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Effect of Nursing Intervention in Caregivers on Treatment Adherence in Patients with Type 2 Diabetes: An Experimental Study

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Abstract
Diabetes is a serious public health problem worldwide, becoming a challenge for the health system and for society itself. Adherence to treatment is a complex phenomenon for patients due to the factors of human behavior. The treatment of type 2 diabetes involves changes in lifestyle that affect the social, family and work environment of the patient; this requires that the illness experience is not restricted to the sick person and family support is considered by educational processes. The objective was to quantify the effect of a nursing intervention directed to the primary caregiver of the patient with type 2 diabetes on treatment adherence. The design was quantitative, longitudinal, quasi-experimental, prospective study prolective study. The experimental group had 76.36% of adherence and control group, 40.74%. X^2=14.26, df 1, p=0.0002; OR=4.70; 95%CI=2.06 to 10.73, AFe=78.72%. At the end of the study for social support was no variation. Nursing intervention in caregiver, the knowledge in diabetes increased from 57.88% to 73.39%. The results obtained in this study the hypothesis that there is a positive effect of nursing intervention on patient adherence with T2D is accepted, however turned out as a confounder the perception of social support through the MOS.

1. Introduction

In chronic non-communicable diseases (NCD) highlights the diabetes to be considered a global public health problem because of its epidemic proportions; it is a challenge for the health system and society. The increase NCD, including type 2 diabetes (T2D), poses huge and growing demands with great responsibilities for health systems thus becoming a health challenge global. [1]

Diabetes is "a systemic chronic degenerative disease of heterogeneous, with varying degrees of hereditary predisposition and participation of various environmental factors, which is characterized by chronic hyperglycemia due to deficiency in the production or

action of insulin, affecting intermediary metabolism of carbohydrates, protein and fat ". [2]

In the world the prevalence of diabetes was 9% in adults over 18; in 2012 1.5 million people died due to T2D, and over 80% of the deaths occurred in low-income countries; T2D is expected to be the seventh leading cause of death worldwide for 2030. [3]

It is expected that the number of people with diabetes in Latin America will increase by more than 50% over the next 15 years, from 13.3 million in 2000 to 32,900,000 in 2030.[4]

In Mexico the prevalence of T2D is 7.5% in people over 20 years, of which 2.8 million Mexicans have diabetes already confirmed, and nearly 820,000 people already have the disease even when they do not yet know, representing 6.8% of morbidity worldwide. [3]

The prevalence of T2D in the state of Guanajuato in people older than 20 was 8.1%, higher than reported in ENSANUT (National Health Survey) 2006 (5.6%), similar to national data; the prevalence by gender was slightly higher in women (9.3%) than men (6.7%). [5]

The experience of suffering T2D is not limited to the sick person, but extends to their social network that is closest family and that affects every one of its members. The family is part of this experience with the chronically ill; which is a source of conflicts and imbalances, many times creating a climate of tension, worry and uncertainty about the presence of signs and symptoms; its impact on the activities of the patient, by the need to change behavior patterns, and the fear of complications to be presented; likewise for the increased costs and reduced revenues, more so when the main breadwinner is the sick person. [6]

An estimated highlights that non-adherence to treatment reaches 30 to 80%, [7] giving place to low metabolic control in patients with T2D; this is unfortunately a common situation; it is estimated that only 25 to 40% of diabetics have a metabolic control. [2, 8]

Among the consequences of non-adherence is lack of therapeutic response, such as delayed healing, recurrence and occurrence of complications; incorrect assessment of the real effectiveness of treatment with an increase or decrease in the number of unnecessary doses, treatment change with the introduction of more powerful and toxic drugs with the risk of the occurrence of acute side effects or long-term dependency the use of the drug. [9]

Besides the non-adherence has economic consequences for the family, which affects the cost invested in drugs that patients does not take; in the economic loss due to absenteeism in work because of uncontrolled disease, affecting the productivity of the workplace; an unnecessary storage of drugs not consumed, in the home, which can cause accidental poisonings in children and increased irresponsible self-medication for any family member. [9]

The social support is associated with adherence to treatment because the patient need more resources to face the stressful event and thus lead to better glycemic control, increasing adherence and reducing stress. [10]

Family support in the early stages of the disease, has a direct impact on the acceptance of the disease and the development of behaviors that allow an adequate control, and if there is a close relationship with family members, contributes to emotional and physical well-being of patients. [11]

This family support is essential for the patient to face the daily problems of their disease, thus becoming a key to upgrade their control glycemic, [12] controlling factor, and develop positive behaviors to health, improve self influencing the patient adherence to medical treatment. [11]

In the home environment, emotional balance loss is generated due to changes in the roles played by each of its members and, in some cases, there are communication or economic problems; especially when the family is who has the disease or if it was the main supplier economically speaking, for expenses generated for the care and treatment of the disease. [13]

In every family there is a caregiver who responds spontaneously or by necessity, without having reached an explicit agreement between people within the family, when it is assumed is thought to be a temporary situation, but often ends up being a situation that lasts several years. [14]

Given this situation it is necessary to know, that educational processes are essential to carry out preventive interventions in the personal, family and community level; education on diabetes is important because it not only medical but the entire health team, motivate, inform and empower diabetic patients themselves and their families. As health professionals we must be convinced that community care is conducive to changing attitudes about diabetes, both patients and in their families. [15]

The objective was to know the effect of a nursing intervention in the caregiver of patients with type 2 diabetes on treatment adherence.

2. Material and Methods

The protocol was approved by the Bioethics Committee of the Division of Health Sciences and Engineering, Campus Celaya Salvatierra University of Guanajuato.

A quantitative, experimental, controlled, randomized, single-blind, longitudinal, prospective study was designed.

The universe were 1139 patients with T2D who came to the Primary Health Care Centers in Celaya, Guanajuato from November 1, 2013 to October 30, 2014.

2.1. Sampling and Sample Size

Assuming 50% of treatment adherence in the control group and 80% in the experimental group, the minimum sample size of 52 patients with T2D and their primary caregiver in each group, with 95% confidence and 90% power (Epi info 7.0, 2013, CDC, Atlanta, GA, USA).

Simple random probability sampling was conducted, with the sampling scheme list of patients registered in Primary Health Care Center. Once they agreed to participate they

were randomized random numbers generated in the Epidat 3.1, 2006 (Xunta de Galicia and PAHO) to integrate the experimental group and the control group.

2.2. Selecting Subjects

2.2.1. Inclusion Criteria

Adults over 50 years with T2D and their primary caregiver of 18-50 years of age who voluntarily accept both, participate in the study. The patient attend the Primary Care Health Center for control of T2D.

2.2.2. Exclusion Criteria

T2D patients and primary caregivers of patients with T2D are located not at home at the time of data collection of the study or who have not agreed to participate.

2.3. Variables

The sociodemographic variables form both patients with T2D and caregivers were age, gender, marital status, education, occupation, place in the family.

T2D related variables as time of evolution of T2D, type of treatment, treatment time, use of alternative treatments were also measured.

As independent variable was the educational nursing intervention: considered as part of the education that is concerned with the prevention, investigation, and treatment of learning disabilities, whatever the causes that originated them and which prevents the normal learning patient.

The dependent variables were:

Family Support: This is a qualitative, categorical, nominal variable, which refers to the process to facilitate a positive family dynamics, problem solving and decision making, as well as enhance and develop family resources.

Treatment adherence: nominal categorical variable, which refers to the degree to which patients follow medical instructions and measured with the categories of family support, community characteristics, physical exercise, medical monitoring, diet, fitness assessment . An instrument developed by Villalobos et al., named scale adherence in diabetes mellitus II, version III (EATDM-III) was used; it consists of 55 items that evaluate the factors of family support, organization and community support, exercise, medical monitoring, hygiene and self-care, diet and fitness assessment, has a Cronbach alpha reliability total of 0.87.[16]

DT2 knowledge: nominal categorical variable, which refers to facts or information acquired by a living through experience or education, theoretical or practical understanding of a subject of reference to reality, and is measured by the categories: diabetes knowledge, no knowledge of diabetes using the questionnaire knowledge of diabetes (DKQ24), [17] with an error of 20% and a confidence level of 95%. Consisting of 24 items which measures the knowledge of diabetic patients, the responses of yes, no or do not know. The responses can be grouped into a) Basic knowledge of the disease (10 reagents), b) glycemic control (7 reagents), c) prevention of complications (7 reagents).

Perception support: This is a qualitative variable, which refers to the ability of the patient to receive images through the senses, impressions or external sensations, or understand and know something; measured with the categories of emotional support, emotional support, instrumental support, using the questionnaire MOS, analyze different styles of medical practice of primary care, social support in primary care. It consists of 20 items. The first question on social network size and 19 items related to four dimensions of functional social support: emotional / informational support, instrumental support, positive social interaction and effective support. The Cronbach α for qualifying factor 1 (0.9411), Factor 2 (0.8557) and factor 3 (0.8707); [18] it summarized with frequencies and percentages.

2.4. Procedures

After obtaining informed consent, and before intervention of nursing, a pre-test in which it was measured in the patient's level of adherence, using the questionnaire EATDMII and family support (MOS questionnaire) were applied, and the level of knowledge about T2D of caregiver was also measured by the questionnaire DKQ24 in both the experimental and the control groups. The same questionnaires were applied after the intervention.

Nursing education program showing integral management strategies of motivation and information increased knowledge about T2D, focusing on the promotion of treatment adherence of patients with T2D was designed.

Subsequently, the educational program in caregivers of patients with T2D in the experimental group which was carried out for 10 weeks, was scheduled for two hours on Tuesdays and Thursdays in the classroom.

In control group, the same educative program was scheduled at the end of research.

2.5. Statistical Analysis

For socio-demographic variables descriptive statistics were used. To test hypotheses, Z test for two proportions and p-value were calculated. To find the association with adherence were calculated using Chi square and p-value.

To calculate the measurement of the effect and impact of the educational intervention Odds Ratio (OR), confidence intervals at 95% and attributable fraction in exposed (AFe) were calculated.

A logistic regression among treatment adherence and intervention, adjusting for all variables was performed.

To demonstrate the statistical significance of the results p-value was set at 0.05.

Statistical analysis was performed using STATA 13.0 (Stata Corp., College Station, TX, USA).

3. Results

The experimental group was composed of 55 patients and 54 in control group. Each subject was linked to his caregiver.

Table 1 shows the distribution of sociodemographic

quantitative variables by experimental and control groups. There were statistically significant differences between the experimental and control groups for the mean age of the patients, age of caregivers and care for time in years ($p<0.05$).

Table 1. *Quantitative sociodemographic quantitative characteristics by group, Celaya, 2015.*

Variables/group	Mean ± S	t	df	p-value
Patients' age (years)				
Experimental group (n=55)	57.62 ± 9.79	-2.60	107	0.01
Control group (n=54)	63.09 ± 12.07			
Caregiver's age (years)				
Experimental group (n=55)	30.31 ± 11.73	-6.03	107	0.0001
Control group (n=54)	44.48 ± 12.78			
Evolution time for T2D (years)				
Experimental group (n=55)	8.24±5.17	-1.52	107	0.13
Control group (n=54)	9.72±4.96			
Time of care (years)				
Experimental group (n=55)	5.4±4.03	-3.31	107	0.0013
Control group (n=54)	8.12±4.85			

S= standard deviation, df= degree of freedom, T2D= type 2 diabetes
Source: Questionnaire of study

Table 2 shows the distribution for categorical sociodemographic variables in the experimental and control groups. Women predominated among patients in both the experimental group (74.55%) and the control group (72.20%) and their distribution is similar in both groups ($p> 0.05$). Among caregivers, women predominated in both groups (83.64% and 72.20%) and there was no statistically significant difference ($p> 0.05$). For the civil status, married patients predominated in both groups (81.82% and 64.81%); because a cell is 0 among members of the control group could not be calculated square Chi and for each dimension of marital status was calculated Z for two proportions and value of p, finding a statistically significant difference between groups for patients living in free union ($p <0.05$). As for the marital status of caregivers it found that prevailed singles (experimental group, 52.73%) and married in the control group (74.07%). Z also calculated for two proportions, finding statistically significant differences for single ($p <0.05$) and married ($p <0.05$). As for the occupation of the patients, housewives predominated in both groups (63.64% and 68.52%); no chi square test was calculated, due to a cell with 0 and no statistically significant differences for the dimensions of marital status between experimental group and control group ($p> 0.05$). Regarding the occupation of caregivers, housewives predominated in both groups and statistically significant difference was found for students ($p <0.05$).

Table 2. *Categorical sociodemographic characteristics by group, Celaya, 2015.*

Variables	Experimental group (n=55)		Control group (n=54)		X^2	df	p-value
	n	%	n	%			
Patients' gender					0.08	1	0.78
Male	14	25.45	15	27.78			
Female	41	74.55	39	72.20			
Caregiver's gender					2.07	1	0.15
Male	9	16.36	15	27.78			
Female	46	83.64	39	72.20			
Patients' civil status*							
Single	3	5.45	4	7.41	-0.42		0.67
Married	45	81.82	35	64.81	2.01		0.05
Widow	4	7.27	13	24.07	-2.42		0.02
Free union	1	1.82	2	3.70	-0.60		0.55
Divorced	2	3.64	0	0.00	1.42		0.16
Caregiver's civil status*							
Single	29	52.73	6	11.11	4.65		0.00001
Married	21	38.18	40	74.07	-3.77		0.002
Widow	0	0.00	3	5.56	-1.77		0.08
Free union	5	9.09	5	9.26	-0.03		0.98
Patients' occupation*							
Housekeeper	35	63.64	37	68.52	-0.21		0.83
Employed	12	21.82	9	16.67	0.68		0.50
Student	3	5.45	7	12.96	-1.36		0.17
Professional	4	7.27	1	1.85	1.35		0.18
Unemployed	1	1.82	0	0.00	1.00		0.32
Caregiver's occupation*							
Housekeeper	22	40.00	30	55.56	-1.63		0.10

Variables	Experimental group (n=55)		Control group (n=54)		X^2	df	p-value
	n	%	n	%			
Employed	11	20.00	18	33.33	-1.57		0.12
Student	18	32.73	0	0.00	4.60		0.00001
Professional	3	5.45	1	1.85	1.0		0.32
Unemployed	1	1.82	5	9.26	-1.70		0.09

* Z for two proportions df= degree freedom
Source: Questionnaries from study

As for the relationship between the patient and the caregiver, being the son prevailed in both groups (74.55% and 57.41%) and statistically significant differences were found to be son ($p < 0.05$) and being a husband (wife) ($p < 0.05$) between experimental and control groups. In terms of educational level, predominated none (43.64%) and elemental (47.27%) in the experimental group and none (46.30%) and elemental (44.44%) in the control group; no significant differences in the level of education among patients in the experimental and control groups were found. Concerning the caregiver educational level, elemental level predominated in both groups, 34.55% for the experimental and 42.59% for the control. No statistically significant difference in educational level between experimental and control groups was found except for none in caregiver (Table 3).

Table 3. *Categorical sociodemographic variables by group, Celaya, 2015 (cont…).*

Variables	Experimental group (n=55)		Control group (n=54)		Z	p-value
	n	%	n	%		
Relationship to patient*						
Son	41	74.55	31	57.41	1.89	0.06
Husband (wife)	6	10.91	18	33.33	-2.82	0.005
Uncle/aunt	2	3.64	0	0.00	1.42	0.16
Grandparent	1	1.82	0	0.00	1.00	0.32
Other	5	9.09	5	9.26	-0.03	0-98
Patients' educative level*						
None	24	43.64	25	46.30	-0.28	0.78
Elemental	26	47.27	24	44.44	0.30	0.77
Secondary	3	5.45	5	9.26	-0.76	0.45
High school	1	1.82	0	0.00	1.0	0.32
University	1	1.82	0	0.00	1.0	0.32
Caregiver's educative level*						
None	2	3.64	16	29.63	-3.65	0.0003
Elemental	19	34.55	23	42.59	-0.86	0.39
Secondary	14	25.45	12	22.22	0.40	0.69
High school	12	21.82	1	1.85	3.22	0.001
University	8	14.55	1	1.85	2.41	0.02
Other	0	0.00	1	1.85	-1.01	0.31

Source: Questionnaires of the study

Regarding treatment adherence in the experimental group were 63.64% and 77.78% in the control group pre-intervention ($p > 0.05$). In the experimental group the 89.09% demonstrating social support and the control group, 94.44% ($p > 0.05$) and knowledge about T2D, 65.45% of the experimental group and 50% in the control group ($p > 0.05$) (Table 4). The experimental and control groups, are fully comparable for the study variables.

Table 4. *Distribution of study variables preintervention, by group, Celaya, 2015.*

Variable	Experimental group (n=55)		Control group (n=54)		X^2	df	p-value
	n	%	n	%			
Adherence					2.63	1	0.11
No	35	63.64	42	77.78			
Yes	20	36.36	12	22.22			
Social support					1.03	1	0.31
No	6	10.91	3	5.56			
Yes	49	89.09	51	94.44			
T2D knowledge						1	0.10
No	19	34.55	27	50.00	2.66		
Yes	36	65.45	27	50.00			

df= degree of freedom T2D= Type 2 diabetes
Source: EATDMII, MOS, DKQ24 questionnaires

After the intervention, there is an association between belonging to the experimental group and have adherence to

treatment (p <0.05), but also the effect of the intervention is measured with OR of 4.70, meaning that patients with treatment adherence had nearly 5 times more likely to be in the experimental group.AFe means that those who had treatment adherence, 78.72% do not have had it if they had belonged to the control group. No association between social support and experimental group (p> 0.05) and knowledge about T2D did found increase in experimental group (p <0.05) with OR of 10.46 and AFe of 90.46% (Table 5).

Table 5. *Distribution of study variables, post-intervention, by group, Celaya, 2015.*

Variable	Experimental group (n=55)		Control group (n=54)		X^2	df	p-value	OR	(95%CI)	AFe %
	n	%	n	%						
Adherence					14.26	1	0.0002	4.70	(2.06 to 10.73)	78.72
No	13	23.64	32	59.26						
Yes	42	76.36	22	40.74						
Social support					0.102	1	0.75	NA		NA
No	5	9.09	4	7.41						
Yes	50	90.91	50	92.59						
T2D knowledge					8.27	1	0.004	10.46	(3.48 to 31.44)	90.44
No	8	14.55	21	38.89						
Yes	47	85.45	33	61.11						

df= degree of freedom AFe= Attributable fraction in exposed T2D= Type 2 diabetes
Source: EATDMII, MOS, DKQ24 questionnaires

The logistic regression model with educational intervention as an independent variable and treatment adherence as dependent variable was generated, and found that the occupation of caregiver and social support are acting as confounders. The crude OR was 4.70 and adjusted for confounding variables was 11.69 (Table 6).

Table 6. *Logistic regression model with confounder variables, Celaya, 2015.*

	Group	Ocupation of caregiver	Social support	Model with all confounders
Odds Ratio	4.70	6.45	11.69	11.69
95% CI	2.06 to 10.73	2.54 to 16.34	3.95 to 34.57	3.95 to 34.57
AFe	78.72%	84.50%	91.45%	91.45%
LRT	14.63	6.76	16.17	28.27
p-value	0.0001	0.009	0.0001	0.0001

CI= confidence interval AFe= attributable fraction in exposed LRT= Likelihood ratio test
Source: Confounders analysis

4. Discusion

In many cases of T2D, the diagnosis is made long after the appearance of the same, and many times the treatment is not effective. For this, it is necessary to promote family education on diabetes from professional nurses directing actions to patients and their families or primary caregivers.

This study allowed to know the effect of a nursing educational intervention aimed at primary caregivers and / or family members of patients with T2D, on treatment adherence in primary health centers.

All patients beginning the study conclude it. However, despite randomization between the two groups, it was found differences in baseline variables as mean of age of patients, mean of age of caregivers, and time to care the patient (Table 1); also, there are differences between groups, for civil status for patients and caregivers, and occupation of caregivers (Table 2), relationship with patient and education level in caregiver (Table 3).

Regarding the mean of age of patients with T2D was 57 ± 9.79 years between the experimental group and 63 ± 12.07 years in the control group. This is related to the natural history of T2D. In addition, Alba in 2009,[19] mentions that the mean age of patients was 64.6 to 68.4. (p = 0.04) in his study. Duran and Varela in 2009,[20] found that the mean age of was 60 ± 9 years in his study. For this variable, we see that the results are interrelated.

By age of the main caregivers shows that between 30 ± 11.73 years in the experimental group and 44 ± 12.78 years in the control group; similar to the study of Diaz-Alvarez in 2009; [21] where he found that the age of the caregiver was between 36 and 59 years old.

The time evolution of the condition of patients with T2D in the experimental group was 8±5.17 years and 9 ± 4.96 years in the control group; this is because T2D is a chronic pathology. Alba in 2009, [19] in their study obtained a result of 6.1% of years of evolution of T2D, data very similar to our study. Also, Duran-Varela in 2001, [20] found that the time of evolution of diabetes in the patient was higher than 5 years with a 57.14%.

Patients with more time suffering their illness may have more skills and knowledge to manage it; but also to have a longer history of illness may be subject to more complications and associated diseases that can hinder proper control.

The time leading care for caregivers in the experimental group was 5±4.03 years and 8 ± 4.85 years in the control group. Vega Angarita in 2002, [22] mentions that 42% reported having a longer care from three years.

The gender of the patient's predominance was female

(74%) of the experimental group and the control group (39%). This is possibly because the woman is the one who usually makes use of health services unlike men who labor issue is difficult to support. As in the study of Alba in 2009, [19] found that the gender of the patient was female predominance (60%) very similar to this study data. Besides, Duran Varela en el 2001, [20] also reported female gender predominance (65%).

For the gender caregivers, female predominance was found in both groups. It is known that for cultural reasons, many women still today being responsible for all or almost all domestic freight, including housework, the upbringing and education of children and the care of sick family members. Also in the study of Soria in 2012, [23] mentions that the gender of primary caregivers corresponded to women (65%); Vega Angarita, [22] also reported the female predominance (82.5%).

For patient marital status prevailed married (73.39%), followed by widowed (15.60%) in both groups. Which it is considered to have a family structure to support the diabetic patient. Similarly Gomez Villas Boas et al. in 2013, [1] reported that the marital status of married was the most frequent in their study (70.4%).

To marital status from caregiver predominantly married (55.93%), followed by single (32.11%) in both groups. Diaz-Alvarez in 2009, [21] found that marital status of the primary caregiver was single (35%) followed by married (32%) contrary to the data of this study.

The occupation that prevailed in caregivers was the housewife with 47.71% followed by the employee with a 26.61% of both groups. For Vega Angarita, [22] mentions that the occupation of the main caregivers are dedicated to the home (60%). Similar to those reported by Diaz -Alvarez in 2009, [21] found that the main occupation in caregivers is the household (69%).

The relationship of patient/ caregivers prevailed the son with 66% followed by the husband (wife) (22%). The relationship of consanguinity found by Vega [22] shows that the majority of caregivers are mother and son, followed by other relationships as husband, very similar to our study data. In addition, Alvarez Diaz, [21] found that the relationship of the caregiver was the son (32%) followed by mother / father (29%) and here a low percentage (8%) for the husband. This ratifies those mentioned in the literature that reported about the immediate family serves as primary caregiver of chronically ill.

The educational level of patients with T2D was the primary (45%) and none (44%). Non-adherence to treatment may be due to education as they have easy access to information about their disease control, plus it is difficult to understand instructions regarding treatment and patient self-care. Alba [19] shows that the educational level of the patient was primary (48%) is similar to study results. Likewise, Duran-Varela [20] found that patients with T2D had a maximum level the primary (78%).

For the educational level of the caregivers was the primary (38.5%) and secondary (23.8%). Vega Angarita [22] found that only 15% of primary caregivers had primary, and only 25% with high levels. Data that resemble those obtained in our study.

With respect to the dependent variable, non-adherence of patients with T2D at the start of the intervention was found in 63.64%, and after the intervention is 23.64% in experimental group, and 77.78% pre-intervention and 59.26% post-intervention in comparison group, meaning a strong effect of nursing intervention in adherence. Alba [19] mentions in its cross-sectional study that 79.3% of patients had adherence.

Social support for did not change at the end of the study; 10.91% pre-intervention and 9.09% post-intervention in experimental group; 5.56% pre-intervention and 7.41% post-intervention in comparison group. Family support is critical for diabetics because it improves adherence to medical indications. Pech [24] found that 71.4% of patients with diabetes have family support. It is mentioned that a suitable family environment seems to favor adherence to treatment [24] but there is little evidence for interventions involving the family or the environment social. [25.26]

The support to the patient with diabetes by his family becomes a key factor to achieve adequate control of their disease, as this represents the main source of social support, emotional, economic, educational and cultural paciente. [27] All institutions of the national health system should not only address their educational programs to improve the condition of the sick but must also integrate and support the family or caregivers in order to prevent or reduce health risks and achieve these better control of chronic patients. Nursing interventions should include educational aspects, diet plan and exercise involving the family.

With respect to the independent variable was the nursing intervention through the implementation of an educational program aimed at caregiver for T2D patient was found that the caregiver at the start of the intervention had the results, a 57.88% of knowledge about the disease, after the intervention this percentage increased to 73.39%. Vega [22] in 2009 found that only 30% of caregivers had knowledge before his speech, and this increased to 47.5% at the end of the intervention, an increase that is very similar in both studies. With this result we accept the alternative hypothesis of our study.

Nursing education aimed at patients and family is a basic factor to achieve adequate treatment to encourage self-care, giving responsibility to the patient, which is an effective strategy for slowing or decrease the complications inherent to the disease. Talks should be planned and / or educational sessions that provide the necessary information to the primary caregiver/patient and his entire family, in order to provide the necessary knowledge of the disease, care and possible complications.

The relationship of this study with the assumption Nola Pender occurs in interpersonal and situational influences, as these are important source of motivation for health behavior of patients with T2D, also the impact of family, social networks or environment where the ill person develops can act positively generating a feeling of support and

acceptance as visualized with the outcome of the MOS; which it gives confidence to their skills; this would be a valuable source for the creation of a health-promoting behavior; however when the family or social environment is adverse and harmful is difficult to adopt such conduct, there also arises the importance of working on changing some conditions of the social environment and economic situation should include high levels of hierarchical command public health. [28]

5. Conclusion

After analyzing the data and taking into account the objective of the study it was to quantify the effect of a nursing intervention aimed at primary / family caregivers of patients with type 2 diabetes on adherence to the following conclusions:

After applying the questionnaire DKQ24 that tests knowledge about the disease DT2 which was applied to the main / family caregivers of patients before surgery; It was identified that they lack the knowledge of what is diabetes and the care the patient must follow regarding diet, personal hygiene, recreation, exercise; ie it is not clear that it can support at some point gave his patient to prevent hereinafter the presence of complications of the disease themselves. It was further demonstrated that applying an educational program aimed at primary caregiver / family knowledge, skills and abilities are increased so that these applied for the benefit of the health of his patient with T2D.

Also the EATDM II instrument applied pre and post intervention to patients with T2D allowed to know in general whether there was adherence finding that in pre intervention no adherence was held, however at the end of the educational intervention This result was increased , achieving adherence effect which is related to the intervention applied to the parent / caregiver familar; however as a confounder was identified in profit social support questionnaire (MOS).

For all the above outlined for this study suggests that patients with T2D by themselves do not keep a commitment to monitoring their treatment, however the fact that his family has the necessary knowledge; promotes motivation and increasing patient adherence.

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