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Effect of Nursing Instructional Program on Genitourinary Syndrome and Stress Level Among Premature Ovarian Insufficiency Women

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ABSTRACT

Background: Premature ovarian insufficiency (POI) has a negative effect on the quality of life and psychological well-being of women. **Aim:** The current study aimed to assess the effect of nursing instructional program on genitourinary syndrome and stress level among premature ovarian insufficiency women. **Methods**: A quasi-experimental design (one-group pretest-posttest) was adopted. A purposive sample of 40 women was recruited. The study was conducted at infertility outpatient clinics at Adam International Hospital, Cairo governorate, Egypt. Data were collected using three tools: structured interviewing questionnaire schedule, genitourinary syndrome assessment tool, and perceived stress scale (PSS). **Results**: there was statistically significant improvement in genital symptoms as 60.0%, 75.0%, 47.5% of the women reported recurrent irritation of vulva, vaginal dryness, and pelvic pain and pressure respectively pre-program compared to 37.5%, 50.0%, 27.5% respectively post-program. Regarding urinary symptoms, there was a statistically significant difference between pre- and post-program in relation to urinary frequency, urgency, and recurrent urinary infection ($p= 0.001$, 0.008, and 0.003 respectively). Concerning sexual function, the total mean score of female sexual function index was significantly increased from 10.1±1.46 pre-program to 15.0±2.20 post-program ($p<0.001$). As well, the difference between stress levels pre-program and post-program was highly statistically significant ($p<0.001$). **Conclusion**: Application of nursing instructional program was effective in improving genitourinary syndrome and stress level among premature ovarian insufficiency women. **Recommendation:** Utilization of such nursing instructional program should be enforced to reduce suffering among POI women.

Key words: Nursing instructional program, genitourinary syndrome, stress level, premature ovarian insufficiency.

Introduction

Premature ovarian insufficiency (POI) is a reproductive endocrine disorder characterized by cessation or reduced ovarian function that occurred in women before the age of 40. POI is recognized by oligo/amenorrhea for at least 4 months, and an elevated follicle-stimulating hormone (FSH) level >25 IU/I on two occasions 4 weeks interval **(Lambrinoudaki et al., 2021; Webber et al., 2016)**. The prevalence of POI is different in numerous studies depending on population characteristics such as racial, social, economic, and lifestyle factors **(Golezar et al., 2020)**. For instance, in a national register study in Sweden, the prevalence of POI in women was 1.9% in 2018 **(Lagergren et al., 2018)**. Another study in Iran revealed 3.2–5.9% of women experience POI but, the global prevalence of POI was reported as 3.7% in a meta-analysis in 2019 **(Golezar et al., 2019)**.

According to **Torrealday et al. (2017)**, POI can be classified into either primary (spontaneous) or secondary (iatrogenic) induced by radiation, chemotherapy, or surgery. Although the two categories

have a similar endpoint of premature and severe attrition in the ovarian reserve and a paucity of circulating sex hormones, the onset of the two categories is different. The onset of primary POI is often insidious and therefore the diagnosis and treatment are commonly delayed. In contrast, secondary POI is almost always expected by both patient and health care provider, and interventions to alleviate symptoms and prevent the long-term complications are initiated earlier.

Although the underlying cause and mechanisms of POI remains elusive and unexplained in most cases, several biopsychosocial risk factors had been recognized. Risk factors of POI include genetic, autoimmune, lifestyle, social/environmental, and iatrogenic factors such as bilateral oophorectomy, chemotherapy, or radiation exposure **(Giri & Vincent, 2021)**. Other risk factors include family history, being a child of multiple pregnancy, early age at menarche, nulliparity or low parity, cigarette smoking, and underweight **(Mishra et al., 2019)**.

The diagnosis of POI can be a distressing and an overwhelming event for women and their families. Unfortunately, the diagnosis and hence the effective treatment of POI are often delayed, causing severe physical, psychological, and social consequences for the patient **(Lambrinoudaki et al., 2021)**. The consequences of untreated POI include vasomotor symptoms typically hot flushes and night sweats. As well as, genitourinary syndrome which includes genital symptoms (vaginal dryness, burning, irritation, and vulvovaginal atrophy); sexual symptoms (lack of lubrication, dyspareunia, low libido, and impaired sexual function); and urinary symptoms (urgency, dysuria, and recurrent urinary tract infections) **(Słopień, 2018; Hamoda, 2017)**. Other symptoms include high level of depression, stress, and low self-esteem **(Li et al., 2020)**.

Tsiligiannis et al. (2019) reported that, the association of amenorrhea, elevated gonadotropins, and estrogen deficiency is accompanied with long-term complications including increased cardiovascular disease (CVD), decreased bone mineral density (BMD), significantly reduced fertility, psychological distress, vulvovaginal atrophy, neurological effects, type II diabetes, and overall reduced life expectancy and increased mortality. A case-control study conducted by **Gunning et al. (2020)** to assess cardiovascular risk profile of middle age women previously diagnosed with premature ovarian insufficiency revealed that, prevalence of hypertension was (37%) among women with POI versus (17%) to healthy controls ($p < 0.01$).

The main nursing role is education, instruction, counseling, support, and follow up. Nurses should provide premature ovarian insufficiency women with adequate instruction to improve symptoms and therefore quality of life. Improved awareness and recognition of this disorder will have a positive impact on the future health and wellbeing of women with POI **(Fenton, 2015)**. These women should be instructed to assume a healthy lifestyle, which comprises both balanced diet and exercise throughout their lifetime **(Paschou et al., 2020)**. In addition to adequate time for instruction and empathetic communication, it is important to personalize care for women with POI utilizing an individualized assessment of needs and a tailored treatment plan utilizing shared decision-making **(Lambrinoudaki et al., 2021)**.

Significance of the study

Several studies have showed that POI affects women's physical and psychological health and reduce their quality of life. In this context, **Pacello et al.**

(2014) conducted a study to evaluate vaginal microbiological and functional aspects in women with and without premature ovarian failure (POF) and the relationship with sexual function. They reported that, women with POF showed worse sexual performance in all domains (POF group, 21.3 $\pm$ 6.3; control group 27.9 $\pm$ 3.4; $p < 0.0001$), with more pain and poorer lubrication than women in the control group.

Moreover, **Huang et al. (2021)** conducted a study to assess the prevalence and severity of menopausal symptoms in women with premature ovarian insufficiency and reported that, the most prevalent symptoms were mood swings (73.4%) and sexual problems. They concluded that, women with POI experienced a high prevalence of menopausal symptoms, compared with women with natural menopause particularly related to psychological and sexual domains.

In spite of genitourinary syndrome and stress associated with premature ovarian insufficiency can significantly impair woman's health and quality of life, those group of patients is under-researched in the context of genitourinary symptoms, and the few available studies are performed on small groups of young women with POI and therefore most evidence is derived from studies in postmenopausal women of older age **(Calik-Ksepka et al., 2018)**. Likewise, there are very few scattered nursing studies that assess the effect of nursing instructional program on genitourinary syndrome and stress level among premature ovarian insufficiency women in Egypt. Therefore, the researchers were interested to carry out this study in order to contribute to the body of nursing evidence-based knowledge.

Aim of the study

The current study aimed to assess the effect of nursing instructional program on genitourinary syndrome and stress level among premature ovarian insufficiency women.

Research hypotheses

H1: Premature ovarian insufficiency women who receive nursing instructional program will exhibit an improvement in genital symptoms than before

H2: Premature ovarian insufficiency women who receive nursing instructional program will exhibit an improvement in urinary symptoms than before

H3: Premature ovarian insufficiency women who receive nursing instructional program will exhibit an improvement in sexual symptoms than before

H4: Premature ovarian insufficiency women who receive nursing instructional program will exhibit low level of stress than before

Subjects and Method

Research design

A quasi-experimental design (one-group pretest-posttest) was adopted to test the proposed hypotheses. In this design, the baseline measures of the dependent variables are performed for all subjects. Then subjects receive the proposed intervention. After that, all subjects are post-tested to measure the degree of change in the dependent variables **(LoBiondo-Wood & Haber, 2018)**.

Setting

Data were collected from the infertility outpatient clinics at Adam International Hospital, Cairo governorate, Egypt. It is a private hospital for fertility and sterility. There are five clinics located in the second floor of the hospital, each of them equipped with an ultrasound machine for obstetrical and gynecological examinations.

Sample

A purposive sample of 40 women with POI was recruited according to the following inclusion criteria: spontaneous POI, disorder duration of at least 1 year, and suffering from genitourinary syndrome. While, women with chronic medical, psychological, or obstetrical disorders such as hysterectomy, polycystic ovary syndrome, and Oophorectomy were excluded from the study.

Sample size calculation

Based on data from literature **(Schmidt et al., 2011**) considering level of significance of 5%, and power of study of 80%, the sample size can be calculated using the following formula: n = n = $[2(Z_{\alpha/2} + Z_{\beta})^2 \times p\ (1\text{-}p)]/(d)^2$, where, p = pooled proportion obtained from previous study; d = expected difference; $Z_{\alpha/2}$ (=1.96, for 5% level of significance) and Z_{β} (equal 0.84 for 80% power of study). Therefore, n= $[2(1.96 + 0.84)^2 \times 0.092 \times (1\text{-}0.092)]/(0.181)^2$=39.9, accordingly, the sample size required is 40.

Tools of data collection

Data pertinent to the study were collected using three tools: Structured interviewing questionnaire schedule; genitourinary syndrome assessment tool; and perceived stress scale (PSS).

1. Structured interviewing questionnaire schedule

This tool was developed by the researchers after reviewing the related literatures. It consisted of three main sections: ***a) Socio-demographic data:*** This section included questions about age, education, and occupation; ***b) Menstrual and obstetrical history***: as age at menarche, regularity of menstruation, history of infertility, type of conception, having children, and number of children; and ***c) history of current disease***: This section consists of questions about duration of disease, type of treatment (hormonal or non-hormonal), and the cause of current medical consultation.

2. Genitourinary syndrome assessment tool

It entails three main sections. Sections (a) and (b) were developed by the researchers after reviewing related literatures, while section (c) was developed by **Isidori et al. (2010)**. ***a) genital symptoms***: It includes questions related to recurrent irritation of vulva, vaginal dryness, and vaginal and/or pelvic pain and pressure; and ***b) urinary symptoms:*** It contains questions related to urinary frequency, urgency, recurrent urinary infection, stress incontinence, and urinary incontinence; and ***c) the 6-item female sexual function index (FSFI-6):*** it is a 6-item, brief, and self-administered instrument derived from the original 19-item FSFI that measures female sexual function. It comprises six questions, each covering one of the original domains: desire, arousal, lubrication, orgasm, satisfaction, and pain. Desire and satisfaction items are rated on a 5-point Likert scale, ranging from 1 ("poor function") to 5 ("optimal function"). While arousal, lubrication, orgasm, and pain items are rated on a 6-point Likert scale, ranging from 0 ("no sexual activity in the past month") to 5 ("optimal function"). Each question can provide a score varying from 0 to 5. Scores obtained for each question are then summed up to provide a total FSFI-6 score ranged from 2 to 30. Higher FSFI-6 scores indicating better sexual functioning. **Isidori et al. (2010)**, have proposed a cut-off value of 19 or less to identify women at risk of female sexual dysfunction.

3. Perceived stress scale (PSS) (Cohen et al., 1983)

The PSS is a widely used psychological instrument for measuring the perception of stress originally developed by **Cohen et al. (1983).** It consisted of 10 questions about feelings and thoughts during the last month. Questions are rated on a 5- point scale ranging from 0 ("never"); 1 ("almost never"); 2 ("sometimes"); 3 ("fairly often"); to 4 ("very often"). Total score on the PSS ranged from 0 to 40 with higher

scores indicate higher perceived stress. The total score was classified into three categories: scores ranging from 0-13 is considered low stress, scores ranging from 14-26 is considered moderate stress, and scores ranging from 27-40 is considered high perceived stress.

Tools validity

Tools constructed by the researchers, structured interviewing questionnaire schedule and genitourinary syndrome assessment tool (sections a and b), were submitted to five scholastic nursing experts in the field of woman's health and midwifery nursing for testing its content validity. The tools were validated for clarity, relevance, and completeness of contents. The required modifications were performed based on the recommendations of the experts.

Tools reliability

The reliability of the proposed tools was tested using Cronbach's alpha coefficient test. For the structured interviewing questionnaire schedule, Cronbach's alpha of 0.81 showed a strong, significant positive correlation between the tool's items. While for genitourinary syndrome assessment tool (sections a and b), the internal consistency coefficients ranged from 0.79 to 83. A good reliability was established in FSFI-6 with Cronbach $\alpha = 0.84$. The alpha scale reliability for PSS was computed at 0.86.

Ethical Considerations

An informed written consent was obtained from women who accepted to participate in the study after explanation of the aim of the study and its significance. As well as, a summary of the study intervention was explained to each woman before she volunteered to participate in the study. Likewise, the researchers emphasized that participation in the study is entirely voluntary, and women were informed that they can withdraw from the study at any time without having to offer justifications. Anonymity and confidentiality were assured through coding of data.

Pilot Study

A pilot study was conducted on 10% of the pre-determined sample size (4 women) who met the selection criteria. It aimed to assess the feasibility of the study process as well as, to verify the clarity, relevance, appropriateness, and applicability of the study tools. It is also conducted to calculate the time required to complete the tools. Based on the results of the pilot study, no problems were found that interfere with the data collection process and no modifications were performed in the tools. The participants in the pilot study were excluded from the main study sample.

Procedure

Data were collected within a period of one year—from the beginning of September 2020 to the end of September 2021. The researchers visited the study setting two days a week from 9:00 am to 2:00 pm. The study was conducted through preparation; assessment, implementation, and evaluation.

Preparation for data collection: An official permission to conduct the study was obtained from concerned authorities of the previously mentioned setting. Also, review of related literature has been done to construct data collection tools and the instructional program. After that, the researchers conducted an interview with woman who met the inclusion criteria at private, comfortable room in the health care unit. During this interview the researchers introduced themselves to the women and explained the purpose, significance, nature, contents, and the time schedule of the study. An informed written consent was obtained from women who accept to participate in the study.

Assessment: After enrollment, the researchers hold an interview with each woman individually to obtain the baseline data related to socio-demographic

data, menstrual and obstetrical history, and history of current disease through using the structured interviewing questionnaire schedule. In addition, each woman was asked about the presence of genitourinary syndrome symptoms utilizing genitourinary syndrome assessment tool. After that, the level of stress was determined using Perceived Stress Scale. The questions were asked in Arabic and the responses were documented by the researchers. The time taken to complete this assessment was about 30-45 minutes for each woman.

Implementation: Women were divided into eight equal groups (5 women each group). Each group attending a weekly session for a total of three sessions. Each session took about 60-90 minutes. To achieved the objectives of each session, several teaching methods were used such as discussion, interactive lecture, and demonstrations. PowerPoint presentation was used as a visual aid to help in clarifying the presented knowledge. After the completion of each session, Arabic brochures containing brief information that were presented during the session and supplemented with colored pictures were distributed.

Session 1: This session aimed to orient the women on measures to improve urinary and genital symptoms. These measures include adopting a healthy lifestyle such as balanced diet, adequate intake of calcium and vitamin D, reduce salt intake, exercise and physical activity for fitness and maintaining a normal body weight, avoidance of smoking, and foods and herbs containing phytoestrogen. In addition, instruct and train women how to perform Kegel exercises to increase the strength of vaginal and pelvic muscles and improve sphincter tone therefore, control over urine incontinence. Furthermore, provide instruction about: avoidance of tight girdles or other tight clothing to avoid irritation of genitalia; wear cotton underwear because cotton prevents dampness resulting in less risk of infection; cleanse perineum following from front to back technique to prevents infection; drying genital area using tissue paper; avoid the use of douches, sprays, or irritating soaps to prevent irritation of genitalia; instruct women to void before and after intercourse to clear urethral meatus from infectious organisms therefore reducing infection; and the importance of prescribed local vaginal estrogen application and water soluble lubricant to provide moisture and prevent atrophic vaginitis.

Session 2: This session is concerned with helping the women to handle problems in sexual relation through providing knowledge about phases of sexual response cycle, inform and encourage women to assume different positions during sexual intercourse, encourage regular sexual stimulation to increases vaginal blood flow and secretions, and the importance of using of water-soluble lubricant to prevent pain and irritation during intercourse.

Session 3: the aim of this session was to train women on measures for reducing stress level. The researchers focus on the benefits of Benson's Relaxation Response and demonstrate the steps to elicit the relaxation response followed by redemonstration by each woman.

Evaluation: Evaluation of outcomes took place one month after the completion of the instructional program sessions to assess the four primary outcomes: genital symptoms, urinary symptoms, sexual symptoms, and stress level. The outcomes were measured by using the same tools used during the assessment.

Statistical Analysis

Collected data were organized, coded, tabulated, and analyzed using IBM statistical package for social science version 26.0 (SPSS, Chicago, IL). Numerical

data were expressed as mean ± SD and range. Qualitative data were presented in the form numbers and percentages. Inferential statistics such as Wilcoxon test was used to study association between two related quantitative variables not normally distributed. McNemar test was used for dichotomous variables. Probability (p-value) less than 0.05 was considered significant, and less than 0.001 was considered highly significant.

Results

As shown in table (1), 72% of the women' age ranged between 36 to 40 years. In relation to education, 75% of them had completed their university education. Regarding occupation, 82.5 % of the women were housewives.

Table (2) reveals that, two-thirds (67.5%) of women having menarche before 12 years of age and more than one-half of them (57.5%) have irregular menstruation. Concerning obstetrical history, 37.5% of women had a history of infertility, 60.0% of them had pregnancy by mean of in vitro fertilization (IVF), and 62.5% of them had children, of them 76.0% had only one child.

As evident from Table (3) more than half of women (55.5%) had been diagnosed with POI for 2-3 years. Regarding treatment, 25.0% of the women had been treated with non-hormonal treatment while, only 5.0% of them received hormonal treatment. Concerning cause of current medical consultation, 70.0 % of women reported the desire of pregnancy as the main cause of consultation.

In relation to genital symptoms, the current study reveals that, there was an improvement in genital symptoms as 60.0%, 75.0%, 47.5% of the women reported recurrent irritation of vulva, vaginal dryness, and pelvic pain and pressure respectively pre-program compared to 37.5%, 50.0%, 27.5% respectively post-program. In addition, the difference in genital symptoms was statistically significant ($p<0.05$) (Table, 4).

As illustrated from Table (5), there were a statistically significant differences between pre- and post-program in relation to urinary frequency, urgency, and recurrent urinary infection ($p= 0.001$, 0.008, and 0.003 respectively). On the other hand, the differences in stress incontinence and urinary incontinence between pre- and post- program were not statistically significant ($p= 0.070$ and 0.250 respectively).

Regarding sexual function, there was a highly statistically significant difference and improvement in all domains of sexual function and in total female sexual function index (FSFI-6) after receiving the instructional program. The total mean score of female sexual function index was significantly increased from 10.1±1.46 pre- program to 15.0±2.20 post-program ($p<0.001$) (Table, 6).

Figure (1) illustrates that, pre-program 27.5%, 52.5%, 20.0% of women had low, moderate, and high level of stress respectively as compared to 60.0%, 32.5%, and 7.50% respectively post- program. As well, the difference between stress levels pre-program and post-program was highly statistically significant ($p<0.001$).

Table (1): Distribution of women according to their socio-demographic data

Variables	Freq. (N= 40)	%
Age / years		
25 –	3	7.50
30 –	8	20.0
35 – 40	29	72.0
Educational level		
Primary	1	2.50
Secondary	4	10.0
University	30	75.0
Postgraduate	5	12.5
Occupation		
House wife	33	82.5
Working	7	17.5

***Freq.= frequency**

Table (2): Distribution of women according to their menstrual and obstetrical history

Variables	Freq. (N= 40)	%
Age of menarche		
Less than 10 years	8	20.0
Less than 12 years	27	67.5
Less than 14 years	5	12.5
Regularity of menstruation		
Regular	17	42.5
Irregular	23	57.5
History of infertility		
Yes	15	37.5
No	25	62.5
Type of conception (N= 25)		
Natural	10	40.0
IVF	15	60.0
Having children		
Yes	25	62.5
No	15	37.5
Number of children (N= 25)		
One	19	76.0
Two	6	24.0

***Freq.= frequency**

Table (3): Distribution of women according to history of current disease

Variables	Freq. (N= 40)	%
Duration of disease		
1 -<2 years	15	37.5
2 – <3 years	22	55.0
3 – 5 years	3	7.50
Non hormonal treatment		
Yes	10	25.0
No	30	75.0
If yes, type (n=10)		
Lubricant	7	70.0
Moisturizer	3	30.0
Hormonal treatment		
Yes	2	5.0
No	38	95.0
If yes, type (n=2)		
Local estrogen	2	100.0
Cause of current consultation		
Desire pregnancy	28	70.0
Sexual problems	12	30.0

***Freq.= frequency**

Table (4): Comparison of genital symptoms pre-program and post-program (N= 40)

Studied variables	Pre- program		Post- program		Mc Nemar test	P value
	Yes Freq. (%)	No Freq. (%)	Yes Freq. (%)	No Freq. (%)		
Recurrent irritation of vulva	24 (60.0)	16 (40.0)	15 (37.5)	25 (62.5)	4.56	**0.004**
Vaginal dryness	30 (75.0)	10 (25.0)	20 (50.0)	20 (50.0)	5.33	**0.021**
Vaginal/pelvic pain and pressure	19 (47.5)	21 (52.5)	11(27.5)	29 (72.5)	4.78	**0.008**

***Freq.= frequency**

Table (5): Comparison of urinary symptoms pre-program and post-program (N= 40)

Studied variables	Pre- program		Post- program		Mc Nemar test	P value
	Yes Freq. (%)	No Freq. (%)	Yes Freq. (%)	No Freq. (%)		
Urinary frequency	30 (75.0)	10 (25.0)	19 (47.5)	21 (52.5)	6.54	**0.001**
Urinary urgency	28 (70.0)	12 (30.0)	20 (50.0)	20 (50.0)	3.85	**0.008**
Recurrent urinary infection	25 (62.5)	15 (37.5)	15 (50.0)	20 (50.0)	5.27	**0.003**
Stress urinary incontinence	32 (80.0)	8 (20.0)	26 (65.0)	14 (35.0)	1.56	0.070
Urinary incontinence	3 (7.50)	37 (92.5)	2 (5.0)	40 (100)	1.15	0.250

***Freq.= frequency**

Table (6): Comparison of sexual function among women pre-program and post-program (N= 40)

Studied variables	Pre- program	Post- program	Wilcoxon test	P value
	Mean ±SD	Mean ±SD		
How often do you feel desire	1.22±0.42	2.75±0.83	5.26	**<0.001**
How often do you feel arousal	1.50±0.50	2.87±0.75	4.94	**<0.001**
How often do you have orgasm	1.25±0.43	2.25±0.92	4.09	**<0.001**
How often do you have pain during or after penetration	3.57±0.98	1.72±0.64	5.05	**<0.001**
How often do you feel wet	1.32±0.47	2.55±0.81	4.92	**<0.001**
How often do you feel satisfied with sex	1.30±0.46	2.87±0.82	4.93	**<0.001**
Total Female Sexual Function Index (FSFI-6)	10.1±1.46	15.0±2.20	5.32	**<0.001**

***Freq.= frequency**

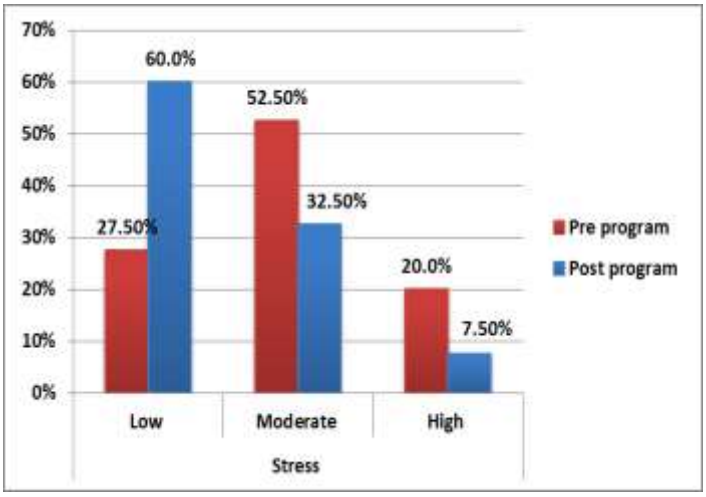

Figure (1): Comparison of stress levels among women pre-program and post-program (N= 40)

Discussion

Premature ovarian insufficiency is a life-altering diagnosis and many patients consider the diagnosis to be a threat to their identity as a woman. The diagnosis is much more than infertility. Yet it affects emotional health, physical health, and spiritual wellness of women **(Chu et al., 2021)**. So, the current study aimed to assess the effect of nursing instructional program on genitourinary syndrome and stress level among premature ovarian insufficiency women.

In relation to genital symptoms the current study results revealed that, pre-program three-fifths of women suffered from recurrent irritation of vulva, three-quarters of them had vaginal dryness, and about one fifth of them suffered from pelvic pain and pressure. These symptoms are related to the decreased estrogen level among women with POI which causes decreased tissues collagen and elastin, diminished blood flow, and reduced elasticity, this can result in thinning and inflammation of the vaginal walls and vulval tissues and decreased vaginal lubrication.

In the same line, **Singer et al. (2011)** conducted a study aimed to investigate women's experiences of diagnosis, long-term consequences, sexual functioning and health-related quality of life of women with POI. They reported that, libido and vaginal dryness were perceived as the main long-term effects by more than three-quarters (79%) of women. Another study conducted by **Palma et al. (2016)** revealed that, symptoms reported by women with POI were vaginal dryness (100%), burning (56.9%), and itching (56.6%). These findings are also supported by **Nappi et al. (2019)**. In their study about "Addressing vulvovaginal atrophy and genitourinary syndrome of menopause for healthy aging women" they reported that, the most commonly reported symptoms were irritation of the vulva, vaginal discharge, and burning sensation.

Notably, these symptoms significantly decreased post-program ($p<0.05$). The improvement of genital symptoms may be explained by compliance of women to given instructions which aimed to avoid irritation of genitalia, reduce infection, and vaginal dryness through wear cotton underwear, cleanse perineum using appropriate technique followed by adequate dryness, avoid the use of douches, sprays, or irritating soaps, and adherence to prescribed local vaginal estrogen application and lubricant. Therefore, the first hypothesis "premature ovarian insufficiency women who receive nursing instructional program will exhibit an improvement in genital symptoms than before" was accepted. In this context, **Sevil et al. (2013)** carried out a study to evaluate the relationship between genital hygiene practices and genital infection and reported that, genital infections were significantly less common among those who appropriately practiced genital cleaning ($p=0.000$), while they were more common among those who used soap/shampoo in cleaning genitalia ($p=0.004$), and who did not dry the perineal area ($p=0.000$).

Regarding urinary symptoms the current study results revealed that, pre-program three-quarters of women suffered from urinary frequency and urgency and four-fifths of them reported recurrent urinary infection. These symptoms were significantly improved post-program which highlights the effectiveness of instructions that focus on measures to reduce urinary tract infection as there is a well-established relation between urinary tract infection and urinary frequency. So that when urinary tract infection is prevented or reduced, the urinary frequency will decrease. In congruent with these findings, **Gandhi et al. (2016)** conducted an observational study to assess the clinical manifestations of genitourinary syndrome among women with POI and found that, two-fifths of women (42%) had urinary tract symptoms including dysuria, urinary frequency, and mild urinary incontinence.

The results also showed that, pre-program four-fifths of women suffered from stress urinary incontinence and small percentage of them have urinary incontinence. In consistence with the current study findings, **Tan et al. (2018)** carried out a study to assess the prevalence of stress urinary incontinence in women with premature ovarian insufficiency and found that, the prevalence of stress urinary incontinence in the POI group tended to be higher than that in the control group. These findings are also in accordance with **Calik-Ksepka et al. (2018)**, who studied signs and symptoms and management of genitourinary tract consequences of premature ovarian insufficiency. They reported that, the young age of patients with POI probably makes them less susceptible to urine incontinence.

Although the current study instructional program included Kegel exercise to increase the strength of urethral sphincter, stress urinary incontinence and

urinary incontinence were not significantly improved post-program. So that, the second hypothesis "premature ovarian insufficiency women who receive nursing instructional program will exhibit an improvement in urinary symptoms than before" cannot be supported. This finding could be explained by the long time needed to manage urinary incontinence and this time was not allowed in the current study as the evaluation of outcomes was conducted after only one month. Contradicting current study findings, **Cavkaytar et al. (2015)** carried out a study to examine the effect of home-based Kegel exercises on quality of life in women with stress and mixed urinary incontinence. They reported that, 68.4% of the women in the stress urinary incontinence (SUI) group and 41.2% of the women in the mixed urinary incontinence (MUI) group reported improvements after Kegel exercises, but the improvement was significantly higher in the SUI group than in the MUI group ($p < 0.05$).

Concerning sexual function, the current study findings revealed that, at pre-program assessment women experienced sexual dysfunction either in the total female sexual function index (FSFI-6) or in each domain of female sexual function including desire, arousal, orgasm, lubrication, and satisfaction. This finding was ascertained by **Yela et al. (2018)**, who conducted a study named " influence of sexual function on the social relations and quality of life of women with premature ovarian insufficiency". They reported that, women with POI had significantly lower arousal, lubrication, orgasm, satisfaction, and more dyspareunia. Moreover, the total score of FSFI was significantly lower among women with POI than control women. They added that, women with POI scored significantly lower on the orgasm and libido domains.

While post-program, there was a highly statistically significant improvement in all domains of sexual function and in the total female sexual function index ($p<0.01$). This finding could be attributed to the improvement achieved in genital symptoms in which vaginal dryness was significantly decreased post-program, as vaginal dryness and inadequate lubrication is a common cause of dyspareunia. Furthermore, it could be attributed to the practice of Kegel exercise which can help strengthen weak muscles and relax tight ones therefore, allow the vagina to be more open so, decreasing pain during sexual intercourse. Kegel exercise also improving blood circulation to vagina and vulva which improve sexual arousal and vaginal lubrication. Therefore, the third hypothesis "premature ovarian insufficiency women who receive nursing instructional program will exhibit an improvement in sexual symptoms than before" was accepted.

In congruent with this explanation, **Nazarpour et al. (2017)** carried out randomized clinical trial to examine the effects of Kegel exercises on the sexual function of postmenopausal women. Their study declared that, the scores of arousal in the Kegel groups were significantly higher compared with the control group (3.15 vs 2.77, respectively). As well as, the scores of orgasm and satisfaction in the Kegel group were significantly higher compared with the control group (4.43 and 4.88 vs 3.95 and 4.39, respectively). In the same line, **Golmakani et al. (2015)** conducted a study to examine the effect of pelvic floor muscle exercises program on sexual self-efficacy and reported that, compared to the control group, the intervention group showed a significant increase in sexual self-efficacy after they performed Kegel exercises ($P = 0.001$).

In relation to stress level the current study showed that pre-program, more than one-half of women reported moderate stress level and one-fifth of them reported high level of stress. The higher level of stress

among women with POI may be attributed to several factors including lower fertility or infertility, elevated follicle-stimulating hormone, distressing symptoms resulting from decreased estrogen level, impaired body image, and loss of support.

Similar results are reported by several studies. For example, **Golezar et al. (2020)** carried out a qualitative study named " An exploration of factors affecting the quality of life of women with primary ovarian insufficiency". They reported that, women with POI experience psychological effects included shock, grief, stress, rage, moodiness, and anxiety. In the same line, **Omu et al. (2016)** in their study about " Emotional impacts of premature ovarian failure" in Kuwait found that, the majority of the patients with POI experience anxiety, depression, anger, stress, fear of divorce, loss of self-esteem, loss of femininity and youth, and loss of ability to have children.

The current study also revealed that, post-program the level of stress was significantly reduced as less than one-third of women reported moderate stress level and small percentage of them reported high level of stress. These findings could be explained by the effect relaxation which reduces sympathetic activity and catecholamine release and relieves muscular tension. Therefore, alleviate stress and anxiety. So, hypothesis number 4 “premature ovarian insufficiency women who receive nursing instructional program will exhibit low level of stress than before” was accepted.

These findings are supported by **Regi Viniciya (2019)** who evaluate the effectiveness of Benson’s relaxation therapy on stress reduction among postmenopausal women. The study revealed that, the mean score level of stress was 30.26 $\pm$ 10.57 in pre-test compared to 16.4 $\pm$ 10.72 in post-test. The mean difference between pre-test and post-test was statistically significant at $p< 0.05$. Similarly, **Lidiya (2014)** carried out a study to examine the effect of Benson’s relaxation therapy on stress among postmenopausal women and reported that, there was a significant reduction in the level of stress. So, it can be concluded that Benson’s relaxation response was effective in reducing the level of stress.

Conclusion

In conclusion, the results of the present study revealed that application of nursing instructional program was effective in improving genitourinary syndrome and stress level among premature ovarian insufficiency women.

Recommendations

Based on the findings of this study, the following are recommended:

- Utilization of such nursing instructional program should be enforced to reduce suffering among POI women.
- Women with POI should be provided with adequate knowledge regarding healthy life style.
- Indorse Kegel exercise and Benson’s relaxation response in nursing syllabus.
- Replication of the current study on a larger probability sample and in other settings is necessary.

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