepção de apoio social e funcionalidade familiar foi positiva, sobretudo entre os homens e os idosos, mas relacionou-se com glicemia apenas na dimensão de informação. É importante levar em conta sexo, idade, família e provimento de informação para oferecer aos pacientes diabéticos tipo 2 uma abordagem que lhes permita obter melhor enfrentamento da doença.

Descritores: Diabetes mellitus; Apoio social; Relações familiares.

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INTRODUCTION

One of the factors enhancing self-care in type 2 diabetic patients is perceived social support, especially among Family, friends and health care providers¹. Family and friends offer important social support to diabetic patients, with a positive influence both in their ability to begin and to maintain the disease control cares².

Social support concerns the resources available to an individual from other people, measured by one's perception of the degree on which interpersonal relations present support functions^{3,4}. From the operational point of view, social support encompasses emotional (affection displays), material (financial aid) and informational (counselling and guidance for dealing with problems) dimensions and positive social interactions⁵. In this context, family arises as one of the most important institutions concerning the wellbeing of these individuals, often being the only support alternative for the economically underprivileged population. Familiar functionality is described in terms of adjustment, companionship, affection and the family's resolution capacity with its members.⁶ However, there's a paucity of studies in Brazil articulating familial and social support variables with the metabolic control in diabetic patients.

The objectives of this research were evaluating the perception of social support and familial functionality by type 2 diabetes mellitus patients (DM2) attended to in the Lauro Wanderley University Hospital's (HULW) Endocrinology clinic (HULW), as well as verifying associations between perceived support with age, sex, blood sugar, body mass index, diagnosis duration and treatment, glycemic control, treatment type, time lapses in clinic returns and economic class.

METHODS

The model of this study was observational and transversal, with a quantitative approach. The sample was selected by nonprobability convenience sampling, with consecutive recruitment of patients attended to in the Endocrinology Clinic of HULW in the period between September 2014 and June 2015. The sample size was estimated in 160 patients, based on a previous study⁷. Patients presenting communication disorders, those who did not perform capillary blood glucose determination in the day of data collection, and those who did not have such information available recently were excluded.

The data collection was performed by three earlier trained Medicine students. Structured interviews were performed through instruments standardized and validated in Brazil and by completing a clinical-demographic form made by the authors. The interviews were performed before the appointments, in the outpatient waiting room, unaccompanied.

The primary variables were social support perception, evaluated through the Social Support Scale from the *Medical Outcome Study* (MOS) and familial functionality through the Smilkstein Family Apgar. Secondary variables were sex, age, civil status, origin, economic class, body mass index, capillary blood glucose, venous blood glucose, glycosylated hemoglobin, treatment type, diagnosis time, duration of care in the outpatient clinic and time lapse between returns.

The MOS Scale estimates five social support dimensions: (practical resources provision and material aid); affective (displays of love and affection); Positive social interaction (having people to relax and have fun with); emotional (social network ability to meet individual needs in relation to emotional problems); information (having people who advise, inform and guide the patient). MOS is scored as a Likert scale, a psychometric evaluation mode with ordinal categories: each response is assigned a score ranging from 1 to 5, with five response options for each item. In the case of the MOS Scale, the items are: 1-never; 2-rarely; 3-fold; 4-always and 5-always.⁴ The items do not specify the source of support (e.g., family, friends, community, or others), and they measure the perceived availability of functional support. The scores are obtained by summing the points assigned to the questions in each dimension, but there is no overall score. The higher the score, the higher the perceived level of social support: the score of value five indicates high perception of support, and the score of value one, no perceived support. The percentage of responses was estimated in relation to the maximum possible score of each dimension (material-20; affective-15; emotional-15; information-20; positive social interaction-4).

The Family Apgar was developed by Smilkstein, with translation and validation performed in Brazil^{8,9}. This instrument allows the identification of the family, from the perspective of its members, as a source of social support. The acronym Apgar comes from the words Adaptation, Partnership, Growth, Affection and Resolve.

The Economic Classification Criterion was applied to stratify the sample, considering possession of household goods and utensils, family income and schooling of the head of the family.¹⁰ According to this criterion, stratification is made in seven classes (A1, A2, B1, B2, C1, C2, D and E), with A1 being the classification of greater purchasing power, and E the classification of lesser power. For the analysis of this study, the classes were designated as A, B, C, D and E, adding the subgroups.

The reading of the items of these scales was adopted aloud for all interviewees, respecting the time needed for each participant to answer, while the researchers filled out the questionnaire, applied in the form of a form, to get around problems of low schooling.

The type of treatment in use at the time of evaluation was classified in one of four categories: (1) diet; (2) diet +

oral antidiabetic; (3) diet + insulin therapy; and (4) diet + oral antidiabetic + insulin therapy.

Weight and height measurements were made, and the body mass index (BMI) was calculated. Overweight and obesity were defined using current World Health Organization definitions: BMI values from 25.0 kg/m² to 29.9 kg/m² correspond to overweight and BMI values \geq 30.0 kg/m² to obesity.¹¹

Capillary glycemia (glucose) was checked immediately before the consultation in the outpatient and fasting clinics. The fasting capillary glucose level equal to or less than 200 mg/dL was considered adequate according to the American Diabetes Association guidelines. The last glycosylated hemoglobin (last three months) and fasting venous glycemia determined in the last week from the medical records were also recorded.

In the descriptive statistics, the relative and absolute frequencies of qualitative variables and means and standard deviations of quantitative variables were determined. In inferential statistics, Mann-Whitney and Kruskal-Wallis tests were used to correlate dichotomous and ordinal variables to quantitative variables, respectively. The chi-square test was used for the analysis of nominal variables. Spearman's linear correlation index was determined to evaluate the association between the scale dimension scores with ordinal and interval variables. The data were analyzed using the SPSS (Statistical Package for Social Sciences) software version 20.0 for Windows.

This research project was approved by the HULW Ethics Committee on Research involving Human Beings (CEP) under the opinion number 182.953 CEP/Plataforma Brasil.

RESULTS

The sample included 160 patients, mean age 55.7 (\pm 11) years, 76% female, 61.3% married, the highest percentage of patients being from class C (Table 1).

It was observed that 55.6% of the patients had normal determination of capillary glucose. The average was 208.1 (\pm 95.8 mg/dL), with a minimum value of 67

mg/dL and maximum of 500 mg/dL. In 62% of the medical records there were no recent measures of glycosylated hemoglobin, and of the 38% that had this dosage, the value of the measure varied between 4.7% and 17.6%. As for venous glycemia, 60% had this test in their medical records, and 59% of them had concentrations less than or equal to 126 mg/dL.

The descriptive statistics of the dimensions of the Social Support Scale (MOS) with percentage of perception of this social support showed a positive opinion, over 80% in the five dimensions of the scale (Table 2). The perceived affective support presented higher average values than the other dimensions, while the material support and positive social interaction had the lowest values.

Table 1- Demographic characteristics, economic class and clinical variables of type 2 diabetic patients seen outpatients at the Endocrinology Service of the Lauro Wanderley University Hospital (n=160)

Variables	Statistics
Sex (% female)	76
Civil status (% married)	61,3
Origin (% Capital)	70%
Age (years, M \pm DP)	55,7 (11)
Economic Class (%)	
A	1,3
B	23,8
C	54,4
D	19,4
E	1,3
Treatment (%)	
Diet+AO	58,1
Diet+Insuline	18,1
Diet+AO+Insuline	16,8
Diet	6,9
Treatment duration (years, M \pm DP)	6,0 (5,9)
Duration of follow-up (years, M \pm DP)	4,8 (1,8)
Return intervals (months, M \pm DP)	2,7 (0,4)
Capillary glucose (mg/dL, M \pm DP)	208,1 (95,8)

M: Averages; DP: standard deviation; AO: Oral Antidiabetic

Table 2 - Descriptive statistics of the dimensions of the Social Support Scale (MOS) of outpatient diabetic patients of the HULW/UFPA (n=160)

Social Support Scale – MOS	Average	DP	Minimum	Maximum	Support perception (%)
Material MOS	17,2	4,1	4	20	83,3
Affective MOS	13,4	2,8	3	15	87,3
Emotional MOS	16,6	4,1	4	20	82,8
Information MOS	16,5	4,4	2	20	82,4
Positive social interaction MOS	16,1	4,9	4	20	80,7

DP: standard deviation; MOS: *Medical Outcomes Study*

Analyzing the mean scores of the five dimensions of the Social Support Scale (MOS) according to sex, it was found that the scores were higher in men, but only in the material support dimension this difference reached statistical significance ($p=0.02$) (Figure 1).

Comparison of the mean and median scores for the dimensions of MOS did not show statistically significant differences among the economic classes regarding the responses of patients to the items of the subscales of material, affective, emotional, information, and positive

social interaction support (Table 3). However, the less favored stratum (class E) presented the lowest mean values of support in all dimensions of MOS (Medical Outcomes Study).

There was also no correlation observed between the scores of the five dimensions of the Social Support Scale and the variables diagnosis time, type of treatment, body mass index, duration of follow-up in the HULW and intervals between returns to the endocrinology outpatient clinic.

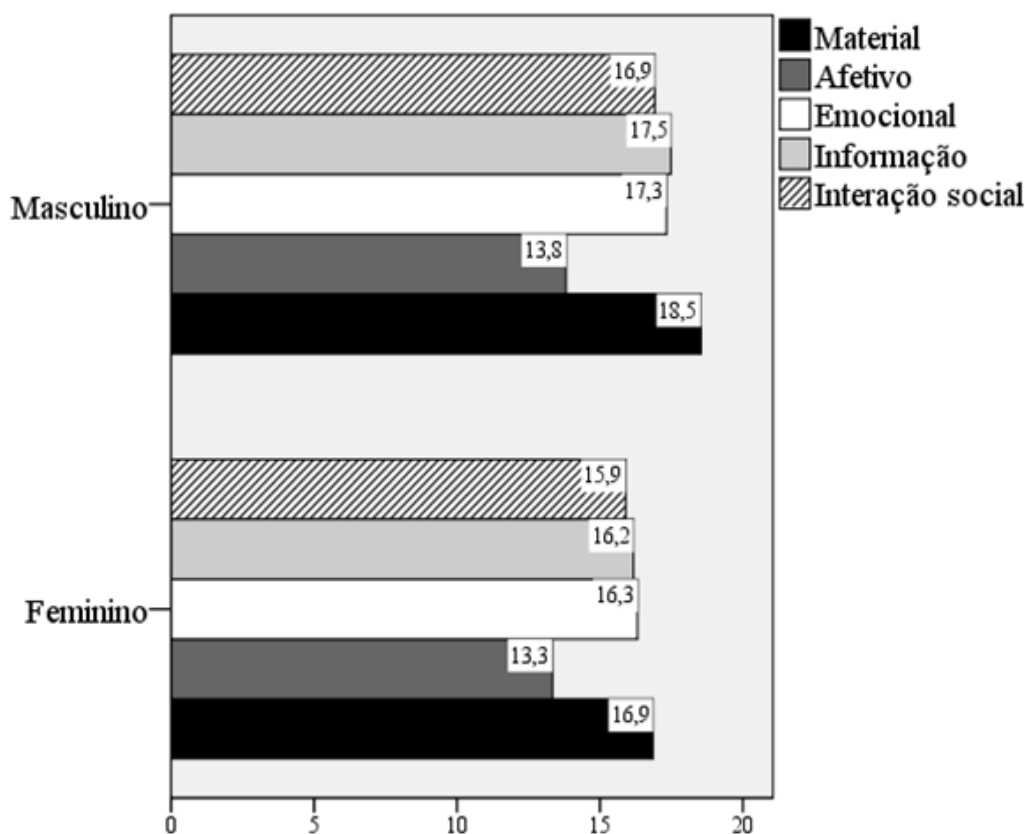


Figure 1 - Mean scores of the five dimensions of the Social Support Scale (MOS) according to the sex of diabetic outpatients of the HULW/UFPB (n=160)

Table 3- Descriptive and inferential statistics of the dimensions of the Social Support Scale (MOS) in outpatient diabetic patients of the HULW/UFPB (n=160) as a function of economic class

Economic Class	Social Support Scale Dimensions– MOS				
	Material $p=0,50$	Affective $p=0,54$	Emotional $p=0,08$	Information $p=0,72$	Interaction $p=0,55$
A	18,0±2,8	13,0±2,8	12,0±11,3	16,0±5,6	20,0±0,0
B	17,9±4,1	14,1±1,6	17,0±3,1	16,9±3,7	16,6±4,2
C	17,0±4,2	13,5±3,0	16,7±4,1	16,4±4,7	15,9±5,4
D	17,3±3,6	12,9±2,8	16,2±4,6	16,5±4,2	16,1±4,7
E	13,0±7,0	8,5±4,9	10,0±2,8	12,5±0,7	12,0±0,0

p : level of statistical significance; MOS: Medical Outcomes Study

There was no statistically significant correlation between age groups, the sample being subdivided into two subgroups (≥ 60 years and < 60 years) in relation to the MOS dimension scores, as well as between these and marital status. However, there was a high magnitude bivariate positive linear relationship between age and material dimension ($p=0.01$; $\rho=0.70$). Among patients 60 years old or older ($n=57/35.6\%$), median values were significantly higher in the material dimension ($p=0.02$), while those under 60 years old had slightly higher median values in the emotional dimension ($p=0.01$). For the emotional dimensions, information and positive social interaction, the correlation with age was negative and of small magnitude ($\rho=-0.30$).

There was good internal consistency in the application of the social support scale to the sample. The linear correlation between the items and the scores of their

respective dimensions was high, positive and statistically significant ($p=0.0001$). In the material dimension, the item-dimension correlation of the scale varied from 0.78 to 0.85, in the affective dimension the variation was from 0.75 to 0.77 among the items; in the emotional dimension it varied from 0.71 to 0.80, while in the information and positive social interaction dimension it varied from 0.69 to 0.8 and from 0.75 to 0.89, respectively.

In the present study, there was no statistically significant difference in MOS subscale scores between patients as a function of the sample division by the 200 mg/dL capillary glucose cutoff point at the time of consultation ($p=NS$), except for the MOS information dimension ($p=0.04$), in which higher levels were observed in patients with capillary glucose below 200 mg/dL, as shown in Figure 2.

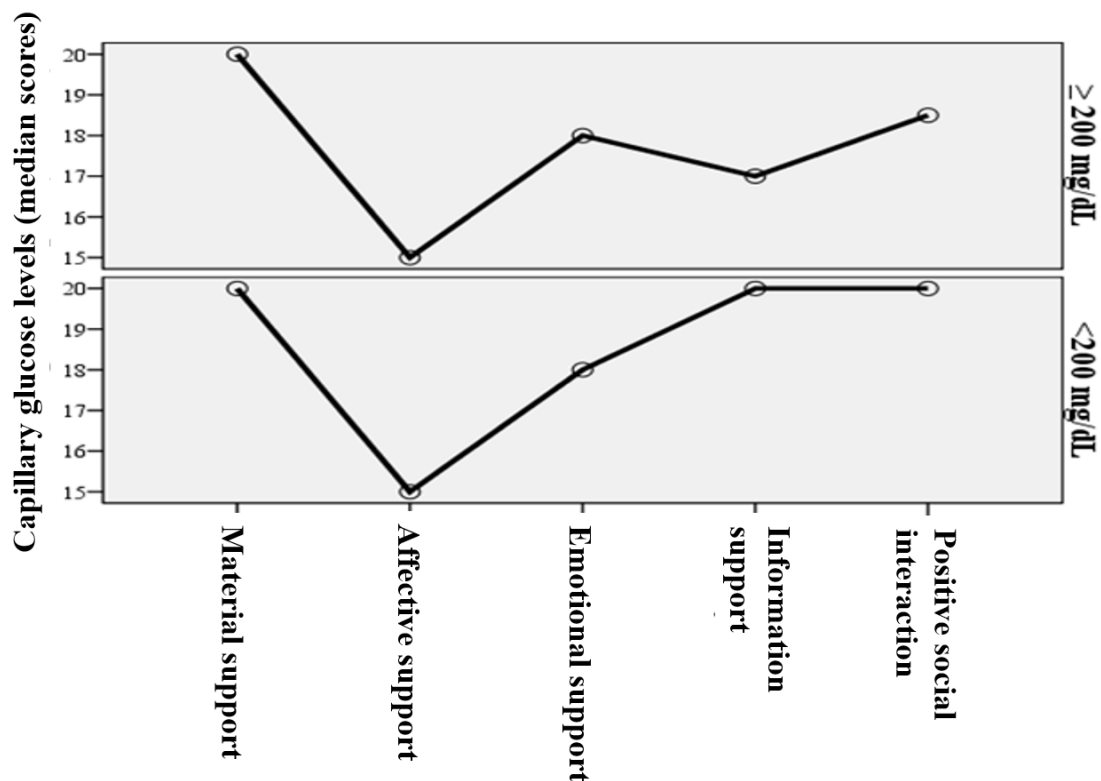


Figure 2- Median values of the five dimensions of the Social Support Scale (MOS) according to the presence or not of capillary hyperglycemia in ambulatory diabetic patients of HULW/UFPB ($n=160$)

Family functionality was also reported as good by 122 (76.3%) of the patients, with moderate dysfunction for 17 (10.6%) and high for 21 (13.1%). There was no correlation between family functionality (Family Apgar) and the variables glycemia, body mass index, time of diagnosis, duration of follow-up in HULW, intervals between returns and economic class. However, family functionality differed according to age ($p=0.03$) and gender ($p=0.02$), noting that patients who reported good

functionality were older than those with dysfunction (57 years vs 51.3 years) and men reported more often good functionality than women.

There were statistically significant differences in the five dimensions of the social support scale (MOS) scores in relation to family functionality classes ($p=0.0001$). It was found that the better the family functionality, the higher the scores of the five dimensions of social support assessed (Figure 3).

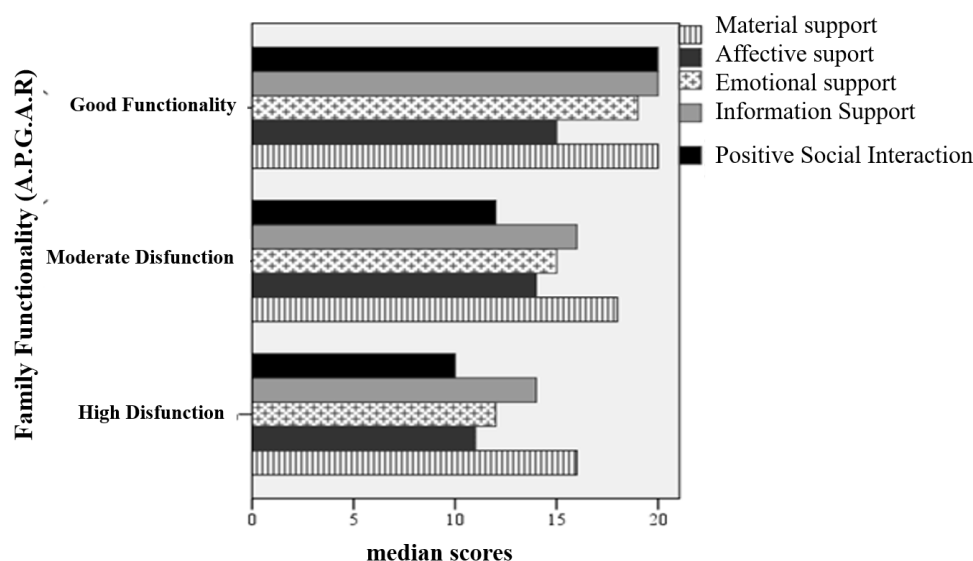


Figure 3 - Median scores of the five dimensions of the Medical Outcomes Study (Social Support Scale) according to the family functionality evaluated through Smilkstein's Family Apgar of diabetic patients seen at Lauro Wanderley University Hospital (n=160)

DISCUSSION

Demographic characteristics, economic classification and clinical profile of the sample studied were similar to those of other studies involving type 2 diabetics attended outpatients in Brazil^{7,13,14}. Because it is a convenience sample, the predominance of women may suggest a trend of greater concern of women with their own health and their greater search for medical care¹⁵. However, in the clinical profile of the present sample, unlike the aforementioned studies, the number of type 2 diabetic patients who were receiving insulin therapy was lower than expected, considering that they were tertiary level users in the health network¹⁶. Such lack of control, when patients are already in the specialized outpatient clinic of the university hospital, could be attributed to a precarious functioning of the health care network in several points of different technological densities, as well as to the poor adherence of patients to follow-up and the complexity inherent to the adequate control of diabetics¹⁷.

The age distribution of the patients in the study sample was compatible with Brazilian research data involving 30 diabetics accompanied in an endocrinology outpatient clinic of a university hospital in São Paulo, Brazil¹⁸. However, in this last study, the diagnostic time was longer than that found in our sample, although more than 60% of the sample presented plasma fasting hyperglycemia. White et al. also reported predominance of diabetic patients with poor metabolic control (65.4%)¹⁹. However, it was not possible to evaluate the metabolic control by means

of glycosylated hemoglobin of the patients in our sample.

The results of this study show that the social support and family functionality perceived by patients was positive in most cases, with the perception of the presence of support exceeding 80% of the score in the five dimensions evaluated by MOS. Similar to what was observed in our study, high perception of social support was found in type 2 diabetics treated as outpatients in a university hospital in São Paulo, Brazil²⁰. Affective support was reported by the patients as the most perceived than that of the other dimensions, while material support and positive social interaction were the least, which is compatible with the economic classification of the sample.

Regarding family functionality, our data corroborates a previous study in which most (80.5%) of the patients seen in a health center in the south-central of Chile had adequate family functionality according to the Smilkstein Family Apgar, while 19.5% registered moderate or high dysfunction²¹. However, unlike these and our results, a high family dysfunctionality was observed in type 2 diabetics treated as outpatients in Mexico and India^{22,23}.

The literature reinforces that the presence of a family member with a chronic disease needing care, even if not dependent, causes discomfort to the patient himself, believing he imposes physical and emotional burdens on the relatives^{24,25}. This problem experienced by the person with a chronic illness could lead to social isolation and reduced expectations of recovery.²⁶ Studies on the relationship between social support and glycemic control have discrepant results. In a European study, social

support was associated with glycosylated hemoglobin levels, but in an unforeseen way: that is, the greater the lack of glycemic control of patients, the greater was the social support perceived.²⁷ In another study, carried out in Jordan, no association was found between glycemic control and social support in a sample of 533 Type 2 diabetics treated at a university hospital²⁸. Similar result to what was done in China, involving 222 type 2 diabetics assisted in primary care²⁹.

On the other hand, the results of Silva et al.³⁰, in Portugal, suggest that the perception of social support played an important role in glycemic control in 316 diabetic individuals. In other studies, the presence of good social and family support was significantly associated with health promotion and well-being behaviors among patients with DM2^{31,32}. Gao et al.²⁹ found that better doctor-patient communication, including the dimension of information to the patient by doctors, who would act as the main source of social support for the participants, was associated with greater self-care behaviors in 222 patients with DM2, and these behaviors were directly related to lower levels of glycosylated hemoglobin. In our study, however, the dimension of doctor-patient communication was not specifically evaluated. The analysis of the social support dimensions of MOS was done in the groups with capillary glucose above and below 200 mg/dL and not by metabolic control through glycosylated hemoglobin, which would offer the best parameter to evaluate if diabetes was controlled or not in the last months. Only in the dimension of information, the scores differed between the two groups, suggesting that those who had glucose (capillary glucose) above 200, the support of information was less than those who had below this cut point. In this sense, family support instructions based on the educational needs of their members could improve adherence to treatment of patients as demonstrated by previous studies³⁴⁻³⁶.

As was evident in the comparative works, although social support is supposed to be an important variable in the control of chronic diseases in general, its association with glycemic control is still controversial. A systematic review of the literature of experimental model studies on this relationship reinforces the hypothesis that specific interventions to improve social support positively affect the self-care of the diabetic patient, but this study did not cover the glycemic control variable.³⁶ In a study of 89 African-American adults with DM2, it was found that patient satisfaction with the social support received was a predictor of the glycemia monitoring performance.³¹ These results may represent a discrepancy of a methodological nature, because in most studies the social support was evaluated through the self-reporting of the patients, i.e., the result of the evaluation is due to the perception of the individuals, and this may not necessarily correspond to the social support effectively received. On the other hand,

several factors besides social support affect the willingness of patients to adhere to treatment, such as self-efficacy, expectations regarding treatment and health beliefs^{32,33}. Although the exact mechanism by which social support affects patient compliance is not yet fully understood, it is supposed to provide patients with practical help and can ease the stresses of living with the disease. Further research is needed to assess how differences in types of support, such as emotional, material and informational support, influence patients' metabolic control by evaluating "empowerment" strategies provided by health education for self-care and self-control³⁷.

The negative correlation found in our study between social support and age in the emotional dimensions, information and positive social interaction may result from the fact that older people have a higher risk of isolation and social exclusion^{38,39}. On the other hand, sex seems to be an important variable on supportive social interactions³⁸. This premise is compatible with what was found in the present study, in which men scored higher in the material dimension of social support and also in the perception of family functionality. This difference observed between men and women in the various social support measures were compatible with results of previous studies^{21,40-42}. The different perception of social support and family function according to sex can be explained by the different experiences of socialization and social roles historically related to gender issues. Women tend to perceive less social support than men, in part because they are more often the providers of support for domestic chores and responsibility for primary care of children and fathers in old age, which can entail higher psychological costs, while men are culturally seen as material providers^{17,39}.

In a study on the role of family support for type 2 diabetics (69% women), it was shown that the advancement of the age of the diabetic patient was significantly associated with greater supportive behaviors by family members, such as attitudes of control related to diabetes⁴³. This result is corroborated by the findings of our study regarding the material dimension of social support, but they are not in line with the perception observed regarding social support in the affective, information and positive social interaction perception.

The potential limitations of this study include the usual difficulties of interpretation of data collected for clinical purposes in tertiary care. The population with type 2 diabetes in this study was a selected population, thus not reflecting what occurs in most individuals with DM2 in the community, as it possibly includes patients with multiple problems, difficult glycemic control, and those who are referred from primary health care for insulin treatment. Another limitation of this study was the lack of availability of glycosylated hemoglobin dosages in the entire sample to evaluate the glycemic control of patients.

Despite the possible limitations related to the use of structured data collection tools, subject to the distortions and biases of the respondents, it was found that the scales used offered relevant data consistent with those found in the literature in the area. The MOS scale of social support presented satisfactory internal consistency, compatible with that of the study of building validation of this research instrument in Brazil.⁸ The positive association between Apgar Family scores and the five dimensions of social support also indicates the satisfactory consistency of the primary variables social support and family functionality, which are theoretically related constructs^{25,45,46}.

The need for longitudinal studies to unveil how the perception of social support is related to glycemic control is stressed. Research with intervention design is necessary to investigate the relationship between social support networks and health promoting behaviors in diabetics. This knowledge can be used in clinical practice to design

education, support, and care programs for DM2 patients in the public health service.

CONCLUSION

It is concluded that the diabetic patients evaluated in this study positively perceived all the dimensions of social support received, as well as family functionality. This perception was more positive among men and the elderly in the material domain, but it related to capillary blood glucose only in the information dimension of social support. There was no association of this with marital status, body mass index, time of diagnosis, type of treatment, time of follow-up in HULW, interval of returns to the outpatient and economic class. It is important to take into account gender, age, family and provision of information to offer type 2 diabetic patients an approach that allows them to better cope with the disease.

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Author's participation: *Rilva Lopes de Sousa Muñoz*: Prepared the project, guided and coordinated the work, analyzed the results, wrote and revised the final version of the manuscript. *Aline Dantas de Sá*: Conducted data collection, analyzed the results, wrote the article and approved the final version submitted.

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