Sexual Dysfunction, Depression and Quality of Life in Individuals with Diabetes Mellitus Type 2

Juana Mercedes Gutiérrez-Valverde, Dr, MSN, BN, RN[1], Paula Flores Portillo, MSN, BN, RN[2], Miltón Carlos Guevara-Valtier, EdD, MSN, BN, RN[3], Geu Salome Mendoza-Catalán, MSN, BN, RN[4], Gabino Ramos-Vázquez, BN, RN[5], José Alfredo Pimentel-Jaimes, MSN, BN, RN[6] &Esther C. Gallegos, PhD, FAAN[7]

Abstract

Objective: Determine the relationship between sexual dysfunction and depression, quality of life and glycemic control. **Methodology:** Correlational descriptive study with the participation of 205 adults with Diabetes Mellitus Type 2. **Results:** 66.3% (n = 136) were females. The average age was 57 years (SD = 11.8), average number of years with Diabetes Mellitus Type 2 was 8.22 (SD = 3.9), 55.6% had good glycemic control. Regarding sexual dysfunction, 78.3% of the men and 66.9% of the women showed sexual dysfunction. 70.7% showed depression, 22% mentioned not having a good quality of life. A relationship between feminine sexual dysfunction and quality of life was identified (r_s = -.241, <p = .01), with depression (r_s = -.370, <p = .01) age (r_s = -.544, <p = .01), education level (r_s= -.387, <p=.01) and number of years with the disease (r_s = -.240, <p = .01). Masculine sexual dysfunction was related to age (r_s = -.303, <p = .05) and the number of years with the disease (r_s= -.238, <p=.05). **Conclusions:** Sexual dysfunction in these patients was high. Most patients showed depression and most of them expressed having a good quality of life.

1. Background and Significance

Diabetes mellitus (DM) is considered a public health problem. At present, 347 million people in the world have been diagnosed with this disease. Countries with medium and low income are the most affected regarding morbi-mortality. It causes 80% of the deaths. The highest percentages of people with the disease are women (World Health Organization [WHO], 2012).In Mexico, 6.4 million adult individuals have been diagnosed with DM, which is equivalent to 9.2% of the general population. Likewise, within this age group DM is considered the first cause of death (Ministry of Health-Health Sectorial Program, [SSA-PSS, 2013-2018]). In Nuevo Leon, the prevalence of Diabetes Mellitus Type 2 (DMT2) is reported as 8.8% (Ministry of Health-State Survey on Health and Nutrition in the State of Nuevo Leon [SSA-EESN-NL-2011-2012]). Women show a higher percentage (15.5%) than men (Hernández-Ávila, Gutiérrez, & Reynoso, 2013).

---

[1] Professor, School of Nursing, Universidad Autonoma de Nuevo León. Monterrey, NL., México. Ave. Gonzalitos 1500 Nte. Col. Mitras Centro, Monterrey, N.L .México. CP 64460. E-mail. juana.gutierrezv@uanl.mx(Corresponding author)

[2] Student of Master of Science in Nursing, Universidad Autonoma de Nuevo León.Monterrey, NL., México.

[3] Professor, School of Nursing, Universidad Autonoma de Nuevo León. Monterrey, NL., México.

[4] Student of Doctoral of Science in Nursing, Universidad Autonoma de Nuevo León.Monterrey, NL., México.

[5] Student of Master of Science of Nursing, Universidad Autonoma de Nuevo León.Monterrey, NL., México.

[6] Professor, Universidad Autónoma de Baja California, Baja California, México.

[7] Professor, School of Nursing, Universidad Autonoma de Nuevo León. Monterrey, NL., México.

In DMT2, there is relative or absolute deficiency in the production of insulin, which leads to insulin resistance (American Diabetes Association [ADA, 2014]). This can generate a series of complications caused by blood vessel damage, as is the case in sexual dysfunction (SD) (Gaspar, Fernández, Dickinson, & Irigoyen, 2013). The World Association for Sexual Health (WAS) classifies sexual health problems in two types: Concerns and SD. The first one is understood as lack of accurate and comprehensive information about a wide range of sexuality issues; SD has to do with the alteration of one of the stages of sexual functions, in the desire, arousal or orgasm (Pan-American Health Organization [PHO], 2009). DS problems can appear in the early stages of the disease due to lack of glycemic control (National Diabetes Information Clearinghouse [NDIC], 2011).

SD is present in both men and women; in men, SD is characterized by Erectile Dysfunction (ED), which is defined as the constant incapacity to achieve or maintain a sufficiently firm erection to penetrate the sex partner during a sexual relation. In women, the sexual health problem is called Feminine Sexual Dysfunction (FSD) and has the following characteristics: decreased vaginal lubrication, painful or uncomfortable intercourse, decreased or lack of sexual desire, decreased or lack of sexual response (NDIC, 2011). SD significantly affects the Quality of Life (QL) in people and may have an impact on their emotional health that leads to depression (OPS, 2009).

Depression is defined as the most frequent emotional disorder in adult populations, being one of the most important causes of incapacity in the world (OMS, 2012).

It is more frequent in older people and among women. The prevalence of depression in the general population ranges from 5 to 10%. It is higher in patients with DMT2, ranging from 30% to 65%. Reports indicate that depression increases the risk of developing DMT2 and it can affect glycemic control as well. Those individuals who suffer from depression and diabetes are more likely to die at an early age (Serrano, Zamora, Navarro, & Villarreal, 2012).

DM (Torres & Gutiérrez, 2010) has a progressive effect on the quality of life of people, affecting their social and emotional life, with significant influence on love and sexual relations and lack of glycemic control (Liu et al., 2013).

As it can be seen in the corresponding literature, people with DM have SD and depression problems that affect their quality of life. Nevertheless, these variables are also interrelated, causing patients to be more affected in their health. However, up to this date, no studies dealing with these three variables together have been identified. The purpose of this study is to identify the relationship between SD, depression and quality of life in individuals with DMT2.

It is important for nurses who work with individuals with DMT2 to provide a more comprehensive care, since, in most cases, care is centered on aspects related to treatment of the disease and the sexual function is overlooked. Nursing professionals can use the results generated in this research to design more specific nursing interventions that include SD problems, in order to propose sexual health prevention and promotion programs in individuals with DMT2.

1.   Revision of the Literature

The following sections show articles about the relationship between DMT2 and sexual dysfunction, quality of life, depression and glycemic control.

Yao et al. (2012) carried out a study of cases and controls with the objective of investigating FSD in women with DMT2 and exploring the factors that affect women 20-60 years of age. The sample consisted of 115 patients with DMT2 and 107 diabetes-free patients. The Index of Feminine Sexual Function (FSFI) Questionnaire was applied and metabolic parameters were evaluated. When the six domains of the feminine sexual function were evaluated (desire, arousal, lubrication, orgasm, satisfaction and pain) it was found the women with DMT2 (18.27 SD = 8.96) had more SD than women without diabetes (23.02SD = 5.78, p=0.000). The percentage of FSD in women with DMT2 was 79.2% and 55.0%, (p = 0.001) in women without diabetes.

Ozcan, Hotun, Bilgic & Dereli (2011) in a transversal, descriptive and co relational study carried out to evaluate sexual dysfunction (SD) in women with diabetes and correlate SD with the factors associated with diabetes and its control. The sample consisted of 310 women older than 19 who had been diagnosed with DMT2. They applied the Arizona Sexual Experiences (ASEX) form, and measured the HbA1c. The average age was 56.99 (SD = 13.6; 19-80); 62.3% (193) were married and 47.1% had primary education. No significant relationship was found between marital status and the sexual function. The affected domains were arousal (F = 2.66, p = 0.03); and the satisfaction of orgasm (F = 5.29, p = 0.001) in the illiterate group. Likewise, there was a significant positive correlation between the sexual function and age (r = 0.42, p = 0.001). A strong positive correlation was determined, indicating that SD increased with age in all domains of the sexual function, except in arousal, desire (r = 0.39, p = 0.001), vaginal lubrication (r = 0.22, p = 0.001), arousal (r = 0.30, p = 0.001), orgasm (r=0.35, p= 0.001) and satisfaction of orgasm (r=0.49, p=0.001). A significant positive correlation between SD and the duration of diabetes was found (r = 0.22, p = 0.008).

Esposito et al. (2010) carried out an observational study to evaluate the prevalence and correlation of feminine sexual function in women with DMT2. The sample consisted of 595 women with DMT2 diagnosis. HbA1c and the feminine sexual function were measured. 83% were married; 65.8% had HbA1c level >7%; the global prevalence of FSD was 53.4%. The risk factors found were age (p = 0.01), metabolic syndrome (p = 0.03), depression (p = 0.01), and atherogenic syndrome (p = 0.04).

Pavía-Ruz, Lope-Gómez & Vera-Gamboa (2012) carried out an observational study to determine the prevalence of ED in patients with DMT2 older than 40. The International Index of Erectile Function (HEF-5) questionnaire was used; the sample consisted of 228 patients. The frequency of ED increased with age; beginning at 70 years of age, 93% reported ED and the least affected group was between 50 and 59 years of age; the prevalence of ED in individuals with DMT2 was 69%.

Shams, Arasteh, Mohsenpour, Karimian & Shams (2013) carried out an observational study to compare the state of FSD among women with diabetes and women without diabetes. The sample consisted of 200 women. The Feminine Sexual Function Index (FSFI) was used as an instrument. The glycosylated hemoglobin (HbA1C) was measured. In the group with diabetes 68% knew how to read and write, and 70% in the group without diabetes (p = 0.76). The average score of FSFI for the group with diabetes and without diabetes was 22.92 (SD = 5.6) and 24.73 (SD = 4.3) respectively, with a statistically significant difference (p = 0.007). The FSFI scores in the group with diabetes were statistically different with HbA1c (p < 0.001), literacy level (p < 0.001), duration of the disease and marriage (p< 0.001) and age group (p < 0.001). They concluded that the higher prevalence of FSD in women with diabetes could be related to the low educational level, and the duration and lack of control of diabetes.

Hintistan & Cilingir (2012) carried out a descriptive, transversal study to determine the prevalence of SD in men and women with DMT2 from Turkey in a sample of 160 patients (80 men and 80 women), 18 to 65 years of age who had been diagnosed with DMT2. HbA1c was measured and the HEF questionnaire for men and IFSF questionnaire for women were applied. 68.9% of the men had secondary education and 57.4% of the women had primary and secondary education; 85.7% of the men were retired and 73.5% of the women were homemakers. 45.5% of the women and 54.5% of the men had HbA1c >7%. Statistically significant differences were found among women between income level (p = 0.003), family size (p = 0.002), and treatment for DMT2 (p=0.017), and SD.

There was a significant difference in SD among women with DMT2 and women without diabetes (p = 0.000). In men with DMT2 and men without diabetes the difference was significant in erectile function (p = 0.000) and sexual desire (p = 0.010). 36.5% of the men had severe ED, 40.4% had moderate ED and 23.1% mild SD. No significant difference was found between age and SD (p = 0.018). There was no significant association between HbA1c levels, diabetes complications and SD. In women with DMT2, the FSD is associated with the income level, the size of the family and treatment; in men, ED is associated with age.

Ziaei-Rad, Vahdanini & Montazeri (2010) carried out a transversal study to evaluate the differences between patients with diabetes, with and without glycemic control. The sample consisted of 200 patients (100 men and 100 women with diabetes). The Feminine Sexual Function Index (FSFI) was applied; and the International Index of Erectile Function (IIEF) and fasting glucose in blood were considered earlier tests than (HEF) and the demographic data. 63% were married, 47.1% had primary education, the domains with SD were desire and satisfaction in orgasm in the illiterate group ($F = 2.66$, $p = 0.003$; $F = 5.29$, $p = 0.001$).Women had a higher level of SD when compared with men (88% against 77%). The FSD was 46.7%, with higher frequency in sexual desire (36.8%), satisfaction of orgasm (25.5%) and orgasm (24.8%). SD has a significant relationship with age ($r = 0.42$, $p < 0.001$), HbA1c ($p = 0.02$), the duration of DM ($p = 0.008$) and illiteracy ($p = 0.05$). The increase of one unit in HbA1c increases SD by 19.1%, 23.2% in desire, 20.7% in satisfaction of orgasm and 17.5% in orgasm ($p < .05$). The number of complications derived from diabetes and a low educational level are risk factors for SD.

Taghreed, Entesar & Kamal (2011) carried out a study to investigate the relationship between DMT2 and depression. They applied the Montgomery Asberg Depression Rating Scale (MADRS). The sample consisted of 125 participants with DMT2, 40 to 60 years of age. 58.4% were women, 52.8% (66) were married, 47.2% were middle class, 74.4% were depressed – 24.8% with mild depression, 37.6% with moderate depression, and 12% with severe depression. The severe depression was significantly higher in women than in men (86.7% against 13.3%, $p = 0.01$), the relationship between depression and the duration of diabetes had a significant difference ($p = 0.000$); 80% of the patients with severe depression had sexual dysfunction with a significant difference ($p = 0.00$). The average level of HbA1c in the participants with depression was higher in mild, moderate and severe depression respectively than in non-depressed patients ($p = 0.000$). Depression was associated with neuropathy, age, retinopathy, gender, and heart complications.

2. Objectives

2.1. General Objectives

Determine the relationship of sexual dysfunction with depression, quality of life and glycemic control in individuals with DMT2.

2.2. Specific Objectives

1. Describe the socio-demographic characteristics (age, gender, marital status, education, and occupation) and glycemic control in individuals with DMT2.
2. Describe the characteristics of sexual dysfunction, depression, and quality of life of individuals with DMT2.
3. Determine the relationship of SD with age, education, and number of years of the DMT2 diagnosis.

4. Methodology

4.1. Design of the Study

The study carried out was descriptive and correlational (Grove, Burns & Gray, 2013); descriptive because the objectives describe the general characteristics of the participants with DMT2 and the main variables of the participants, and correlational because the relationship between sexual function and depression, quality of life and glycemic control of individuals with DMT2 was revised.

4.2. Population, Sampling, and Sample

The population of the study consisted of individuals with DMT2. The type of sampling was systematic -- one in two with random beginning, based on the population of individuals with DMT2 from the Terminal Unit Health Center. The sample was calculated through the n´Query Advisor version 4.0 statistical packages with significance level of 0.5, a correlation coefficient of 0.8 and power of 90%. The sample consisted of 205 participants with DMT2.

4.3. Measurement Instruments

The Personal Data Card was used for this study. Feminine Sexual Dysfunction was measured using the (FSFI) created by Rosen (2000) in the USA to assess the various forms of feminine sexual dysfunction regardless of their etiology. It is a self-administered questionnaire with 19 items. It describes sexual activity during the last four weeks, and evaluates six domains: desire (items 1, 2); arousal (items 3, 4, 5, 6); lubrication (items 7, 8, 9, 10); orgasm (items 11, 12, 13); satisfaction (items 14, 15, 16); and pain (items 17, 18, 19).

Masculine Sexual Dysfunction was measured using the International Index for Erectile Function -5 (IIEF), abbreviated version, developed by Rosen, 1999. It is a self-administered questionnaire where the participant answers five different questions: confidence to maintain an erection, frequency of erections for penetration, frequency to achieve and maintain an erection, frequency of rigid erections for penetration.

The quality of life was measured with the Diabetes-39 (D39) questionnaire, in its Spanish version, created by Boyer & Earp, (1997). The original English version was adapted to Spanish in Mexico by a group of researchers who were experts in the construction and validation of questionnaires. It proved to be reliable and valid to measure QL of Mexican patients with DMT2 ($\alpha=0.95$ for the total score). The questionnaire has 39 items grouped in five sections: (a) Energy-mobility (15 items: 3, 7, 9, 10, 11, 12, 13, 16, 25, 29, 32, 33, 34, 35 & 36); (b) Diabetes Control (12 items: 1, 4, 5, 14, 15, 17, 18, 24, 27, 28, 31 & 39); (c) Anxiety-concern (four items: 2, 6, 8 & 22); (d) Social load (five items: 19, 20, 26, 37 & 38); and (e) Sexual functioning (three items: 21, 23 & 30).

Depression was evaluated with the Depression of Beck-II Inventory (Beck, Steer & Brown, 1996). It is a self-report instrument with 21 Likert type items designed to evaluate depression in adults.

4.4. Biochemical Measurement

Blood sugar was measured by capillary glycaemia using a BAYER-CONTOUR TS glucometer. The results were classified in accordance with the American Diabetes Association (2014b). When the pre-prandial capillary blood sugar level was 90-130 mg/dl, it was considered good control; capillary blood sugar level 2 hours pre-prandial<180 mg/dl and values outside of this range were considered bad blood sugar level control.

5. Ethical Considerations

The study was carried out in accordance with the regulation of the Health General Law for Health Research (Ministry of Health, 1987). It was considered that the Second Title, Chapter I establish the general guidelines and principles with which every scientific research with human beings must comply. It had the approval of the Ethics, Biosafety and Research Committees.

6. Data Analysis

The IBM Statistical Package for Social Sciences (SPSS), Spanish version 21.0 for Windows was used for the processing and analysis of data. The Cronbach's Alpha co relational coefficient was used to evaluate the internal consistency of the instruments; the adjustment kindness test by Kolmogorov-Smirnov with Lilliefors correction was used to determine the normality of variables.

Descriptive Statistics was used to give the answer for the specific objective one. Descriptive Statistics was used for the second specific objective; measures of central tendency were used for the total points of the FSFI, IIEF, and depression and quality of life instruments. Additionally, frequencies and percentages were obtained when the total points were categorized based on the cutting points of the FSFI, IIEF, depression and ED quality of life. Inferential Statistics was used to answer specific objective three and the general objective applying Spearman correlation.

7. Results

In the following section, we give an answer to the first objective of describing the socio-demographic and biochemical characteristics of individuals with DMT2. This study included 205 participants with DMT2; most of them (66.3% - *n* 136) were women. The average age was 57 (*SD* = 11.8; 20-83). The number of years of formal education was 7.55 (*SD* = 3.91; 0-17). 41.5% were married and 38% were workers. The average number of years from the DMT2 diagnosis was 8.22 years (*SD* =6.4; 1-30). Regarding glycemic control, 55.6% had good control (Table 1).

Table1: Sociodemo graphic and biochemical characteristics of individuals with DMT2

Variable	*f*	%
General Characteristics Gender		
Masculine	69	33.7
Feminine	136	66.3
Marital Status		
Single	30	14.6
Married	85	41.5
Free Union	42	20.5
Divorce	17	8.3
Widowed	22	10.7
In a Relationship/Couple	9	4.4
Occupation		
Worker	78	38.0
Professional	5	2.4
Unemployed	11	5.4
Housewife	110	53.7
Other	1	.5
Glycemic control		
Good blood sugar level control (90-130 mg/dL)	114	55.6
Bad blood sugar level control (> 131 mg/dL)	91	44.4
Total	205	100

Note: f=frequencies, %= percentage

In order to answer the second specific objective of describing the characteristics of SD, depression and quality of life of individuals with DMT2, we began by reviewing the total score for each variable. An average of 19.51 (*SD*=3.05) was identified for the Erectile Function Index, and 15.22 (*SD* =12.83) for the Feminine Function Index. Regarding depression, a general average of 11.34 (*SD* =7.9) was obtained, and an average of 18.81 (*SD* = 16.24) was obtained for quality of life. These values are shown in Table 2.

Table 2: Descriptive index statistics of SD, depression, quality of life

	$\bar{x}$	SD	Min	Max
Erectile Function Index				
Confidence to maintain an erection	3.67	.741	2	5
Rigid erections for penetration	3.84	.797	2	5
Capacity to maintain an erection	3.80	.850	2	5
Erection until the end of the sexual act	4.07	.846	2	5
Sexual satisfaction	4.13	.839	2	5
Total Erectile Function Index	19.51	3.052	10	25
Feminine Sexual Function Index				
Desire	2.51	1.59	2.24	2.78
Excitation	2.02	2.25	1.64	2.40
Lubrication	2.21	2.46	1.80	2.63
Orgasm	2.30	2.53	1.87	2.73
Satisfaction	3.66	1.48	3.41	3.91
Pain	2.48	2.72	2.01	2.94
Total Feminine Sexual Function Index	15.22	12.83	3.60	36.00
Depression	11.34	7.19	0.0	38.00
Quality of life	18.81	16.24	.00	73.50

Note: $\bar{x}$ = Mean; SD= Standard Deviation; Min=Minimum; Max=Maximum

When the percentages of ED, FSD, depression and QL were classified, it was found that 78.3% of the men had ED, 66.9% of the women had FSD, 70.7% of the sample had minimal depression and 78% mentioned that they had a good quality of life (Table 3).

Table 3: Frequencies y percentages de IIEF, FSFI, depression y QL

IIEF	f	%
Without SD	15	21.7
SD Mean	44	63.8
SD Mean to Moderate	9	13.1
SD Moderate	1	1.4
SD Severe	0	0
FSFI		
With FSD	91	66.9
Without FSD	45	33.1
Depression		
Minimum Depression	145	70.7
Mild Depression	35	17.1
Moderate Depression	20	9.8
Severe Depression	5	2.4
Quality of Life		
Good Quality of life	160	78.0
Bad Quality of life	45	22.0

Note: f=frequencies; *%*= percentage; *FSFI*= Index of feminine Sexual Function *IIEF* = International Index of Erectile Function; QL= Quality of Life

The Kolmogorov-Smirnov test with Lilliefors correlation was applied to the variables of interest. From this test, it was found that the data did not have a normal distribution, and that is why the non-parametric statistics was used.

The Spearman correlation test was applied to give an answer for specific objective three, which determines the relationship between SD and age, level of formal education and the number of years from the DMT2 diagnosis. The results showed a relationship between FSD with age, educational level and the number of years from the DMT2 diagnosis (r_s= -544, $p < .01$), (r_s= -.387, $p < .01$), (r_s= -.240, $p < .01$) respectively, and MSD showed a significant relationship with age and the number of years from the DMT2 diagnosis (r_s= -.303, $p < .05$), (r_s= -.238, $p < .05$) respectively (Tabla 4).

Table 4: *Spearman correlation of variables FSFI, IIEF, age, Scholarship y number of years with DMT2*

Variable	1	2	3	4	5
1. FSFI	1.000				
2. IIEF	0.000	1.000			
3. Age	-.544**	-.303*	1.000		
4. Scholarship	.387**	.200	-.467**	1.000	
5. Years with DMT2	-.240**	-.238*	.341**	-.154*	1.000
** p <.01. * p < .05; FSFI = Index of Feminine Sexual Function; IIEF =International Index of Erectile Function; DMT2 = Diabetes Mellitus Type 2; n = 205					

The Spearman correlation coefficient was applied to answer the general objective of determining the relationship between SD with depression, QL and blood sugar control. A significant relationship was found between FSFI and quality of life and depression (r_s= -.241, $p = < .01$), (r_s= -.370, $p= < .01$) respectively. No relationship was found between IIEF and the variables of interest.

8. Discussion

The purpose of this study was to identify the relationship between SD, depression and quality of life with blood sugar control in a sample of 205 participants with DMT2 in the metropolitan zone of Monterrey, Nuevo Leon. In this study, the percentage of ED in patients with DMT2 was 78 %, higher than the one reported by Pavia-Ruz et al. (2012) where they identified 69%; the prevalence of this illness is high in both studies and it is important to know the problems that surround sexuality. With more objective data, it will be possible to open new research from which new treatment strategies will emerge with specific characteristics that will help to reduce the problem in less time.

On the other hand, the FSD in this study reported 66.9%, similar to the one obtained by Hintistan&Cilingir (2012). Both studies reported a high FSD index; this could be because it affects women with DMT2, regardless of the type of population and/or age.

Regarding depression, most patients had minimal depression and only one case had severe depression. These results coincide with Taghreed et al. (2011) who also reported a high percentage of depression; this could be because a degenerative chronic disease like DMT2 affects the mood of the people who have the disease.

Regarding QL, most participants expressed that they enjoyed a good quality of life. On the other hand, Salazar et al. (2012), in a study carried out in Guadalajara with a sample obtained from four health service units, using the same Diabetes-39 instrument, showed a higher percentage for bad quality of life; likewise, most participants had diabetes complications. This study did not include DMT2 complications as a variable and the sample was applied in only one health unit. This could explain the discrepancy between both studies. Most participants reported good blood sugar control. These results coincide with those obtained by Salazar et al. (2012) who also reported good blood sugar control (HbA1c) in most participants. This could be because they adhered to the treatment and are affiliated to the social security system and adhered to the DMT2 treatment.

It was found that ED was higher as age and the number of years from the DMT2 diagnosis increased. The results were similar to those obtained by Hintistan & Cillingir (2012) who found a significant relationship between ED and age; the greater the age and the number of years from the diagnosis, the higher the probability of suffering ED. This could be because of the progressive damage caused by DMT2 and the physiological decline corresponding to their age.

A significant relationship was found between FSD and depression. The deeper the depression, the greater the FSD. The results found coincide with those found in a study carried out by Fabian et al. (2010), who found a significant relationship between both variables. This could be because people with FSD are more likely to develop depression. Disorders in sexual function have a negative effect on the mood (PHO, 2009), which could explain the negative impact of sexual dysfunction on mood.

FSD and quality of life have a significant relationship. Nazar-Salvatierra et al. (2010) reported the same, that is, less sexual dysfunction corresponds to better quality of life. Sexual dysfunction affects the quality of life. A good sexual function has a direct impact on the bio-psychosocial environment of human beings (PHO, 2009). This could explain the significant relationship between both variables. When FSD is present, it has an impact on the quality of life. It is very important to evaluate these in individuals who have been diagnosed with DMT2 in order to plan a timely intervention if alterations are found, aiming to improve the quality of life.

On the other hand, a significant relationship was found between FSD and age, educational level and the number of years from the DMT2 diagnosis. These results are similar to those found by Shams et al. (2013), who reported a significant relationship between FSD and the educational level, and the duration of the disease. This could be because FSD increases with the decline that comes with age, with the evolution of the disease and the time from the DMT2 diagnosis.

No significant association between SD and blood sugar control was found. The results are different from those found by Shams et al. (2013) who measured HbA1C and reported a significant relationship for both variables. The discrepancy between the two studies could be the result of using different methods to measure blood sugar level. Capillary blood sugar cannot be as reliable as HbA1C.

9. Conclusions

SD in patients is high for both men and women. Most patients with depression were placed in the minimum depression category and most of them expressed that they enjoyed a good quality of life. A relationship between FSD and quality of life, depression, age, educational level and number of years from the DMT2 diagnosis, was identified. A relationship between ED and age and the number of years with DMT2 was also identified. The greater the age and number of years with DMT2, the more significant the SD. The less depression and SD people experienced, the better quality of life they enjoyed.

10. References

American Diabetes Association. (2014). Standards of Medical Care in Diabetes-2014. Diabetes Care, 37, 14-80.
American Diabetes Association. (2014b). Standards of Medical Care in Diabetes-2014.Diabetes Care. Recuperado de http://care.diabetesjournals.org/content/37/Supplement_1/S14.extract
Beck, A.T., Steer, R.A., & Brown, G.K. (1996). Manual for Beck Depression Inventory-II. San Antonio, TX: Psychological Corporation.
Boyer, J., G., Earp, J., A., (1997). The Development of an Instrument for Assessing the Quality of Life of People with Diabetes: Diabetes-39. *Medical Care;* 35 (5): 440-453
Castro-Acré, G., Tovar-Espinoza, J., & Mendoza-Cruz, U. (2009). Trastorno depresivo y control glucémico en el paciente con diabetes mellitus 2. *Rev Med Inst Mex Seguro Social*, 47, 377-382.
Correa, M.(2014). Factores orgánicos relacionados con la disfunción sexual femenina. *Revista Sexología y Sociedad.;* 20(1): 79-97.

Esposito, K., Maiorino, MI., Bellastella, G., Giugliano, F., Romano, M., & Giugliano. (2010, Abril 8). Determinants of female sexual dysfunction in type 2 diabetes. *International Journal of Impotence Research*, 22, 179-184.

Fabián, M., García, M., & Cobo, C. (2010). Prevalencia de síntomas de ansiedad y depresión en pacientes con diabetes mellitus tipo 2 y su asociación con el tipo de tratamiento, complicaciones de la diabetes y comorbilidades. *Medicina Interna de México*, 26, 100-108.

Gaspar, C., Fernández, M., Dickinson, E., & Irigoyen, A. (2013). Frecuencia de disfunción sexual en un grupo de pacientes diabéticas mexicanas. *Revista Cubana de Medicina General Integral*, 29, 44-53.

Grove, S., K., Burns, N., & Gray, J., R. (2013). The practice of nursing research: Appraisal, synthesis and generation of evidence. St. Louis, MO: Elsevier

Hernández-Ávila, M., Gutiérrez, J., & Reynoso-Noverón, N. (2013). Diabetes mellitus en México. El estado de epidemia. *Salud pública de México*, 55, 129-136.

Hintistan, S., &Cilingir, D. (2012).Sexual Dysfunction in Turkish Men and Women with Type 2 *Diabetes Mellitus .Sex Disabil*, 31, 31-41.

Jiménez, R., Martínez, M., Hernández, V., López, A., Jiménez, I., & Carrasco, P. (2012). Sexuality among Spanish adults with diabetes: A population-based case control study. *Primare Care Diabetes*, 6, 269-276.

Juárez-Bengoa, A., Pimentel-Nieto, D., & Morales-Carmona, F, (2009). Aspectos clínicos de la disfunción eréctil en el paciente con diabetes tipo 2. *Perinatología y Reproducción Humana*, 23, 169-177.

Liu, Y., Maier, M., Hao, Y., Chen, Y., Qin, Y. &Huo, R. (2013).Factors related to quality of life for patients with type 2 diabetes with or without depressive symptoms - results from a community-based study in China. *Journal of Clinical Nursing.* 22,:80-8.

López, J., Rodríguez, R. (2006). Adaptación y validación del instrumento de calidad de vida Diabetes 39 en pacientes mexicanos con diabetes mellitus tipo 2. *Salud Pública de México*, 48, 200-211.

National Diabetes Information Clearinghouse. [NDIC] (2011). Los problemas sexuales y urológicos de la diabetes.2013, de National Institute of Diabetes and Disegestive and Kidney Diseases. Recuperado de: www.diabetes.niddk.nih.gov/spanish/index_sp.aspx

Nazar, A., & Salvatierra, B. (2010). Envejecimiento, calidad de vida y mortalidad temprana en hombres diabéticos. Una aproximación desde la perspectiva de género. *Papeles de Población*, 64, 67-92.

Nowosielski, K.,Drosdzol, A., Sipinski, A., Kowalczyk, R., &Skrzypulec, V. (2010). Diabetes Mellitus and Sexually-Does it really Matter? *International Society for Sexual Medicine*, 7, 723-735.

Organización Mundial de la Salud (OMS). (2012). Diabetes Mellitus. 2012, de OMS. Recuperado de:web: http://www.who.int/mediacentre/factsheets/fs312/es/

Organización Mundial de la Salud [OMS] (2012). *Diabetes mellitus.* Recuperado de: http://www.who.int/mediacentre/factsheets/fs312/es/

Organización Panamericana para la Salud (OPS). (2009). Identify, Adrdress and Treat Sexual Concerns, Dysfunctions and Disorders. En Sexual Health for the Millennium. A Declaration and Technical Document (117-132). USA: World Association for Sexual Health.

Ozcan, S., Hotun, N., Bilgic, D., &Dereli, S. (2011, Abril). Is Sexual Dysfunction Associateed with Diabetes Control and Related Factors in Women with Diabetes? *Sex Disabil*, 29, 251-261.

Pavia-Ruz, N., Lope-Gómez, M., & Vera-Gamboa, L. (2012). Disfunción eréctil en pacientes con enfermedades crónico-degenerativas y metabólicas en una población rural de Yucatán, México. *Rev Mex Urol*, 72, 240-244.

Pérez, F. (2009). Epidemilogía y fisiopatología de la diabetes mellitus tipo 2. *Rev Med Clin. Condes*, 20, 565-571.

Rosen, R., Brown, C., Heiman, J., Leiblum, S., Meston, C., Shabsigh, R., Ferguson, D., &D´Agostino, R. (2000). The Female Function Function Index)FSFI): a multidimensional self-report instrument for the assessment of Female Sexual Function. *Journal of Sex & Marital Therapy*, 26, 191-208.

Rosen, R., Cappelleri, J., Smith, M., & Peña, B. (1999). Development and evaluation of the International Index of Erectil Function (IIEF-5) as a disgnostic tool for erectile dysfunction. *Urology* , 49, 319-326.

Salazar, J., Gutiérrez, A., Aranda, C., González, R., & Pando, M. (2012). La Calidad de vida en adultos con diabetes mellitus tipo2 en centros de salud de Guadalajara, Jalisco (México). *Salud Uninorte*, 28, 264-275.

Salcedo-Rocha, A., García, J., Sevilla, E. (2008). Dominio cultural del autocuidado de diabetes. *Rev Salis Publica*, 42, 256-64.

Sánchez, C., Carreño, J., Martínez, S., Gómez, M. (2005, Agosto). Disfunciones Sexuales Femeninas y Masculinas: Comparación de género en una muestra de la Ciudad de México. *Salud Mental*, 28, 74-80.

Secretaría de Medio Ambiente y Recursos Naturales-Secretaría de Salud [SEMARNAT-SSA]), Norma Oficial Mexicana NOM-087-ECOL-SSA1-2002, Protección ambiental - Salud ambiental - Residuos peligrosos biológico-infecciosos - Clasificación y especificaciones de manejo. Recuperado de ttp://www.salud.gob.mx/unidades/cdi/nom/087ecolssa.html

Secretaría de Salud, (2010). NORMA Oficial Mexicana NOM-010-SSA2-2010, Para la prevención y el control de la infección por Virus de la Inmunodeficiencia Humana. Recuperado de: http://www.spps.gob.mx/marco-juridico/normas-oficiales.html

Secretaría de Salud, (2010). NORMA Oficial Mexicana NOM-015-SSA2-2010, Para la prevención, tratamiento y control de la diabetes mellitus. Recuperado de: http://www.spps.gob.mx/marco-juridico/normas-oficiales.html

Secretaria de Salud, [SS]. (1987) *Reglamento e La Ley General De Salud en Materia de Investigación para la Salud* (7ª Ed). México. Porrúa

Secretaria de Salud. (2011-2012). Encuesta Estatal de Salud y Nutrición del Estado de Nuevo León (EESN-NL). 2013, de Secretaria de Salud. Recuperado de: http://www.nl.gob.mx/?P=salud_noticias_16122010_99.

Secretaria de Salud. (2013). Plan de Desarrollo 2013-2018-Programa Sectorial de Salud. 2013, de Secretaria de Salud. Recuperado de: http://www.salud.gob.mx/indicadores1318/pdf/programa.pdf

Serrano, C., Zamora, K., Navarro, M., Villareal, E. (2012). Comorbilidad entre depresión y diabetes mellitus. *Med IntMéx*, 28, 325-328.

Shams, N., Modabber, A., Mohsenpour, B., Karimian, F., & Shams, A. (2013, Jul-Sep).Comparison of sexual dysfunction between diabetic and non-diabetic women.*Journal of Mid-life Health*, 4, 167-172.

Taghreed, M., Entesar, O., & Kamal, I. (2011). Depression among type 2 diabetic patients. *The Egyptian of Hospital Medicine*, 44, 258-271.

Torres, B., & Gutiérrez, C. (2010). Enfermedad crónica, calidad de vida y sexualidad. *Investigaciones Medicoquirúrgicas*, 11, 23-29.

Yao, S., Xin, S., Qing, L., Ya, C., Hui, Z., & Jian, Z. (2012, Enero 11). Study on Female Sexual Dyscfunction in Type 2 Diabetic Chinese Women. *Biomed Environ Sci*, 25, 557-561.

Ziaei-Rad, M., Vahdaninia, M., &Montazeri, M. (2010). Sexual dysfunctions in patients with diabetes: a study from Iran. *Reproductive Biology and Endocrinology*, 8, 1-8.