More Than 10 years Diabetes Mellitus Related Female Sexual Function

THESIS

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Laila Hesham Al Galaly

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ABSTARCT

Introduction: Diabetes is a serious problem and has an impact on female sexual function.

Aim: The aim of this work was to asses the prevalence of sexual dysfunction among married diabetic females more than 10 years of duration.

Methods: This study was carried on 350 married women, age range 30-60 years old, women were divided into two groups 250 diabetic patients from outpatients clinics of National Institute of Diabetes and Endocrine Diseases in Kasr El Aini Hospital and Wadi El Neel Hospital and accepted to share in this study and 100 control group non diabetic women.

Main outcome measures: After history taking from all women, blood pressure was measured then laboratory investigations which includes fasting blood sugar, postprandial and glycosylated hemoglobin to the diabetic group. We used the female sexual function index (FSFI),a recognized 19-item questionnaire to assessment of female sexual function for both groups.

Results: The result of current study summarized as following: there was a significant decrease in score of total FSF score and all domain that include desire, arousal, orgasm and vaginal lubrication in comparison between diabetic and control women. Diabetics more than 15-year duration were found to have decrease in all domains of FSFI compared with those having duration less than 15 years. There were no significant differences between type I and type II of diabetes with respect to FSFI scoring and FSD percentage. There was statistically significance inverse relation between FSFI and FBS&PP. there was no significance with Hb1AC. FSD was significantly greater in hypertensives than in non-hypertensives.

Conclusion: Diabetes mellitus significantly affects female sexual function

Key words: female sexual dysfunction, Diabetes mellitus.

List of Abbreviations

ACTH	:	adrenocorticotropic hormone.
AFUD	:	American foundation of urological diseases.
BDI	:	beck's inventory for depression.
BISF-W	:	Brief Index of Sexual Functioning for Women
cGMP	:	cyclic guanosine monophoshate.
CRP	:	c-reactive protein.
DHEAS	:	dehydroepiandrosterone sulphate.
DISF/DISF – SR	:	Derogatis Interview for Sexual Function
DKA	:	Diabetes ketoacidosis.
DM	:	Diabetes mellitus.
EDIC	:	Epidemiology of diabetes interventions and complications.
eNOS	:	endothelia nitric oxide synthase.
ESRD	:	End stage renal disease.
FAD	:	female arousal disorder.
FDA	:	Food and drug administration.
FOD	:	female orgasmic disorder.
FSD	:	Female sexual dysfunction
FSDS	:	Female Sexual Distress Scale
FSF	:	female sexual function.
FSFI	:	female sexual function index.
FSH	:	Follicle-stimulating hormone.
FT	:	free testosterone.
fT3	:	free tri iodo thyronine.
fT4	:	free thyroxine.
GAD	:	Glutamic acid decarboxylase.
GALP	:	galanin- like peptide.
GDM	:	Gestation diabetes mellitus.
GFR	:	glomerular filteration rate.
GnRH	:	Gonadotropin releasing hormone.
HbA1c	:	Glycated hemoglobin.
HDL-C	:	High density lipoprotein cholesterol.
HCG	:	Human chorionic gonadotropin.

HHNKC	:	hyperglycemic hyperosmolar nonketotic coma.
HLA	:	Human leukocyte antigen.
HSDD	:	hypoactive sexual desire disorder.
IFG	:	Impaired fasting glucose.
IGT	:	Impaired glucose tolerance.
LADA	:	Latent autoimmune diabetes of the adult.
LDL-C	:	Low density lipoprotein cholesterol.
LH	:	Lutenizing hormone.
NADH	:	nicotinamide adenine dinucleotide.
NO	:	nitric oxide.
NOS	:	nitric oxide synthatase.
PAI	:	Plasminogen activator inhibitor.
PDE 5	:	phosphodiestrase 5.
PKE	:	protein kinase expression.
SD	:	sexual dysfunction.
SHBG	:	sex hormone-binding globulin.
SPD	:	sexual pain disorder.
SSRIs	:	selective serotonin reuptake inhibitors.
TGF-β1	:	transforming growth factor beta 1.
VIP	:	vasoactive intestinal peptide.
NGSP	:	National Glycohemoglobin Standardization Program
DCCT	:	Diabetes Control and Complications Trial

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INTRODUCTION

Diabetes mellitus, is a metabolic disorder of carbohydrate, fat and protein metabolism, due to insulin deficiency, insulin insufficiency or insulin resistance. It results in hyperglycemia, thirst, polydypsea and polyurea. It may result in acute and chronic complications. Sexual dysfunction is an entegral part of the complications of diabetes mellitus. ***(Giuseppe Derosa et al, 2011)***

Sexual dysfunction refers to a difficulty experienced by an individual or a couple during any stage of a normal sexual activity, including desire, arousal or orgasm that prevents the individual or couple from experiencing satisfaction from the sexual activity***. (Lombardi et al, 2011)***

Women with diabetes are twice as likely to experience sexual problems as those without. Sexual dysfunction in females may be due to disturbances in sexual desire and pathological changes such as:

- Blood vessel damage (atherosclerosis) can cause vaginal dryness and affect arousal because it affects the blood supply to the clitoris, affecting orgasm.
- Nerve damage (neuropathy) can cause reduced sensation, making arousal and orgasm more difficult.
- Endocrine disorders cause sexual dysfunction. Normal function of the hypothalamo pituitary axis, thyroid and gonads are important for normal sexual function.

- Low estrogen levels, This is more common in women with diabetes, because it can affect the parts of the body responsible for producing hormones, thereby affecting the amount of lubrication produced during arousal.

- Smoking, drugs and alcohol can affect blood flow to the clitoris affecting orgasm.

Also Psychological factors such as: depression, stress, anxiety & panic disorders, poor self-image from weight gain, can all cause loss of desire or arousal problems. ***(Giraldi and kristensen, 2010)***

Aim of Work

This work aimed to assess the prevalence of sexual dysfunctions among married female diabetic patients more than 10 years using the Modified Arabic translated version of female sexual function index (FSFI).

CHAPTER I

Normal Female Sexual Response Cycle

Female sexual physiology

The human sexual response cycle is a four-stage model of physiological responses during sexual stimulation. These four phases, in order of their occurrence, are the excitement phase, plateau phase, orgasmic phase, and resolution phase according to **Maters and Johnson Human Sexual Response, 1966.** William masters and Virginia johnson were the first to describe the human sexual response as it applies to both men and women **(Bantam, 1981).**

They proposed a linear model with four separate successive phases although inadequate for understanding the fine psychogenic aspects of the sexual response, their model provide a useful frame work for the future descriptions and studies **(Sutherland and Althof, 2004).**

Phase I: Excitement (desire)

The initial phase of the normal sexual response cycle is the excitement phase, also known as the arousal phase, it is the first stage of the human sexual response cycle. It occurs as the result of any erotic physical or mental stimulation, that lead to sexual arousal. During the excitement stage, the body prepares for coitus, or sexual intercourse ***(Kohn and Kaplan, 2000)*.**

During this time, a woman experiences physical changes in her body, such as swelling of the nipples and of the breasts. During this stage, she

will have an increased respiratory rate, elevation of blood pressure, and vasocongestion of the pelvic organs. The woman may experience a skin flush due to increased blood flow to the skin. Other signs that signify the excitement phase are increased size of the clitoral shaft and labia separation as blood flow increases **(McAnulty and Burnette, 2001).**

The labia may also have notable physical changes. The labia majora become flatter, thinner, and raise upward and outward in nulliparous women (those who have not given birth). In parous women (those who have given birth), they may increase two or threefold in size. . The labia minora may increase in size and may protrude from the labia majora, as blood flow increases depending on the size they are in a relaxed state. The clitoral glans becomes tumescent, or swollen, like the glans of the penis and vaginal lubrication is produced by the vasocongestion of the vaginal walls. They darken in color and become smoother than normal. Also, the uterus elevates, more vertically as time passes, and the inner two-thirds of the vagina expand, usually a total of 7 to 10 cm **(Basson, 2001).**

Phase II: Plateau (desire)

The second stage is the plateau phase. This is a continuation of the excitement phase, although more intense at its peak, it is the period of sexual excitement prior to orgasm. The phase is characterized by an increased circulation and heart rate in both sexes, increased sexual pleasure with increased stimulation, and further increased muscle tension. Also, respiration continues at an elevated level **(Basson, 2001).**

During the excitement phase, events are happening very fast, but during plateau, these changes are continuing to increase, although at a slower rate, until maximum excitement is reached. The plateau concept

describes the woman reaching her peak level of physical excitement prior to orgasm occurring. The vasocongestive response is at its highest. There is continued myotonia, increased heart rate and blood pressure, and the clitoris retracts under its hood. The areola and labia further increase in size, the clitoris withdraws slightly and the bartholine glands produce further lubrication. The tissues of the outer third of the vagina swell considerably, and the pubococcygeus muscle tightens, reducing the diameter of the opening of the vagina and creating what **Masters and Johnson, 1966** refer to as the orgasmic platform**(Kohn and Kaplan, 2000).**

Prolonged time in the plateau phase without progression to the orgasmic phase may result in frustration if continued for too long. It is at this point in time that many women need extensive clitoral stimulation in order to continue into the orgasmic phase.

This phase lasts anywhere from a few seconds to several minutes and is many times reported as the most intense. Feelings of desire are described as a sense of warmth and tingling in sexual regions, and a desire for further arousal is common **(Basson, 2001).**

Phase III: Orgasm

The third phase is the orgasmic phase, Orgasm is the conclusion of the plateau phase of the sexual response cycle and is experienced by both males and females. It is accompanied by quick cycles of muscle contraction in the lower pelvic muscles, which surround both the anus and the primary sexual organs. Women also experience uterine and vaginal contractions. Orgasms are often associated with other involuntary actions, including vocalizations and muscular spasms in other areas of the body, and a

generally euphoric sensation. Heart rate is increased even further ***(Jyoti Yadav et al, 2001).***

During the orgasm phase, a several-second time period of very significant myotonia occurs, followed by an abrupt release, and rhythmic contractions of the perineal, bulbocavernosus, and pubococcygeus muscels. The uterus contracts, as well as the rectal sphincter muscle. Collectively, these muscle contractions lead to perceived rhythmic tightening of the perivaginal muscles. These localized specific contractions may become generalized to the rest of the body, leading to a relatively involuntary spasm of skeletal muscle throughout the body. The time of tonic contraction at the beginning of orgasm is commonly described as when the most intense pleasurable feeling is noted. The muscular spasms are theorized to aid in the locomotion of sperm up the vaginal walls into the uterus **(McAnulty and Burnette, 2001).**

Phase IV: Resolution

The last phase of the sexual response cycle is the resolution phase. During resolution, there is a return of all the physiologic changes described previously to their normal basal state. Heart rate, blood pressure, and respiration return to normal minutes after orgasm. Muscles that were in a state of contraction become very relaxed, Women may describe their relaxation as a time of complete calm.

Feeling of closeness to the partner may be at the maximum during resolution (**Bohlen et al, 1982).**

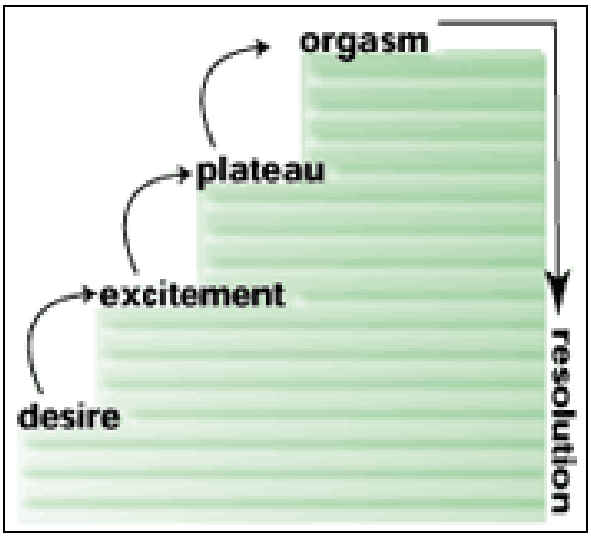

Figure 1: Masters and Johnoson's Four- Phase Model,1966

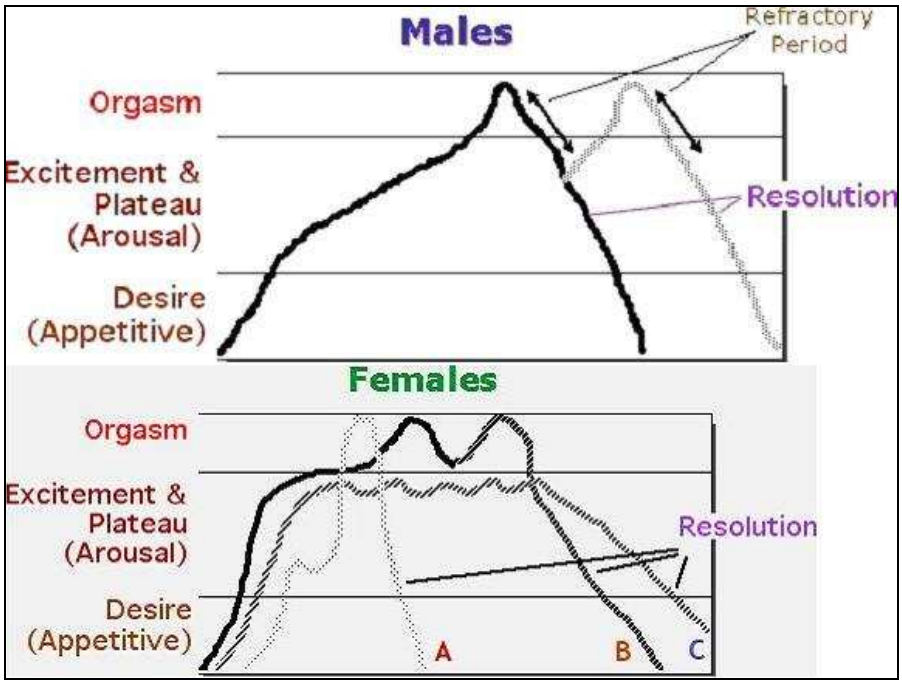

Figure 2: Master and Johnson the four phases of human sexual cycle graph.

Anatomy of female External Sexual Organs (Vulva)

Understanding the female pelvic anatomy and physiology is important for the evaluation and treatment of female sexual dysfunction. Female pelvic anatomy comprises external and internal genitalia.

The female external sexual organs are grouped together and called the **vulva**, the vulvar area includes structures that are visible externally and extends from the pubic bone (symphysis pubis) anteriorly to the anal sphincter posteriorly and laterally to ischial tuberosities. The vulva consists of the labia , interlabial space, clitoris and the vestibular bulbs. The urethral orifice is inferior to the frenulum of the clitoris. Adjacent to the urethra are the Skene's glands. The hymen is circumferential and is sentinel to the vaginal tube. Lateral to the hymenal ring is the labia minora, followed by the labia majora laterally toward the thighs. Bartholin's glands open at 5- and 7-o'clock positions inferiorly on the vulva ***(Ira Horowitz. et al, 2010).***

On the front of the body, the **Mons Pubis** is a rounded fat-filled cushion that lies over the interior surface of the right and left pubic bones. During puberty the skin of the mons pubis becomes covered with pubic hair that usually grows in a triangular area **(Althof, et al, 2005).**

- **Labia majora and minora:**

The labia majora enclose and protect the other external reproductive organs. Literally translated as "large lips," the labia majora are relatively large and fleshy, and are comparable to the scrotum in males. The labia majora contain sweat and oil-secreting glands. It extend to the midline and fuse to form a small ridge of tissue called the posterior fourchet.

This area often becomes obliterated by vaginal deliveries. ***(O'Connell et al, 1998)***.

The Labia minora: Literally translated as "small lips," the labia minora can be very small reddish folds of tissues up to 2 inches wide. They lie just inside the labia majora, and surround the openings to the vagina and urethra, At the front end, they come together to form the prepuce of the clitoris or the clitoral hood, and below the clitoris they form its supporting membrane or frenulum. The labia minora are endowed with many nerve endings and are extremely sensitive to touch, they contain erectile tissue which resemble the corpus spongiosum of the penis. They comprise one of the few areas of the body that has a large number of sebaceous glands without hair follicles **(Munarriz, et al, 2003).**

During sexual arousal, both the clitoris and the labia minora become engorged, consequently becoming everted, exposing their inner surface ***(Bancroft, 1989).***

- **Bartholin's glands**:

These glands are located beside the vaginal opening and produce a fluid (mucus) secretion.

- **Vestibular bulbs**:

The vestibular bulbs are 3-cm long paired structures that lie along the sides of the vaginal orifice, directly beneath the skin of the labia minora. they are separated from the clitoris, urethra and vestibule of the vagina***(O'Connell et al. , 1998)***.

- **Clitoris:**

Is a central erectile structure at the front of the opening to the vagina, It consists of three parts; the innermost crura or legs that are attached to the pubic symphysis, a body often called the corpus, and an outermost glans or head. The glans has one of the largest concentrations of nerve endings in the female body. The body of the **clitoris** has two corpus cavernosa in its walls, which are lined by smooth muscle fibers. Studies have demonstrated that the glans and body of the clitoris are 2–4 cm long and that thecrura are 9–11 cmThese structures allow the **clitoris** to become erect upon stimulation ***(O'Connell et al, 1998).***

- **The hymen**:

The hymen is composed of both elastic and collagen connective tissue and varies widely in structure and shape in adult females. Small tags or nodules of firm fibrous tissue may be left as remnants from the breaking of the hymenal ring. The hymen is so varied in appearance. Occasionally, the hymen is thick and very persistent and must be surgically removed before intercourse can take place **(basson et al, 2004).**

- **Vagina:**

The vagina is a canal that joins the cervix (the lower part of uterus) to the external genitalia, it usually measuring 7 to 15 centimeters in length depending on the position of the uterus. It can easily dilate and expand for intercourse and childbirth. It is also know as the birth canal **(Steven bassett et al, 2001**)