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Family Support for the Patient with Type 2 Diabetes Mellitus

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Abstract:- Type II diabetes mellitus is a disease of the endocrine system that is characterized by alterations in glucose levels in the blood; it is related to risk factors, such as high blood pressure, obesity, family history, smoking and sedentary lifestyle; whereas, once you have the disease, complications such as nephropathies, neuropathies and retinopathies can develop. That is why the diabetic patient requires permanent care, especially in glycemic control, and family support is necessary to avoid complications. In the San Pedro health center of the Cuenca canton, the diabetic population of the sector is cared for, where different community interventions are also carried out by the nursing staff; however, the real scope of family support in diabetic patients is not known. Objective: To determine the level of family support in the care of patients with type 2 diabetes mellitus at the San Pedro health center, Cuenca. Methodology: Observational, analytical, cross-sectional study. The "Instrument to evaluate family support for diabetic DM2 patients" was applied, developed by Valadez Figueroa et al. and whose reliability is 0.93. The sample consisted of 60 diabetic patients who met the inclusion and exclusion criteria. Results: 72.7% of the family caregivers of patients with DM2 are female, 62.1% live in urban areas, 37.9% have primary school and another 37.9% secondary, 50.0% are children and daughters of the patients and 92.4% live with the patient. Of the patients with DM2, 50.0% are 65 years or older, and 65.2% are female; 63.6% have medium level family support and 83.3% have a high level of depression. Conclusion: The average level of family support is the most frequent, while there is a high prevalence of state depression in diabetic patients. There is no statistically significant association between family support and state depression in patients with DM2.

Keywords:- *Diabetes Mellitus, Family, Care.*

I. INTRODUCTION

Currently, type 2 diabetes mellitus is one of the most prevalent chronic diseases, especially in patients aged 40 years or older; this involves a series of changes in habits and lifestyle, which are related to self-care, nutrition and family support. Type 2 diabetes mellitus (DM2) is defined as a metabolic disorder of multiple etiology characterized by chronic hyperglycemia with alterations in carbohydrate, fat and protein metabolism as a result of defects in insulin secretion, insulin action or both (1). Diabetes is one of the most common public health problems in developed and developing countries; the prevalence of DM2 is increasing, alarming and threatening the population worldwide (2).

Worldwide, the number of patients affected by DM2 has experienced a steady increase in terms of incidence and prevalence (3). According to LeRoith et al. (4) the prevalence of DM2 can reach up to 33% in older adults in some regions. This indicates that DM2 represents a growing public health problem, which can also lead to disability and high costs in the care of the disease.

Patients with DM2 need the support of their families to perform self-care to prevent complications; however, not all families have effective support. For this, it is necessary the articulation of institutional, family and personal efforts, where the nursing staff intervenes through training in the communities, either from the health center or directly in the different communities.

According to Figueredo Borda et al. (5), the theory developed by Dorothea Orem provides the foundations for the nursing staff's actions, particularly in the phase of disease prevention and health promotion, as well as the importance of care and self-care, emphasizing the influence of professional nurses trained to improve people's conditions and quality of life.

The San Pedro de Cuenca health center provides different types of primary care services to the community of the San Pedro parish; it also serves the population suffering from type II diabetes mellitus, however, the scope of family social support on the diabetic patient is not known.

Type 2 Diabetes Mellitus (DM2) is a chronic non-communicable disease that mainly affects the endocrine system; it is characterized by the presence of high levels of glucose in the blood, due to the relative impairment of insulin production and secretion (6). Diabetes mellitus is a chronic disease that causes people to suffer from it throughout their lives (7).

According to Ahmed and Yeasmeen(8), the management of diabetes is complex and challenging due to the chronicity and complexity of the disease process. Four categories of factors have been identified in diabetes management: patient characteristics, stress, provider-patient relationship, and social support; the last being the least studied. In adults, diabetes self-care can improve glycemic control and prevent the development of related complications, hospitalization and mortality. Social support is required to change health behavior with respect to diabetes self-care. On the other hand, according to Luthfa and Ardian (7), family empowerment is a strategic family-based intervention that can improve family support for these patients.

The research work will allow an approximation to the knowledge about the level of family support provided to the diabetic patient in the local area of influence of the San Pedro de Cuenca health center; in addition, the study is novel, since there are no previous references of other studies for the locality.

The study is framed under the lines of research related to diseases of the endocrine system and coverage of support systems of the "Priorities of research in health, 2013-2017" of the Ministry of Public Health (9), in force at the time of this study.

The main beneficiaries of the research will be the population of diabetic patients and their families, by having the possibility of consulting the findings and improving their support relationships. Also, the scientific-academic community and society in general will benefit by obtaining updated results on diabetic patient support.

In this order of ideas, the following research questions are posed:
- What is the level of family support of the patient with Diabetes Mellitus Type 2 of the San Pedro Health Center, Cuenca?
- What is the relationship between the level of family support received by the diabetic patient and the sociodemographic variables?
- What is the relationship between the level of family support received by the diabetic patient and the level of state-trait depression according to the Inventory of State-trait Depression (IDER)?

State of the art

Definition and prevalence of Diabetes Mellitus type II

Diabetes is a disease defined as that caused when the level of hyperglycemia increases the risk of micro vascular damage, macro vascular complications and decreases the quality of life (3).

Diabetes Mellitus type II (DM2) is a chronic, non-communicable metabolic disease of multifactorial etiology, which is caused by defects in the secretion or action of insulin in the blood; it is estimated that between 90% and 95% of patients affected by this condition present DM2; it manifests itself in adults, although cases have been reported in children and adolescents (10).

Globally, the number of patients affected by diaDM2 has experienced a sustained increase in terms of incidence and prevalence, while the frequency in the elderly population is increasing due to prolonged human life; thus, the elderly population is more at risk of developing hypoglycemia than the adult population, which is due to the high prevalence of comorbidities, polypharmacy, cognitive impairment and the use of agents that interfere with glucose metabolism (3).

According to Altamirano Cordero et al. (11), the prevalence of DM2 has increased dramatically over the last 40 years worldwide, from 108 million patients in 1980 to about 422 million in 2014, representing a population prevalence of 8.5%; also, an estimated annual mortality of approximately 1.5 million deaths attributable to DM2 and up to 2.2 million due to some form of hyperglycemia. According to Mende et al. (12), the prevalence of DM2 among people aged 20 to 79 years in the African region is 4.9% and most people with diabetes are under 60 years of age. In turn, the study by Sapunar (13) shows that in Venezuela and Chile the prevalence of DM2 is around 11% in the adult population, these being the main Latin American countries with the highest prevalence. Espinoza Díaz et al. (14) conducted a study in 2017, where they report that in the city of Cuenca-Ecuador there is a prevalence of DM2 of 5.7%.

Care and Treatment of the Diabetic Patient

The American Diabetes Association (ADA) and the American Association of Diabetes Educators (AADE) state that, optimal glycemic control is achieved annually in the diabetic population when glycosylated hemoglobin (HbA1c) is less than 7%; they also indicate that successful diabetes care requires a systematic approach to support patient behavioral changes, which include (12):
- healthy lifestyle changes (physical activity, healthy eating, smoking cessation, weight control, and effective coping),
- disease self-management (taking and administering medications and, when clinically appropriate, glucose self-monitoring), and
- prevention of diabetes complications (self-management of foot health; active participation in screening for eye, kidney, and foot complications; and immunizations).

Reyes et al. (15), refer that there are five main groups of drugs that are used in the treatment of DM2; these are classified as:
- those that increase the insulin secretion capacity regardless of the glucose level;
- those that decrease insulin resistance, such as biguanides and thiazolidinediones;
- those that reduce glucose production by acting on the digestive tract;
- those that increase insulin secretion in relation to the glucose level and that suppress glucagon secretion; and,
- inulins and insulin analogues.

Family support to the diabetic patient

According to Baggio et al. (16), family support and help to the main caregiver is fundamental and is an ally to obtain adequate health guidelines and the best conditions to face the disease; the approach to the diabetic individual and the family involved in the care should promote knowledge about the disease, as an unconditional part of the care. In this context, the application of patients' and caregivers' previous experience and knowledge about the disease is necessary.

The primary informal caregiver is a family member who, in the private domestic space, performs or assists the diabetic patient in his/her basic and instrumental activities of daily living, according to his/her needs, with the aim of preserving his/her autonomy and independence for the control of DM (16).

DM2 influences the lives of individuals and families, as a result of which they experience difficulties in their daily activities; therefore, self-care is necessary (17,18). Dorothea Orem's general theory of self-care focuses on individuals having the capacity to care for themselves and is composed of three interrelated theories: self-care theory, self-care deficit theory, and nursing systems theory, which are linked (19,20). Self-care practices include the care of all dimensions of the human being, such as physical, mental, social, spiritual and emotional (21).

Measurement of family support for diabetic patients

In 2003, Valadez Figueroa et al. (22) developed the "instrument to evaluate family support for diabetic patients with DM2". This instrument consists of an inventory of 24 items that discriminates by age, sex and years of evolution; it has two main scales, each with sub-scales; in addition, the instrument has a reliability alpha level of 0.93.

In 2003, Valadez Figueroa et al. (22) developed an instrument to evaluate family support for type 2 diabetic patients; the instrument is a 24-item inventory that discriminates by age, sex and years of evolution; it has two main scales, each with subscales. The knowledge scale is composed of the sub-scales of knowledge about control measures and knowledge about complications; while the attitude scale is composed of the sub-scales of attitudes towards the patient and attitudes towards control measures. The research determined an alpha value for the entire inventory of 0.93.

Ríos González and Espínola Chamorro (23) developed a study in 2020 whose objective was to determine the relationship between family support and glycemic control in Type II diabetic patients attending a III Level of Care Hospital in Paraguay during July and August 2019. For this purpose, the "instrument for measuring family support in Type II diabetics" by Valadez Figueroa et al. validated in 2003 was applied. As results of the research it was found that 67% of the respondents had inadequate glucose control; with respect to overall family support 82% had average family support and a positive association of glycemic dyscontrol was found in relation to average family support.

Merodio, Rivas and Martinez (24) published a study in 2015 in Mexico, whose objective was to describe the perception of family support and diabetes-related difficulties in the older adult. The sample was 113 older adults with diabetes, to whom three questionnaires were applied: Social Support Network Scale for Older Adults (ERASAM) and questionnaires to identify the †problem areas of diabetes (PAID-1 AND PAID-2). Among the main results, it was obtained that 49.6% of MAs worry about future problems; 42.5% do not perform physical activities sufficiently; 29.2% refer to having strict surveillance by family members, 24.8% perform infrequent and brief consultations. 64.7% of men and 60.8% of women have uncontrolled glucose. The researchers concluded that the best support is received by men, compared to the low family support concerning women, due to the cultural entrenchment of the position of women as ideal caregivers.

Ahmad Sharoni et al. (3) studied social support towards diabetic patient in 2015. A survey was conducted involving 200 patients between March 2013 and May 2013 in three hospitals in Kelantan, Malaysia; data were obtained through self-administered questionnaires and clinical characteristics were acquired from patient records. Among the main findings were that higher social support was associated with higher levels of glycosylated hemoglobin (HbA1c), fasting blood sugar (FBS) level, duration of diabetes and a decrease in body mass index (BMI) ($p<0.05$); there was a significant negative relationship between increased social support and decreased self-care activity ($p<0.05$), leading to the conclusion that self-care activities decrease with external care or family and social support.

The general objective of the research was to determine the level of family support in the care of the patient with Diabetes Mellitus Type 2 at the San Pedro Health Center, Cuenca.

To accomplish this, it was necessary to establish the following specific objectives:
- To characterize the study population according to sociodemographic variables of research interest.
- To quantify the level of family support to the diabetic patient in the study population.
- To relate the level of family support received by the diabetic patient and the sociodemographic variables.

- To relate the level of family support received by the diabetic patient and the level of state-trait depression according to the Inventory of State-trait Depression (IDER).
- To carry out an educational intervention regarding family support and its importance in the care of the patient with Type 2 Diabetes Mellitus at the San Pedro Health Center, Cuenca.

II. METHODOLOGY (verb tense: past)

Type of research

Non-experimental research design, cross-sectional, descriptive-correlational, prospective and quantitative approach.

Population

The study had a population of 66 diabetic patients who are regularly attended at the San Pedro health center in the canton of Cuenca, aged 30 years or older, with their respective caregivers or family support.

Sample

The sample consisted of the total population of 66 patients with DM2; therefore, no sampling techniques were applied, due to the scope of the study in a local setting that is accessible to the researcher. Nevertheless, the total number of patients who provided data for the study corresponds with those who met the inclusion and exclusion criteria.

Inclusion and exclusion criteria

We included people who agreed to participate voluntarily in the study with a diagnosis of type 2 diabetes mellitus and who were in consultation at the San Pedro health center in the canton of Cuenca. Persons with a diagnosis other than type 2 diabetes mellitus, those who did not wish to participate in the study, and those who were unable to respond were excluded.

Instruments

- Sociodemographic characteristics: age, sex, place of residence, educational level, living with the diabetic patient.
- Instrument to evaluate family support for the diabetic patient with DM2: Instrument adapted by Valadez Figueroa et al. (22), whose reliability according to Cronbach's alpha is 0.93; it will be complemented with a demographic information sheet for the respective analyses (Annex 1). This instrument has been used in several studies since its construction in 2003, which supports its use and allows comparability between investigations.
- Inventory of Trait-State Depression (IDER): The Inventory of Trait-State Depression (IDER) was designed to assess depression as a state and as a trait (Appendix 2). In relation to the internal external validity of the instrument, it has been found that it reported a Cronbach's alpha coefficient of 0.78 for the trait depression scale and 0.79 for the state depression scale (25).

Procedure

The research was carried out by accessing the sample. A meeting was organized via ZOOM with the participants in order to inform them of the research objectives. Then, home visits were made, telephone contact in some cases and an online survey for the application of the instruments detailed above, which were used to collect data on sociodemographic variables, the instrument to evaluate family support for the DM2 diabetic patient and the Inventory of Depression Trait-State (IDER); this application was performed prior to the acceptance and signing of informed consent; and lasted 40 minutes for each patient. The data of each subject, in rows, only had an identifier code of subject number, but in no case were names, surnames, ID number or e-mail registered, therefore, the participating subjects could not be identified.

Ethical considerations

Informed consent was used in accordance with the Helsinki protocol, which establishes the protection of the identity of the informants, notification of the implications of the research and the freedom to participate or withdraw when deemed appropriate, as fundamental elements of respect for the dignity of individuals (26).

The sample of participants depended on the fulfillment of the inclusion and exclusion criteria, considering that the sample unit will be the diabetic patient, but the observation unit will be the family member who assists in his/her care. The inclusion criteria are: family members of diabetic patients attending the San Pedro health center, who wish to participate in the study and sign the informed consent form. The exclusion criteria were: relatives of diabetic patients who did not wish to participate in the study and questionnaires with incomplete answers.

The records were identified by a correlative number from 1 to N, with N being the last participant in the study, in order to protect the identity of the persons participating in the study, so that the person answering the questionnaire could not be identified.

The confidentiality of the data was guaranteed by the researcher and the academic advisor of the research work. Once the questionnaires were applied, they were kept in a safe place at all times by the researcher; the information contained in the questionnaires was faithfully transcribed in the SPSS software database, version 25. The questionnaires were incinerated once the research work was finished and they were not required for statistical consultation or data revision, since the database will be faithful to their content and will remain under the custody of the research department of the graduate program of the Catholic University of Cuenca in electronic format.

The data and the statistical information generated by them were exclusively for academic use, since they will be used for the development and presentation of the research work as a requirement for the completion of the Master's Degree in Care Management and its publication will show statistical aggregates, so it will not be possible to identify the respondents in the report.

In order to carry out the study, authorization to conduct the study and manage the data was requested from the Bioethics Committee of the postgraduate research

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department of the Catholic University of Cuenca, as well as permission from the management of the San Pedro health center for the application of the questionnaire. Subsequently, each participant will be contacted and presented with the Informed Consent.

The research work was financed by the researcher herself; on the other hand, the development of the same did not generate conflicts of interest, so the researcher declares the absence of conflict of interest.

Statistical analysis

Descriptive analysis was performed using frequency and percentages (qualitative variables) and measures of central tendency (quantitative variables), followed by the normality test using the Shapiro Wilk test, as well as Pearson's correlation analysis. Statistical analyses were performed using the SPSS version 26 statistical program.

III. RESULTS

The instruments were applied to a final sample of 66 participants who met the inclusion and exclusion criteria. From them, the following results were obtained:

As can be seen in Table 1, in general the caregivers were between 13 and 91 years old, with a mean of 50.1 years and a standard deviation of 17.7 years. In the male group, the age was between 26 and 91 years, with a mean and standard deviation of 56.4 ±18.8 years; while, among women the age was between 13 and 85 years, with a mean and standard deviation of 47.8 ±16.8 years.

Table 1. Descriptive data on the age of family caregivers by gender and overall.

Genre	Age (years old)			
	Min..	. Max..	. Mean.	Mean St. Dev.
General	13	91	50,1	17,7
Male	26	91	56,4	18,8
Female	13	85	47,8	16,8

According to the results in Table 2, 72.7% of the family caregivers of patients with type 2 diabetes mellitus are female, while 27.3% are male; 62.1% of the respondents reside in urban areas. With respect to educational level, 37.9% have primary education and another 37.9% have secondary education. Of the respondents, 50.0% are sons and daughters of patients with DM2, 31.8% with spouses and 10.6% with siblings of the patient. Of the total number of respondents, 92.4% live with the patient.

Table 2. Distribution of family caregivers according to gender, origin, educational level, kinship and lives with the patient.

Variables	Categories	**Frec. (n = 66)**	**Percentage**
Gender	Male	18	27,3%
	Female	48	72,7%
Origin	Urban	41	62,1%
	Rural	25	37,9%
Educational level	No level	13	19,7%
	Primary	25	37,9%
	Secondary	25	37,9%
	Higher technical	1	1,5%
	Higher university	2	3,0%
Kinship Relationship	Son / Daughter	33	50,0%
	Spouse	21	31,8%
	Brother / Sister	7	10,6%
	Grandson / Granddaughter	2	3,0%
	Father / Mother	1	1,5%
	Nephew / Niece	1	1,5%
	Daughter-in-law / Son-in-law	1	1,5%
Living with the patient	Yes	61	92,4%
	No	5	7,6%

Next, in Table 3, it can be seen that 63.6% of the patients with DM2 have medium level family support, while 36.4% have high level family support. No patients with low family support were found in the sample.

Table 3. Distribution of family caregivers by rank of family support.

Family Support (rank)	Frequency	Percentage
Medium	42	63,6%
High	24	36,4%
Total	**66**	**100,0%**

According to the results presented in Table 4, of the 66 patients in the sample, 50.0% were 65 years of age or older and 45.5% were between 45 and 64 years of age. Likewise, 65.2% were female and 34.8% were male.

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Table 4. Distribution of patients with Type 2 Diabetes Mellitus according to age and gender.

Variables	Categories	**Frec. (n = 66)**	**Percentage**
Age group (patient)	30 to 44 years old	3	4,5%
	45 to 64 years old	30	45,5%
	65 years old and over	33	50,0%
Gender	Male	23	34,8%
	Female	43	65,2%

Table 5 shows that 83.3% of the patients with DM2 have a high level of depression and 16.7% have a medium level of depression, while the remaining 16.7% have a low level of depression.

Table 5. Results of the IDER-E instrument.

IDER-E (ranges)	Frequency	Percentage
Medium	11	16,7%
High	55	83,3%
Total	**66**	**100,0%**

When evaluating whether there is a significant relationship between the level of family support and depression status in diabetic patients, as can be seen in Table 6, it was found that there is no association between these variables since the p-value was 0.626, higher than the significance level of 0.05.

Table 6. Results of the IDER-E instrument.

Family Support (rank)	**IDER-E (range)**		Total	p-value
	Medium	High		
Medium	10,6%	53,0%	63,6%	0,626
High	6,1%	30,3%	36,4%	
Total	**16,7%**	**83,3%**	**100,0%**	

IV. DISCUSSION

The objective of the study was to determine the level of family support in the care of patients with Type 2 Diabetes Mellitus at the San Pedro Health Center in the Cuenca canton. For this purpose, an instrument composed of a section of sociodemographic variables, the instrument to evaluate family support to the diabetic patient and the inventory of state-trait depression (IDER) was applied; the study population consisted of 66 patients with DM2.

Among the results, it was found that 72.7% of the family members surveyed were female and the average age of the participants was 50.1 ±17.7 years. 62.1% of the respondents live in urban areas; 37.9% of the family members or caregivers surveyed have primary and another 37.9% have secondary school; 50.0% are sons or daughters of the patient with DM2 and 92.4% of the respondents live with the diabetic patient.

Of the total number of patients with DM2 in the sample, 50% were 65 years of age or older and 65.2% were female. In the study by Ríos and Espínola (23), 54.21% of the diabetic patients were found to be aged 60 years or older, while 71.13% were female. The differences between the studies may be related to the fact that samples of different sizes were taken, at the same time that the populations differ in their structure and size; in addition, different age ranges were taken. Nevertheless, the proportion of patients at higher ages corresponds to what is expected for chronic diseases such as DM2.

63.6% of patients with DM2 have medium level family support, while 36.4% have high level family support. Ríos and Espínola (23), observed that 82.04% of diabetic patients receive medium family support, which is a higher value than that found in the present study; 6.9% receive high family support and 11.27% low.

According to Luthfa and Ardian (7), family support is a process of providing assistance by the family to other family members who have health problems to maintain and improve their health status; the support that families provide to patients with type 2 diabetes mellitus includes four dimensions: emotional support or empathy, appreciation support, instrumental support and informational support. In this sense, Djamaluddin et al. (27) affirm that, the positive impact of family support in the realization of a diet for diabetic patients is that they can control what the treating physician or nutritionist recommends to carry out their diet, they can be reminded and motivated among family members.

Of the total number of patients with type 2 diabetes mellitus, 83.3% have a high level of depression status, while 16.7% have a medium level; this is indicative of the high frequency of depression status in the population studied. Similarly, in the study developed by Antunez and Bettiol (28), it was found that diabetic patients have a high prevalence of depression, with a frequency of 82.93%. According to Rajangam et al. (29), they state that a high prevalence of depression has been observed in diabetic patients, since symptoms of depression, anxiety and stress appear due to the disease situation.

No significant statistical association was found between the levels of family support and depression in diabetic patients (p: 0.626). This result may be explained by the patient's own situation with the disease, although family support is considered important to mitigate the psychological and emotional impact of having DM2. In this sense, Ahmed and Yeasmeen (8) affirm that diabetic patients show better adherence to the treatment regimen if the level of conflict is low and a high level of cohesion prevails in the family, which provides emotional and economic support and safe food, ensures that the treatment regimen is strictly followed, reinforces the fight against depression and even mitigates the harmful effects of stress in patients.

V. CONCLUSIONS

Family support is generally of medium level in diabetic patients, while the levels of depression state in them is of high prevalence. There is also no statistically significant relationship between family support and depression in diabetic patients, which may be related to their personal situation with the disease and not to family support, although it is expected that with this the patient may feel better.

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