

Effect of Evidence-Based Nursing intervention on Quality of Sexual Function among Vaginal introitus laxity Women

Hanan Fawzy Abbas Soliman¹, Rania Eid Farrag², Haitham Badran³

¹Lecturer of Maternity and Gynecological Nursing, Faculty of Nursing, Ain Shams University, Egypt

²Assist. Prof. of Maternal and Neonatal Health Nursing, Faculty of Nursing, Fayoum University, Egypt

³Lecturer of Obstetrics and Gynecology, Faculty of Medicine, Fayoum University, Egypt

Abstract: Vaginal laxity is a significant issue affect women, long-term physical and psychological consequences may occur, including loss of sensation and sexual dissatisfaction. An evidence-based nursing intervention as pelvic floor muscle exercises was effective in improving the quality of sexual function among women with vaginal laxity. This study aimed to evaluate the effect of the evidence-based nursing intervention on quality of sexual function among vaginal introitus laxity women. An intervention research design (time series) was adopted. A purposive sampling technique was used to recruit 60 women at gynecological outpatient and family planning clinics in Ain Shams Maternity Hospital. Four tools of data collection were used: Self-Administered Questionnaire, Female Sexual Function Index (FSFI), Female Sexual Distress (FSD-R), and Self-reported changing in sexuality post-intervention tool. Results: revealed that there were statistically significant improvements in the total (FSFI) mean score and the total (FSD-R) mean score after the intervention at ($P < 0.001$). In addition, women reported positive changing in their sexuality by the increase in the sexual activity, intercourse frequency, and satisfaction, and decreased the sexual difficulties. Conclusion: the Sexual function of women with vaginal introitus laxity was improved post 3 and 6 months of the intervention. This indicates that vaginal tightening with exercises had a positive effect on the sexual function in women. However, it will take a long period and need to give a good effect. Recommendation: Sexual relation counseling for the couples should be an integral part of the gynecological treatment in the hospitals especially for cases with sexual dysfunction.

Keywords: Evidence Based Nursing intervention, Sexual function, Sexual Distress, and vaginal introitus laxity.

I. INTRODUCTION

Vaginal skin is consisted largely of collagen tissues, which able to expand, contract and return to its original size. However, after childbirth, many women experience vaginal loose or laxity (a reduction in the resilience, strength, and contractility of vaginal tissues) that may interfere with quality of sexual life by reducing the sensation during intercourse.

^[1] Vaginal laxity is reported by 38% of women attending urogynaecology clinics of whom 43% report this as "Quite a problem" or a "Serious problem". ^[2]

A loose vagina (vaginal laxity) is considered problematic, poorly recognized, and ill-defined condition. Long-term laxity of the "vaginal introitus" is differentiated from "pelvic organ prolapse" (POP), which foremost includes the collapse of the internal genito-pelvic structures. While vaginal introitus laxity refers to the looseness of the vaginal opening. ^[3] ¹ Many factors contribute to loosening or laxity of vaginal muscles including; Strenuous vaginal childbirth which overstretches or tears the pelvic muscles and can also be the result of multiple births, instrumental deliveries, insertion of large objects during masturbation, menopausal estrogen deficiency (affect 50 to 75% of vaginal laxity), and advancing age. ^[4,5]

Women may experience vaginal laxity at a younger age in case of certain genetic disorders of collagen metabolism. Another factor is a history of significant severe or recurrent trauma to the vagina, which may contribute to loose and incompetent vagina's tissues. As well, as tissue damage is caused by long-term straining, overweight or a cough or chronic constipation. [6] Estrogen deficiency in the female genitalia causes vaginal atrophy, which has been related to vaginal laxity and dryness. This deficiency can be a result of hormonal disturbances during a menstrual cycle, menopause, episiotomy, unhealthy lifestyle, side effects of medication (e.g., oral contraceptives or antidepressants), chemotherapy, and stress. [7]

As a result of vaginal loosening (vaginal laxity), a broad variety of embarrassing and distressing situations occurred for women, which in turnover leads to problems in relationships, leading to feelings of anxiety and depression. Vaginal laxity may affect women health-related quality of life (HRQOL) and in some women, adversely affect women's sexual health and self-image. [8, 9] Women with vaginal laxity may present with changes in sexual self-esteem, vaginal flatulence, pain during intercourse, vaginal dryness, genitourinary incontinence and/or female sexual dysfunction. As well, as vaginal looseness can lead to diminished physical sensation during intercourse. One may find it difficult to get orgasms and sexual pleasure, which may lead to unsatisfactory sexual encounters [1]

Thus, Women feel the need to repair the vaginal muscles through what is known as vaginal practices. Vaginal practices by using traditional products are commonly performed by women worldwide. These practices include vaginal tightening, vaginal drying, and intravaginal cleansing. [3] Little studies have been done on these traditional products to determine their efficacy and safety. In addition, these products use is poorly curbed, and some of the products may contain adulterated products resulting in possible adverse effects. [5] Moreover, Vaginal practices were proposed as risk factors that may increase women's vulnerability to human immune deficiency virus (HIV) as the inserted agents may cause irritation and damage to the vaginal mucosal lining. Thus, there is an increased need to understand these practices in detail.

Currently, there are not adequate surgical procedures to address vaginal introitus defects associated with an acquired sensation of wide vaginal introitus. [10] Some gynecologists have performed "traditional colporrhaphy" on patients with a sensation of a wide vagina who had lost the ability to experience orgasms as the main symptom. [8] The selective vaginal tightening surgeries in women with vaginal laxity may improve some aspects of sexual function; however, dyspareunia and vaginal dryness remain a concern in these types of surgery. [11] Therefore, application of one-procedure-fits-all is not a solution for these abnormalities.

Lifestyle modification is needed in tightening the wide vaginal introitus and improve women sexual function. Lifestyle refers to a pattern of individual practices and personal behavioral choices that are used to improve or reduce the health. Therefore, intervention to foster a healthy lifestyle is essential and must be adapted to tightening the loose vagina and improve women sexual function. Lifestyle modifications in the current study are focused on pelvic floor exercises. It has been assumed that the pelvic floor muscle tone (PFM), strength and ability to contract are important factors for vaginal receptivity and responsiveness, for pleasure during intercourse for both partners, and for the orgasmic muscular response. Some studies have shown that strong PFM may be associated with better orgasmic and arousal potentials, desire, excitement and vaginal lubrication, in addition to improved vaginal sensation and tightness. [12,13] Pelvic floor muscle exercise, or Kegel exercises, consist of frequently contracting and relaxing the muscles that form part of the pelvic floor. In addition, squatting and leg up exercises incorporate working on the pelvic floor muscle and strengthening the core muscles, which together will help keep the women's pelvic floor muscles tighter. [1]

Nurses play a crucial role in the identification of women who face the subsequent risk of developing vaginal laxity (vaginal loosening), and should be able to adopt preventive strategies to prevent the problem. Also, Nurses should have an active role to act as health educators and counselors to deliver important health educational instructions to the women developing vaginal laxity associated problems, through help women to adopt a healthy lifestyle. Increase the women knowledge and awareness, and encourage them to be not shy to report it and asking for medical help, which consequently helps them in improving their health by reducing the incidence and the associated complications of vaginal laxity. Adopting a healthy lifestyle will help the women to condition their vaginal muscles by tightening the wide vagina and improve their sexual function. [14]

Significance of the study:

Vaginal laxity is a highly rampant and undertreated medical condition that affects millions of women across the world. At some point during women lifetime, some if not most women will experience loosening of the vagina; long-term physical and psychological consequences may occur, which adversely influence their health-related quality of life and quality of sexual function. One may find it difficult to get orgasms and sexual pleasure, which may lead to unsatisfactory sexual encounters. In our eastern society, this problem may lead to increase divorce rate or to a second marriage. In addition to most women do not talk to gynecologists about their loss of sensation or perceived vaginal looseness for various reasons; one is their embarrassment to bring it up. Surgical and traditional methods, which commonly used by women to tighten the vaginal laxity, have adverse effects as infection, vaginal dryness, dyspareunia, fistula and recurrence of the vaginal problem. Few studies that describe an accurate assessment of vaginal laxity “wide or loose” incidence and prevalence, as well as its negative impact, as loss of sexual sensation or satisfaction and for its management. However, the good news is women do not have to opt for surgery to get to its pre-birth condition. Instead, they can employ natural vaginal tightening methods. In Egypt, there are scattered researches that are carried out to examine the effect of a nonpharmacological intervention on women have vaginal laxity. In this context, the current study has one central goal: providing a remarkable evidence to the positive effect of an evidence-based nursing intervention as exercises “Kegel exercise, Squatting and leg up exercises” to improve the quality of women sexual function with vaginal introitus laxity, which is cost-free and effective with no risks for women.

Aim of Study:

The aim of this study is to evaluate the effect of evidence-based nursing intervention on quality of sexual function among vaginal introitus laxity women through the following:

1. Determine the vaginal introitus laxity “loose” degrees and the associated symptoms.
2. Investigate the effect of evidence-based nursing intervention on tightening the vaginal introitus laxity and improves sexual function among participants.

Research hypothesis:

The current study hypothesized that: the evidence based nursing intervention will have a positive effect on tightening the vagina and improves the quality of sexual function among participants.

II. SUBJECTS AND METHODS

1. Research Design, setting, and timing:

An intervention (time series) study design was utilized to meet the aim of the study, conducted in the gynecological outpatient and the family planning clinics at Ain Shams University Maternity Hospital, Cairo Governorate-Egypt.

2. Sampling technique, size and criteria:

A purposive sampling technique was used to recruit 60 women who were complaining of low or no sexual pleasure associated with vaginal introitus laxity and were recruited after their acceptance to participate in the study. The sample number were selected according to the following statistic formula $n = Z_{21} - \alpha/2p (1-p)/d^2$. During the follow up time of the implementation phase of the study. The women were enrolled based on the inclusion and exclusion criteria. **The inclusion criteria;** married women who have an acquired sensation of wide vaginal introitus (self-reported of a diminished or absent sensation of vaginal insertion of the penis with a decrease or lack of ability to reach orgasm), literate and aged 25–45 years (reproductive age). Women had at least one full-term vaginal delivery and delivered at least 12 months prior to enrollment, and had vaginal intercourse \geq once per month. Otherwise, Women who had a history of urogenital infections, had experienced recent stressful events in their life, suffered from chronic diseases, pelvic organ prolapse/urinary incontinence, were under medication that affects sexual function (e.g. antihypertensive drugs, cimetidine, and antidepressants), smokers, pregnant women. Moreover, those whose husbands had a history of sexual disorders, previous vaginal, perineal or anal surgery, and the presence of neurological condition **were excluded**.

3. Tools for data collection: four tools were used for data collection as the following:

Tool 1. Self-administered questionnaire sheet: This tool was developed by the researchers to collect data after reviewing the relative literature. It was divided into 3 parts; **First part;** consisted of eight questions included socio-demographic characteristics (age, current marriage period, educational level, occupation... **Second part** “*Vaginal laxity questionnaire (VLQ)*”; obtains perceptions on level of vaginal laxity “widening or loosening”, assessed with 4-level ordered responses , Self reported perceptions of vaginal laxity defined as “ very loose”, moderately loose”, “slightly loose” or neither loose” on the vaginal laxity questionnaire. The score ranged from 3 for very loose to 0 for neither loose (*Herbst et al, 2009*).^[15] **Third part** “*the Vaginal laxity associated symptoms*”; developed by the researchers based on literature review, consisted of six questions related to vaginal introitus laxity; the score was (1) for answer with yes and (0) for answer with no.

Tool 2. Female sexual function index (FSFI): A six-domain instrument contains 19-questions; libido domain had (two questions), sexual arousal area had (four questions), lubrication area had (four questions), and three questions each for orgasm, sexual satisfaction and pain. A 5-point Likert scale was used for scoring. The score ranged from (0-36), a score ≤ 26.55 is classified as female sexual dysfunction. There are two domains of Female sexual function index; “the individual domain scores and full-scale scores” were originated from the computational formula outlined in the below table. The individual domain scores were achieved by compile the individual items scores that include the domain and multiplying the sum by the “domain factor”. On the other hand, the full-scale score was attained by adding the six domain scores (*Rosen, et al 2000*).^[16]

Domain	Questions	Score range	Factor	Minimum score	Maximum score	Score
Desire	1,2	1-5	0.6	1.2	6.0	
Arousal	3,4,5,6	0-5	0.3	0	6.0	
Lubrication	7,8,9,10	0-5	0.3	0	6.0	
Orgasm	11,12,13	0-5	0.4	0	6.0	
Satisfaction	14,15,16	0 (or 1)-5	0.4	0	6.0	
Pain	17,18,19	0-5	0.4	0	6.0	

Full scale score range 1.2 36.0 Total

Tool 3. Female sexual distress scale (FSD-R); consisted of (13 items) to provide a quantitative measure of sexually related personal distress in women over the last 4 weeks. The response ranged from 0 = never to 4= always. The score ranged from (0-52), a score of ≥11 effectively discriminates between women total with female sexual distress and no female sexual distress (*Derogatis et al, 2008*).^[17]

Tool 4. Self-reported changing in sexuality post-intervention tool; consisted of 4 questions used to ask the participants if they had noticed any changes after the intervention in “sexual activity, satisfaction, intercourse frequency, and difficulties during intercourse”. The response was 3 = increased, 2=unchanged or 1=reduced (*Braekken et al,2015*) and (*Mouritsen, & Larsen, 2003*)^[13,18]

4. Content validity and reliability

Study tools were submitted to a panel of five experts in the field of maternity nursing to test the content validity. Modifications were done according to the panel's judgment on the clarity of sentences and content appropriateness. Reliability analysis was conducted to investigate the instrument internal consistency, which used in the study. Internal consistency describes the extent to which all the questionnaire items measure the same concept or construct. Cronbach alpha coefficients were calculated to examine the measurement reliability with multipoint items. The accepted values of Cronbach alpha coefficient range from 0.60 to 0.95 (*Tavakol and Dennick, 2011*).^[19] The questionnaire items of the present study tools (tool 1, 2, 3 and 4) were proven reliable where α = 0.92, 0.96, 0.92 and 0.95.

5. Pilot Study

It was conducted on 10% of the participants, were selected randomly and excluded from the total sample. Its aim was to evaluate the simplicity and clarity of the tools. It also helped in the estimation of the time needed to fill in the forms. According to the pilot study results, simple modifications were done as rephrasing or canceling some questions.

6. Ethical consideration

An official permission was granted from the director of the Ain Shams University Maternity Hospital. The researchers introduced themselves to the women who met the inclusion criteria and informed them about the purpose of this study in order to obtain their acceptance to share in this study, the researchers ensured that the study posed no risk or hazards to their health and their participation in the study is voluntary. Women who were willing to participate in the study and met the inclusion criteria were approached by the researchers and asked for verbal consent to confirm their acceptance, and all events that occurred during data collection were considered confidential.

7. Fieldwork:

Recruitment and follow-up of the participants were carried out from May 2017 to November 2017. The researchers attended the pre-mentioned study setting three days per week starting at 9.00 a.m. to 2.00 p.m. to collect the data. At the beginning, a written permission was obtained from the institutional authority of maternity hospital before conducting the study. After that, the researchers have introduced themselves to women who met the inclusion criteria and inform them about the purpose of this research to get their acceptance and cooperation to be recruited in it. Confidentiality of information was ensured to gain women confidence and trust. The researchers were constructed and prepared the different data collection tools, designed the evidence-based nursing intervention teaching materials were developed by the researchers and revised by experts in the field of maternity nursing. The collection of data covered a period of 6 months. Two periods of data collection: pre-test and post-test periods; in the pretest, data was collected from the women with vaginal introitus laxity, then at the same time the researcher began the intervention for and follow-up them after 3, then 6 months, the researchers collected the data as a posttest. During the 6 months, the participants were free to contact the researchers in case they had any questions about their practices and sexual function. Data collection was carried out through three phases: assessment phase, implementation phase, and the evaluation phase.

i. Assessment phase: In this phase, the researchers met the participants at the gynecological outpatient and family planning clinics; explaining to them, the study purpose and explain for each woman the proper way to fill the tools accurately after obtaining their acceptance to share in the study. The tools of data collection required approximately 20-30 minutes from the participants to complete the data collection forms, the tools filled in this phase (part one, two and three in the first tool, FSFI and FSFS before intervention), then the researchers recorded the women's' telephone number and address in order to follow-up them.

ii. Implementation phase: In this phase, the intervention was administered through individual and group counseling according to the discussed topic such as the sexual relation topic and the women prefer to be in a group or alone. Three sessions (90 minutes for each session) followed by follow-up of data collection through face-to-face and telephone interviews, were conducted at the lectures room of the hospital according to the suitable time for each woman in the follow-up schedule in the outpatient clinic.

At the first session, after filling the tools, the researchers taught the participants how to self-examine the vagina for determining the introitus laxity degrees through the following: 1) Lie in the lithotomic position. 2) Insert two fingers (middle and index) in the vagina to the highest degree possible. 3) Squeeze the fingers by the pelvic floor muscles to the highest degree possible. 4) Vaginal "laxity" was confirmed if the pressure tone could not be maintained for 3 seconds; the following quantification of a subjective squeezing strength of the vaginal introitus was established and used: (a) absence, (b) mild, (c) moderate, (d) significant squeezing strength. In addition, any discomfort reported by a woman that occurred during the examination or during coitus was recorded.

At the following two sessions, the researchers providing clear information for each participant regarding the sexual relationship, training them the exercises (Kegel, Squatting and leg up exercises), and how to fill the schedule of weekly physical activity form. Different teaching methods were used in counseling sessions such as lectures, discussions, and videos. At the end of each session, the researchers made a conclusion and took the feedback from each participant. In the third session, the researchers summarized all the information and techniques taught and took feedback from each participant. The researchers followed up the participants in the clinics and through phone or WhatsApp if the woman had any problem during the follow-up.

(Evidence-based nursing intervention): The following exercises were taught for the participants; Kegel exercise, squatting and leg ups exercises. Instructions for the participants were as the following:

a. Kegel Exercises

1. Identify which muscles are your pelvic muscles. You can do this by stopping your urine during midstream.
2. Tighten your pelvic muscles and hold for 5 seconds and then release for 5 seconds. Repeat this until you work your way up to holding for 10 seconds and releasing for 10 seconds.
3. Remember to breathe normally throughout. Also, zone in on flexing just the pelvic muscles and no other muscles nearby like your stomach, butt, or thighs.
4. Gradually increase the length of time you tighten and release every week until you reach the 10 seconds mark.
5. Make it your goal to do at minimum three sets of 10 repetitions per day.

Just remembering to do them! Here is a tip; Put a reminder on phone to do the “Kegel exercises” and mark it off a calendar! You can do it anytime, and anywhere. The exercise needs to be performed many times each day, for several minutes at a time, for one to three months, to begin to have an effect (*Bridgeman, et al. 2010*).^[20]

b. Squatting; to perform these exercises,

1. Stand with feet shoulder-wide. Keeping the hips tucked in, and slowly bend at the knees.
2. Hold weights to get better results and work your hands at the same time.
3. Make it a goal to do, at a minimum, three sets of fifteen repetitions per day. Doing these, exercises frequently and on a regular basis that will help tighten your vaginal muscles over time.

c. Leg ups; to perform these exercises,

1. Lie down on your back with your knees bent and feet flat on the ground.
2. Raise your bent right knee off the ground.
3. When you will feel your lower back begin to flatten, lower your knee back to the start position.
4. Next, do the same with the left side.
5. Make three sets of 10 repetitions per day. This will help strengthen the muscles around vagina and offer the added advantage of tightening the booty and leg muscles at the same time! (*web sites*,^{1,2,3})

iii. Evaluation phase:

In this phase, the researchers evaluated the quality of sexual function by tool 2, sexual distress by tool 3, and self-reported changing sexuality by tool 4 in the lecture room of the Ain Shams Maternity hospital. The Post-test consumed about 20-30 minutes for each woman, using the previous data collection tools. The researchers kept on a continuous telephone contact with women to determine the exact time for measuring the post-test.

8. Statistical design

All statistical analyses were done using SPSS version 20. Initially, the internal consistency coefficients were examined to ensure the reliability of the used instrument for the present samples. Frequencies, means and standard deviations were calculated to describe the samples. T test and ANOVA test were used to compare the means of pre and post-intervention. Statistical significance was considered at p-value <0.05.

III. RESULTS

Table (1) revealed that the mean age of the women and their spouse was 37 ± 5.3 and 40.6 ± 5.9 respectively. Moreover, the mean length of marriage and deliveries number was 15.6 ± 6.6 and 3.3 ± 1.7 respectively and most of the women delivered by spontaneous vaginal delivery (SVD). About half of women and their spouses was moderately educated and more than half of women not working.

Figure (1) showed the distribution of vaginal loosening degrees as reported by women as very loose (60%), moderately loose (30%), and slightly loose (10%) respectively.

Figure (2) illustrated the distribution of associated vaginal introitus laxity symptoms as reported by women as anxiety and depression (70 %), vaginal dryness (20 %), pain during intercourse (50 %), low sexual self-esteem (90%), vaginal flatulence (40%), and difficult orgasm and sexual pleasure (85%).

Table (2) Illustrated that there was a highly statistically significant improvement in each sexual function domain among the women also in the total sexual function mean scores at (F=19.29 & P= 0.001), post three and six months of intervention. In addition, a significant decrease in the sexual distress scores was observed with a highly statistically significant improvement between pre and post intervention post three and six months among the participants at (F=27.3 & P= 0.001).

Figure (3) revealed the Change in sexual function as reported by women following the six months of intervention. Most of the women reported increase in sexual activity by (66%), increase in intercourse frequency by (68%), and increase in sexual satisfaction by (76%). In addition, more than two thirds of women reported reduction of sexual difficulties during intercourse by (74%).

Table (1). Characteristics of the study subjects.

Items	Intervention group N=60 Mean ± SD or n(%)	
Age in years	37± 5.3	
Age of spouse in years	40.6 ± 5.9	
Length of marriage in years	15.6 ± 6.6	
Number of deliveries	3.3 ± 1.7	
Previous mod of delivery		
- C.S	1	1.6
- SVD	46	76.7
- Assisted VD	13	21.7
Education		
- Low education	27	45.0
- Moderate education	30	50.0
- High education	3	5.0
Husband's education		
- Low education	18	30.0
- Moderate education	36	60.0
- High education	6	10.0
Occupation		
- Working	26	43.0
- Housewife	34	57.0

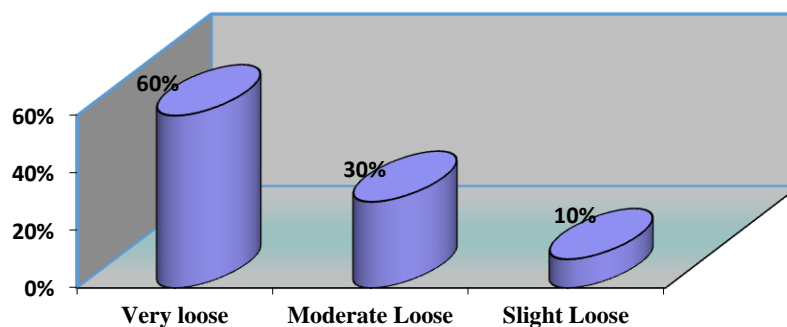


Figure (1). Percentages of vaginal loosening degrees as reported by women.

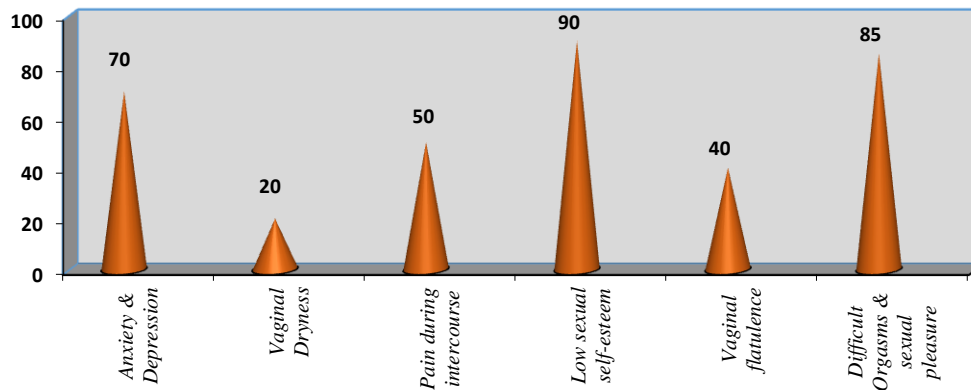


Figure (2). Percentages of Associated vaginal loosening symptoms among the subjects.

Table (2). Changes in Sexual Function (FSFI) and Sexuality related Distress (FSDS-R) Scores among the participants

Sexual function domains	Pre-intervention	Post 3 months	Post 6 months	p-value
	Mean ± SD or %			
Libido (Desire)	2.96 ± 0.8	4.7 ± 0.9	5.3 ± 0.81	< 0.001*
Sexual arousal	2.9 ± 0.4	4.9 ± 0.7	5.1 ± 0.5	< 0.001*
Orgasm	3.6 ± 1.2	5.0 ± 1.2	5.3 ± 1.1	< 0.001*
Lubrication	4.6 ± 1.1	5.3 ± 0.8	5.4 ± 0.8	< 0.001*
Sexual satisfaction	4.5 ± 0.69	5.1 ± 1.0	5.3 ± 0.7	< 0.001*
Pain	3.5 ± 1.72	3.6 ± 0.79	5.2 ± 0.5	< 0.001*
FSFI Mean total scores (2-36)	23.5 ± 2.6	28.6 ± 4.1	31.6 ± 2.0	< 0.001*
	<i>F = 19.29</i>			
FSDS-R Mean total scores (0-52)	16.2 ± 4.2	6.96 ± 2.2	4.1 ± 1.97	< 0.001*
	<i>F = 27.3</i>			

*Highly statistically significant differences at ($p \leq 0.001$)

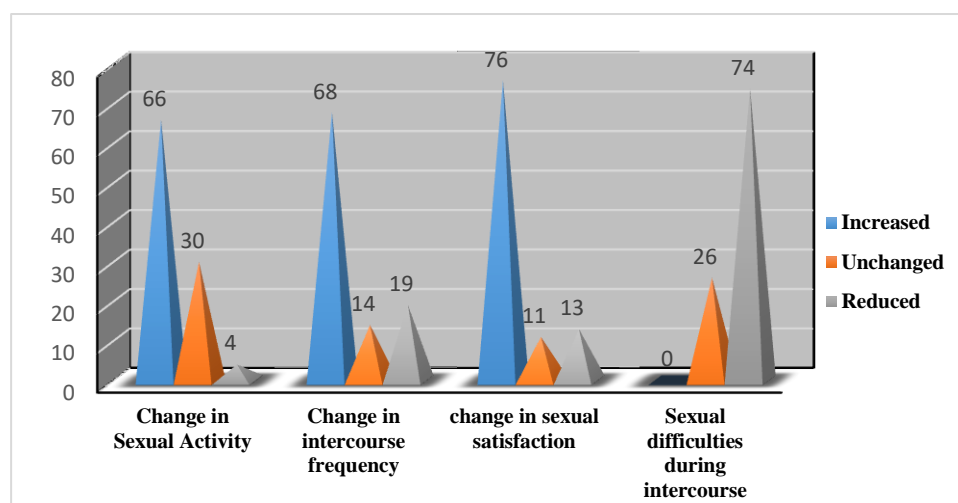


Figure (3). Changes in women's sexuality as reported following 6 months of intervention.

IV. DISCUSSION

Stretching of the vaginal introitus during childbirth may lead to permanent tissue changes resulting in loss of physical and sexual sensation during intercourse. Although many women experience this condition, it remains for most an unnamed, unspoken and invalidated issue. It is rarely discussed between patients and physicians possibly due to the lack of evidence-based treatment, embarrassment and lack of recognition of the condition. Without medical support, open discussions with friends and lack of communication with sexual partners, women feel they are “suffering in silence” with this condition. The aim of this study is to evaluate the effect of the evidence based nursing intervention on quality of sexual function among vaginal introitus laxity women.

The result of the present study revealed that the mean age of the women and their spouse was (37 ± 5.3) and (40.6 ± 5.9) respectively. In addition, the mean length of marriage and deliveries number was (15.6 ± 6.6) and (3.3 ± 1.7) respectively and most of the women (76.2%) delivered by spontaneous vaginal delivery (SVD). More than half of women and their spouses was moderately educated and about half of the participants not working. Also, the result of the current study showed that most of women had very loose vaginal introitus (60%). This previous finding was in agreement with *Pauls et al, (2012)*^[21] who conducted an observational, descriptive study to query physician toward sexual health and vaginal laxity/looseness in their patients. They found that the most frequently cited location responsible for Laxity was the introitus (52.6%). Also the current finding was in agreement with (*Millheiser, Kingsberg & Pauls 2010*)^[9] who conducted a study to assess the prevalence and symptoms associated with laxity of the vaginal introitus. They found that approximately half of the women in all age groups expressed a diminished interest in sex after having children, initiated sex less frequently and felt like it was more of an effort. laxity of the vaginal introitus was expressed as a concern (“some” or “a little” or “a lot”) by 48% (201 of 421) of respondents. Also with an agreement with (*Dietz et al, 2018*)^[22] who conducted a retrospective observational study at tertiary urogynecological unit, conducted on 337 patients found that vaginal laxity or ‘looseness’ is common in urogynecology service at a prevalence of 24%.

Regarding the associated vaginal introitus laxity “loosening” symptoms among the women, the reported symptoms were; anxiety and depression (more than two-thirds), vaginal dryness (slightly less than quarter of the women), pain during intercourse (half of the women), low sexual self-esteem (most of the women), vaginal flatulence (slightly less than half of the women), and difficult orgasm and sexual pleasure (most of the women). This finding may be due to vaginal laxity can lead to rebate the physical sensation during coitus, this is often coupled with a rebate in sexual satisfaction, which can affect a woman’s sense of sexual self-esteem and relationship with her husband which will accompany with less excitement, pain during coitus and difficult to reach orgasm. Moreover, the women consider the vagina the main important organ for her femininity in marital life, so if she has any defect in this organ she will feel with tension and embarrassment during the sexual relationship because she will feel that she cannot make her partner interested in the relation.

The previous study finding was in agreement with *Pauls et al, (2012)*^[21] who revealed most physicians felt that laxity affects their patients’ sexual functioning (95%). Common sexual impacts cited included less confidence, perceived an inability to please their partner, altered sensation, and decreased satisfaction. Also, this finding was in agreement with a study conducted on the effect of radiofrequency (RF) on sexual function on women with vaginal laxity; it was found that a significant change in the women perceptions of vaginal laxity. About half of the women complained of decreased sexual satisfaction during vaginal coitus, 42% of the women might be considered at risk for sexual dysfunction. Over a period of 6 months with radiofrequency treatment, the sexual function score improved and levels of personal distress decreased significantly with scores greater than 15 (*Millheiser et al, 2010*)^[23] In addition, *Kingsberg and Millheiser, (2010)*^[24] reported in their study that; Women candidly described the complexity of physical and emotional consequences due to vaginal laxity as “reduced sensation, difficulty reaching orgasm, feeling old worn out, loss of sexuality, burdensome sexual performance, yearning for intimacy and confidence”.

The present study findings indicated that the mean scores of the women sexual function domains were improved after 3 and 6 months of the intervention with highly statistically significant differences between the pretest and posttest scores at ($F= 19.29, p < 0.001$). In addition, the total scores of the domains were improved from (23.5 ± 2.6) pre-intervention to (28.6 ± 4.1) after 3 months of intervention then to (31.6 ± 2.0) after 6 months of intervention. On the other hand, the total scores of the female sexual distress were decreased from (16.2 ± 4.2) pre-intervention to (6.96 ± 2.2) after 3 months of

intervention then to (4.1 ± 1.97) after 6 months of intervention with highly statistically significant differences ($F = 27.3$, $P < 0.001$). This finding may be due to physical and social causes. Firstly, the physical cause is the evidence-based nursing practice as Kegel exercise, leg up and squatting helped in improving the tone and elasticity of pelvic floor muscle, so the muscle became more healthier and strong which helped in improving the sexual relation. Secondly, the social cause is, the women especially in reproductive age she tries to obey the instructions to improve her condition which affected her sexual function to reserve her marital life and her husband as well as improve her femininity. In addition, when the women feel she returned to her femininity and her sexual function was improved, her sexual tension will be reduced immediately. This study finding was in accordance with *Abedi et al, (2014)*^[11] who conducted a study to evaluate the sexual function preoperative and 6 months after selective vaginal tightening in women of reproductive age in Iran with vaginal laxity. Total mean scores of sexual function after intervention was improved from 24.19 to 26.92.

Also, the finding was in agreement with *Sekiguchi et al, (2013)*^[7] who conducted a Prospective single-arm study of 30 premenopausal women (21–52 year) with one 30-minute office procedure using Low-Energy Radiofrequency Thermal Therapy applied to the vaginal introitus. They found that Sexual function improved significantly throughout 6 months; mean FSFI total score was (22.4 ± 6.7) before treatment and then improved to mean (26.0 ± 5.8) at month 6 ($P = 0.002$). Distress related to sexual activity decreased significantly; baseline FSDS-R mean score of (15.8 ± 11.7) improved to (9.8 ± 8.0) at one month and was sustained throughout 12 months ($P < 0.001 - 0.002$). Subjects reported decreased vaginal laxity within the first month after the procedure ($P < 0.001$); responses peaked, and effectiveness was sustained through 12 months ($P < 0.001$).

Moreover, most of the participants reported change “improvement” of their sexuality following 6 months of intervention as an increase in the sexual activity (two-thirds of the sample), increase in intercourse frequency (more than two-thirds of the sample), increase in sexual satisfaction (slightly more than three-fourths of the sample). In addition, it was reported reduced sexual difficulties during intercourse by slightly less than three-fourths of the sample. This findings were in agreement with *(Millheiser et al, 2010)*^[23] who found that approximately half of the women in all age groups expressed a diminished interest in sex after having children, initiated sex less frequently and felt like it was more of an effort. Approximately 50% or more of women felt that improving the tightness of their vaginal introitus would have a positive effect on the relationship with their partner, both their sexual confidence and overall confidence, the orgasmic experience of both them and their partner, and sexual satisfaction. In a contrary with *Brækken et al, (2015)*^[13] who conducted a study to evaluate the effect of floor muscle training on sexual function in women with pelvic organ prolapse. The study findings revealed that most of the women had unchanged sexual activity represents the major of the sample, unchanged frequency of sexual intercourse represents slightly more than two-thirds, unchanged satisfaction with sexual intercourse represents slightly more than three-fourths of the sample and unchanged sexual difficulties during intercourse represents slightly less than three-fourths of the sample. The differences between the two studies related to the difference of culture, sample size and the severity of the condition that the present study conducted on vaginal introitus laxity and the other conducted on the pelvic organ prolapse.

Finally, the current study indicated that the intervention used was effective in improving the sexual function among the vaginal introitus laxity women. These findings were in agreement with *Pauls et al, (2012)*^[21] who found in their study that physicians recommend Kegel exercises for three-fourths of patients, and less than two-thirds of women reported that Kegel exercises somewhat effective or very effective. In a contrary with *Kingsberg and Millheiser L (2010)*^[24] the authors reported that Women do not believe that Kegels exercises work as a treatment for vaginal laxity. Also, *Willans, (2014)*^[25] conducted a randomized controlled trial to assess the role of pelvic floor muscle exercises in the treatment of female sexual dysfunction at twenty three centers in the UK, one in New Zealand, and one in Australia. Studies reported that there was an improvement in female sexual dysfunction with significant improvements at ($P=0.01$) in desire, arousal, lubrication, orgasm, and satisfaction. Also, the results found that forty-eight percent (204) of women reported Kegel exercises are effective in tightening the vagina, fifty percent (65) indicated they were not effective and thirty-six percent (152) did not know if the Kegel exercises were effective in improving their vaginal tone (*Millheiser, Kingsberg & Pauls 2010*)^[9]. Also, *(Kolberg et al, 2016)*^[26] conducted a study to evaluate the effect of pelvic floor muscle training (PFMT) on vaginal symptoms and sexual matters, dyspareunia and coital incontinence in “primiparous women” characterized by major or no defects of the levator ani muscle. The findings showed that Unadjusted stratified analysis of women with a major defect of the levator ani muscle showed that women in the training group had forty-five percent less chance of

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having the symptom 'vagina feels loose or lax' compared with the control group. From the previous findings, as a result of woman's feeling of embarrassment about sexual function, such as shame about the improper appearance of genitalia and anxiety about her relationship with her husband, a strong desire was found to improve sex. In Egypt, women embarrass to ask medical help to improve sex. On the other hand, surgery and herbal treatments were proven in studies to have many complications; all are cited may be as reasons for women try to use non-surgical methods as pelvic floor muscle exercises "Kegel, the leg up and squatting" which are effective and safe methods with no risks.

V. CONCLUSION

The results of this study concluded that the evidence-based nursing intervention "Kegel, the leg up and squatting" has a positive effect on tightening the vagina and improves the quality of sexual function among vaginal introitus laxity women. Quality of Sexual function was statistically improved among participants after the intervention post 3 and 6 months. Furthermore, there was a reduction in women sexual distress. In addition, women reported positive changing in their sexuality by the increase in the sexual activity, intercourse frequency, and satisfaction, and decreased the sexual difficulties. This study confirms that pelvic floor muscle exercises "Kegel, the leg up and squatting" are effective and safe procedures shown to produce subjective improvements in vaginal introitus laxity and improved quality of women sexual function.

VI. RECOMMENDATION

In the light of the study findings, the researchers recommend that:

- Utilization of non-surgical treatment methods as pelvic floor muscle exercises for improving the vaginal introitus laxity and women sexual satisfaction.
- Further research still needed to identify effective non-surgical treatment modalities for vaginal laxity as web-based reproductive-aged women lifestyle intervention.
- Further studies with a longer follow-up are required to confirm the long-term findings of vaginal tightening and effect on sexual function.

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