

## Effect of Nursing Approach Based on Roy's Adaptation Model on Sexual Function and Health Promoting behaviors of Women after Hysterectomy

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### Abstract

**Background:** Hysterectomy is a difficult operation that affects sexual function and alters women's health behaviors and its effect in these aspects has received less attention. One of the nursing models used in improving sexual function and adaptive behaviors after surgeries is Roy's adaptation model. **Aim:** The present research aimed to evaluate the effect of the nursing approach based on Roy's adaptation model on sexual function and health-promoting behaviors of women after hysterectomy. **Design:** A quasi-experimental research design (Two-Groups, Time series pre /post-test quasi-experimental design) was used. **Sample:** A purposive sample of 90 women after hysterectomy operations. **Setting:** The present research was conducted at Obstetrics and Gynecology department and the outpatient clinics at Benha university hospital. **Tools:** four tools utilized included: self-administered questionnaire, Female Sexual Function Index, Roy Adaptation Model scale and Health Promoting Lifestyle behaviors. **The Results:** After three and six months of the intervention, the study group's mean scores for Roy's Adaptation Model, health-promoting behaviors, and overall aspects of female sexual function were higher than the scores in the control group with highly statistical difference. Additionally, nearly two-thirds of the research group satisfied of Roy's adaption model for hysterectomy. **Conclusion:** the implementation of the nursing approach based on Roy's adaptation model had a highly significant improvements in women' sexual function, the women became highly adapted with hysterectomy and showed high level of health-promoting behaviors scores related to hysterectomy in (three and six months) after the intervention among the study group as compared to the control group. Which achieved the current study aim and hypotheses. **Recommendations:** Provide post-hysterectomy instructional guidelines to promote adaptation to sexual problems after hysterectomy.

**Keywords:** Health Promoting behaviors, Hysterectomy, Nursing Approach, Roy's Adaptation Model & Sexual Function.

### Introduction

A fundamental feature of the human person throughout life is sexuality. Throughout life, sexuality is a fundamental component of who we are, and have significant implications on our physical, mental, and overall quality of life. Sexuality includes sexual orientation, gender, identities, and roles, as well as sex, intimacy, happiness and reproduction. Also, sexuality is experienced in thoughts, fantasies, demands, beliefs, attitudes, values, activities, roles, and attain relationships. All of these aspects of sexuality are there, but not all of them are constantly felt or expressed (Bolin et al., 2021). Female sexuality is influenced by a variety of factors, such as gynecological surgery, ageing, hormonal changes, endocrine disorders, mental and psychological disturbances as despair, anxiety, poor body image, and emotional neglect. (Nemati & Weitkamp, 2020). Hysterectomy is One of the most frequent gynecological surgical operations in which the uterus is removed whole or partially. Despite recent declines

in hysterectomy rates, over 400,000 hysterectomies were performed in the European Union only in 2017 making it the second most common gynecological procedure worldwide (Wan et al., 2022).

The majority of women who have undergone hysterectomy are worried about the change in a sexual condition and being rejected by husbands in such a case. The majority of women also think that this operation damages feminine beauty, reduces sexual desire, and worsens marital issues. Another important aspect in why reaching menopausal age is viewed by some cultures as a sign of senility and sexual impotence is cultural beliefs. The long- or short-term sexual relationship difficulties following hysterectomy have been demonstrated in several investigations (Sobhani et al., 2020).

A systematic, intentional, regulated, and successful approach to patient care is made possible by nursing approaches based on recent models. The Roy Adaptation Model (RAM), is one of the most commonly adopted models in nursing, has been

effectively applied to chronic illness in general and sexual adaptation in particular, also examined women coping with illness and adjustment in terms of bio-psycho-social stressors. According to the RAM, three stimuli are shaped around the woman, which is contextual, focal, and residual stimuli. The RAM has four adaptive modes, which are self-concept, physiologic, role function, and interdependence mode (Heyes & Bond 2020). The physiological and psychological adaptation of humans to their surroundings is the main emphasis of the Roy Adaptation Model which integrated in its four modes as physiologic mode, self-concept mode, role function mode and interdependence mode to sustain to meet the patients' demands and provide holistic (Buckner, 2020).

Health-promoting behaviors is defined as controlling certain behaviors and selecting appropriate ones in daily life for sustain women health. Health-promoting behaviors are a multifaceted model of perception, self-initiated action, or practice. Enhancement of information, motivation, and behavioral skills are necessary to change the related behaviors and to achieve correct self-care behaviors (Gokyildiz et al, 2017). Promoting healthy behaviors will help women keep independence and function following hysterectomy, which will improve the quality of life and save costs associated with health care. (Hatami & Hojjati, 2019). Roy adaptation Model is one of the comprehensive models that focuses on the promotion of health and the empowerment of women for improving health and preventing illnesses via behavioral changes (Pender, 2015).

Following a hysterectomy, nursing approaches based on the Roy adaption model play an important role in the post-operative rehabilitation process, the provision of high-quality holistic care, and the assistance of women and families in creating care management plans which would be expected that enhance women adaption to their conditions and achieve more healthier behaviors (Kassymova et al., 2021

### Significance of the study

Over a million hysterectomy operations are carried out worldwide. In the developed countries, hysterectomy is performed on more than 500,000 women annually in the United States alone, and 2–5 per 1000 women in North America, Europe, Australia, and China for different causes. While in Egypt's, the hysterectomy incidence rate is 165,107 per year (Mohamed et al., 2020).

Hysterectomy affects overall a woman's life. The incidence of depression after hysterectomy is elevated and expressed by feelings of prolonged sadness, no life, low sexual function, impaired healthy behaviors,

fatigue, and thoughts of death or suicide. This negative effects of hysterectomy on body image were due to hormonal changes after operation and the presence of surgical scars in the abdomen (Marni & Adnani, 2020).

Sexual function and sexual health care are still in appropriately studied due to barriers false beliefs about sexual issues in our Egyptian culture. And there are a limited studies relevant to sexual health of women after hysterectomy are found in Egypt (Papadopoulou et al., 2019) (Mohamed et al., 2020).

Part of the challenges of the 21st century is to promote women` empowerment, promote healthy behaviors, and adapt to new life situations. Achieving these goals require the development and implementation recent nursing approaches based on RAM which can be an effective framework for boosting sexual and marital satisfaction in women after hysterectomy and enhancing sexual function as well as promoting healthy behaviors. There're limited studies that examined the effect of RAM on sexual function and health-promoting lifestyle behaviors after hysterectomy in Egypt Thus what motivates the researchers to conduct a such valuable study.

### Operational definitions:

**Roy's adaptation model:** Roy's adaptation model enhanced sexual function and health behaviors of women after hysterectomy operations and composed of four physiological, self-concept, interdependence and role function modes, in which maladaptive behaviors and related focal, contextual or residual stimuli to be identified and managed.

**Sexual function:** Sexual function refers to how women react to changes of total hysterectomy in different stages of the sexual response cycle .distorted sexual function after hysterectomy has a significant impact on women satisfaction and feeling inadequacy. So, it is considered an essential part of a good quality of life to have sexual satisfaction.

**Health-promoting behaviors:** prompting health behaviors by applying the Roy adaptation model helps women to maintain independence and function after hysterectomy.

### Aim of the study:

The current study aimed to evaluate the effect of a nursing approach based on Roy's adaptation model on sexual function and health-promoting behaviors of women after hysterectomy.

### Objectives of the study:

- Assess the women sexual function, adaptation, and health-promoting behaviors after hysterectomy.
- Construct a nursing approach based on the Roy's Adaptation Model about sexual function, adaptation, and health-promoting behaviors after hysterectomy and according women needs.

- Implement a nursing approach based on the Roy's Adaptation model of sexual function and health promoting behaviors of women after hysterectomy.
- Evaluate the effect of a nursing approach based on the Roy's Adaptation model on sexual function, adaptation and health promoting behaviors of women after hysterectomy.

**Study hypotheses:**

- H1:** Implementation of a nursing approach based on Roy's Adaptation Model will have a positive effect on the sexual function of women after hysterectomy than those who will not receive it.
- H2:** Implementation of a nursing approach based on Roy's adaptation model will have a positive effect on the adaptation of women to hysterectomy than those who will not receive it.
- H3:** Implementation nursing approach based on Roy's adaptation model will have a positive effect on health-promoting behaviors of women after total hysterectomy than those who will not receive it.

**Subject and Methods****Research Design:**

A quasi-experiment research design (Two-Groups, Time series quasi-experiment design) was utilized. The Quasi -Experiment is a study in which the researcher operates the level of some independent variable and then measures the result. Quasi-Experiments are potent methods for assessing cause-and-effect relations (**Gopalan, Rosinger & Ahn, 2021**).

**Study Setting:**

This study was conducted at the obstetric and gynecological department and outpatient clinic at Benha university hospital, which is the official Benha university hospital that offers obstetrics and gynecological health care services for nearby villages including antenatal care, delivery care, gynecological care, and family planning services. The outpatient clinic has two rooms located in the outpatient clinics building on the ground floor to provide obstetric care and follow-up for gynecological problems.

**Sampling****Sample type:**

A Purposive sample was chosen from the above-mentioned study setting.

**Sample size:**

The sample consisted of 90 women after total hysterectomy operations who met the criteria of inclusion.

**Inclusion**

- Read and write.
- Total hysterectomy operations
- Married and have active sexual relationship.
- Don't use medicines that have an impact on the sexual health.

- Women who not using antidepressant medications.
- Women are free from psychological disorders or chronic diseases.
- Women are free from complications during or after the operation.

**Exclusion criteria:**

Women suffering from cancer and receiving chemotherapy treatment.

**Sample technique:**

The researchers visited the study setting introduced themselves, and explained the aim of the research briefly to the participants with inclusion criteria after two months of the operation because the sexual relation is postponed for at least 6 weeks. Then the women were divided in random selection into two equal groups (45 women for the control group who attended the mentioned setting with the selected inclusion and exclusion criteria, and also are firstly interviewed then interviewed the same number (45 women) for the study group to implement the nursing approach based on the Roy's Adaptation Model).

**Tools for data collections**

Four main tools were utilized in collecting data:

**The tool I: Self-administrated Questionnaire:** it was constructed by researchers after reviewing the related literature (**Buckner, 2020** and **Callis,2020**). And translated into simple Arabic language including two parts;

**Part 1:** demographic characteristics as (age, level of education, occupation, residence, and telephone number).

**Part 2:** History of hysterectomy as the mode of hysterectomy and indication of hysterectomy,

**Tool II: Female Sexual Function Index (FSFI):**

The tool was formulated by (**Rosen, et al., 2000**) to assess the female sexual function after hysterectomy. It was translated into Arabic to suit women level of understanding, the Arabic (FSFI) tool was tested for validity, reliability, and was locally accepted to be used in the assessment of Egyptian female sexuality by **Anis (2011)**. The FSFI is a brief six-item self-administered questionnaire designed to assess the main elements of sexual functioning as Desire, arousal, orgasm, lubrication, satisfaction, and pain. It consists of 18 questions to detect and evaluate female sexual function according to the following.

**Desire domain** (2 questions): it included (times of feeling sexual desire and level of sexual desire).

**Arousal domain** (4 questions): it included (times of feeling sexually aroused during sexual activity, level of being sexually aroused, the confidence of becoming sexually aroused at the sexual activity, and satisfaction with arousal during sexual intercourse).

**Lubrication domain** (3 questions): it included (frequency of becoming lubricated or difficulty of becoming lubricated during sexual activity or

intercourse, frequency of being lubrication until completion of sexual activity, and difficulty of being lubrication until completion of sexual activity or intercourse).

**Orgasm domain** (3 questions): it included (frequency of experiencing orgasm, difficulties of reaching orgasm, and pleasure with the ability to reach orgasm during sexual activity).

**Satisfaction domain** (3 questions): it included (satisfaction with the degree of emotional closeness with a husband, satisfaction with a sexual relationship with a husband, and satisfaction with overall sexual life among husband).

**Pain domain** (3 questions): it included (frequency of pain or discomfort during vaginal penetration, frequency of pain or discomfort following vaginal penetration, and the severity of pain during or following vaginal penetration).

#### Scoring system:

Score vary from either 0/1 (no sexual activity or sexual dysfunction,) to 5 (suggestive of normal sexual activity). Adding the scores of the questions to make up the domain and multiplying the total by the domain factor, so give the domain score (i.e., Desire is 0.6, arousal and lubrication are 0.3, orgasm, satisfaction, and pain are 0.4). The overall score of sexual function was recorded using Likert scale, the minimum score attainable is 1 and the maximum is 95, depending on the item and how confident were the women about being sexually aroused during sexual activity or intercourse (Anis et al., 2011).

Domain	Questions	Score variation	Factor	Total Score
Desire	1,2	1 - 5	0.6	10
Arousal	3,4,5,6	0 - 5	0.3	20
Lubrication	7,8,9,10	0 - 5	0.3	20
Orgasm	11,12,13	0 - 5	0.4	15
Satisfaction	14,15,16	0(or1) - 5*	0.4	15
Pain	17,18,19	0 - 5	0.4	15
<b>Total scale Score variation</b> = 1: 95				95

\*Vary for item 14=0-5; vary for items 15 & 16 = 1-5. The score of total sexual function was categorized as the following:

**Better:** if the total scores of sexual functions were  $\geq 75\%$

**Much the same:** if the total score of sexual function was  $60\% - < 75\%$

**Worst:** if the total score of sexual function was  $< 60\%$

**Tool III: Roy's Adaptation Model Scale:** it was adapted from (Roy and Andrews 2009) and the necessary modifications were applied by the researchers to examine the adaptation level of women by assessing women's maladaptive behaviors and corresponding focal, contextual, and residual stimuli. It contained 34 items in four adaptive modes. The physiological mode (9 items), self-concept mode (9

items), role function mode (7 items), and interdependence mode (9 items).

#### Scoring system:

The answer to each item was arranged on a three-point Likert scale. The minimum score was 1 indicates (strongly disagree), a score of 2 indicates (neither agree nor disagree) and the maximum score was 3 indicates (strongly agree). The total score is attained by calculating the mean of responses to all the items. The possible range of scores is from 34 to 102 with a high score indicating a more consistent use of coping strategies (highly adaptation) (Roy and Andrews 2009).

**Total Roy's Adaptation Model scores ranged from Highly adaptation** when the total score was  $\geq 75\%$

**Moderately adaptation** when the total score was  $60\% - < 75\%$

**Slightly adaptation** when the total score was  $< 60\%$

**Tool IV: Health Promoting behaviors.** It was adapted from the English version (Walker et al., 1987) and Arabic version (Abo- Ali, 2021), 52 items were used to assess health-promoting behaviors and were divided into six domains: stress management, nutrition, interpersonal connections, spiritual growth, and health responsibility. Physical activity accounted for eight of the items (eight items).

#### Scoring system

Each item was given a score on a four-point Likert scale, with 1 (never), 2 (sometimes), 3 (frequently), and 4. (Routinely). Calculating the average of all 52 replies yields the final score. The overall score is divided into four categories: bad (from 52-90), moderate (from 91-129), good (from 130-168), and exceptional (from 169-208). High scores in all subscales indicated better adherence to health-promoting behaviors.

#### Operational design:

##### Preparatory phase

Reviewing current and related literature was done. Additionally, theoretical knowledge of various aspects of the study using books, papers, journals and magazines, and the internet to develop tools for data collection.

##### Tools validity

A panel of three jury experts in obstetrics and gynecological nursing at Benha University evaluated the validity of the questionnaires to determine the clarity, relevance, comprehensive, and applicability of tools (female sexual function index, Roy's Adaptation Model scale, Health Promoting behaviors). Moreover, Rosen et al., (2000), confirmed the validity of the female sexual function index (FSFI) for the English form and Anis et al., (2011) for the Arabic form.

##### Tools reliability

Reliability was calculated by Cronbach's alpha coefficient test, and the internal consistency of the

FSFI tool (Tool II) was  $\alpha=0.85$ . And Roy's Adaptation Model Scale (Tool III) was 0.83 and it ranged from 0.71 to 0.86 in the four domains. Additionally, Cronbach's alpha for the Health Promoting Lifestyle questionnaire (Tool IV) was 0.84, and it ranged from 0.79 to 0.87 for the six subscales.

The above results indicated that they utilized the Arabic version of the tools were relatively homogenous and indicated by the moderate to high reliability of each tool.

#### **Ethical consideration:**

The completion of the study required the ethics committee for faculty-sponsored scientific research approval. For the purpose of carrying out the study, an official consent from the selected study settings was obtained. Before beginning to use the questionnaires in interview the women and throughout the study, the purpose of the study was stated to each woman in order to build confidence and trust. Women who enrolled in the study have signed an informed consent, and confidentiality will be maintained. Women's self-worth, dignity, and anonymity were upheld throughout the study process, and no personal information was shared. The women were also given the assurance that all data would be utilized only for research purposes and that they may leave the study at any time. The study also had no negative effects on physical, social, or psychological risk to the participants.

#### **Pilot study:**

The pilot study was conducted before beginning of data collection. It was done to assess the amount of time needed to complete the sheets and to evaluate the developed tools' simplicity of use, clarity, relevance, and practicality. 10% of the entire sample was used for the pilot study (9 women). There were no changes made, therefore Women who participated in the pilot study were included in total sample.

#### **Field work:**

The researchers attended the study setting 3 days a week from 9:00 am to 2:00 pm (from the beginning of November 2021 to the end of July 2022). Fieldwork included the following phases:

#### **Assessment phase:**

- The researchers attended the mentioned study setting, introduced themselves, welcomed each woman, and then stated the purpose of the research, scheduled visits, and frequency of sessions to selected women to assure adherence to interventions. The researchers then obtained the women's signed consent to participate in the study.
- Women were given a self-administered questionnaire (Tool-I) to evaluate the socio-demographic data and hysterectomy history

then, the female sexual function index (FSFI) (Tool-II) to assess women's sexual function, and the Roy's Adaptation Model Scale (RAM) (Tool-III) was used to evaluate the women's maladaptive behaviors through conducting personal interviewing of the women.

- There were 4-6 women (2-3 women/day) interviewed each week. Depending on how the women responded, each sheet took an average of 30 to 45 minutes to answer.

#### **Planning phase:**

- The educational method was developed using RAM. Based on how the study group's participants responded to RAM for determining maladaptive behaviors and the related stimuli with the use of group educational techniques as lectures, discussions, films, and role-plays, to modify the maladaptive behaviors of women. Computers, projectors, and PowerPoint software were also utilized as educational materials.
- The control group receives standard hospital care, such as post-operative hysterectomy care and planned follow-up visits, but is not given health information about how sexual function changes after surgery or encouraged to engage in health-promoting behavior to maintain a healthier lifestyle.

#### **Implementation phase:**

The intervention included of the use application of Roy's Adaptation model (RAM) through planned educational sessions by using above- mentioned educational methods and media, as well as the use of virtual education during sessions to provide better clarifications and the opportunity to receive social supports for the development of adaptive behaviors and by enhancing communication between the researchers and women. The implementation phase was carried out over the course of three sessions, each lasting 45–60 minutes. Each woman attended all three sessions in a prepared room in the mentioned setting to provide more confidentiality, and interviewing were made either individually if woman preferred or in a group (three to five women can attend each session) Some women chose to attend the seminars alone in order to share their own sexual concerns without feel shamed from others in the group, the sessions were classified as follows:

**The first session (theoretical):** The following topics were discussed sexual function, physiology of sexual response in men and women, and societal beliefs related to sexuality after hysterectomy. Besides an overview of post-hysterectomy sexual problems after the operation.

**The second session (practical session):** This session included skills to manage post hysterectomy sexual issues using female sexual index and the Roy adaptation model such as (effective communication

before having sexual intercourse and relaxation activities including walking, strengthening pelvic muscles utilizing Kegel exercises, and use of lubricating gels). So, the women were being able to cope with changes and express feelings about new sexual adaptation. The researchers gave advice to the women how to overcome negative thoughts. Additionally, the importance of love and sexual relationships, how to boost women's self-esteem, how to adjust sexual routines, how to employ new sexual games and positions, how to create the tone for marital intimacy through following Roy's Adaptation Model's six steps (RAM).

- Evaluation of the four adaptive modes' effects on the behaviors of women.
- Classifying the stimuli as focal, contextual, or residual after evaluating them.
- Offer a nursing diagnosis on the woman's adaptive state.
- Set goals to encourage healthy behaviors.
- Implement interventions aimed at controlling the stimuli.
- Evaluate the success of the adaptive goals.

**The third session (practical session):** This session covered skills for stress management and explained the negative effects of stresses on women's health behaviors, fitness, and coping. Some of these skills included positive thinking, good assertiveness skills, relaxation techniques such as (meditation, yoga, and imagination) and behaviors modifications as (healthy eating habits, exercising regularly, enough sleep).

Before each session, the researchers provide opportunity to women to express their feelings, and then there was a discussion on the predetermined topics. At the end of each session, the researchers gave a summary and took feedback. The duration of the study intervention continued for nine consecutive months.

**The break phase** included telephonic contacts with study group during the period after implementation of session were done and till the evaluation phase started in order to answer women's questions and promoting engagement in the delivered education. The researchers assured women to feel free to call researchers during a specific determined one hour daily (researchers set one-afternoon hour/day for participants to call for any further discussion needed either to call or through chatting via mobile communication programs).

Also, the control group of women was followed by telephone to avoid their dropping out of the study, but no care was provided to women during a break to prevent study bias.

**Evaluation phase:**

The evaluation phase was done two times; post-test was applied after 3 months and follow-up was applied

6 months after intervention for both the study and control groups to evaluate the effect of (RAM) interventions on women's sexual function, Roy adaptive behaviors, and health-promoting behaviors at different times of assessment with the same format of pretests.

**Administrative design:**

After illustrating the title and its purpose obtained, the written official approval to from the Dean of Faculty of Nursing to the Director of Benha University Hospital and it was delivered to the Director of the Obstetrics and Gynecology department and outpatient clinic, in order to proceed the study.

**Statistical design:**

Prior to automated input, data were checked. Data tabulation and analysis were done using SPSS version 22 (Statistical Package for Social Sciences). The use of descriptive statistics was used (e.g., mean, standard deviations, frequencies, and percentages). Pearson correlation coefficients, independent t-tests, and Chi-square tests were applied. For all of the statistical tests done, p-value > 0.05 which indicated no statistically significant difference, p-value <0.05 indicated a statistically significant difference, and p-value ≤ 0.001 indicated a highly statistically significant difference.

**The limitations of the study:**

Two limitations were present in the current study; firstly, the relatively low number of cases, and secondly sampling dropouts due to long period of follow-up which takes more effort from researchers to attain new cases.

## Results

Table (1): Distribution of the studied women regarding socio-demographic characteristics (n=90).

Socio-demographic characteristics	Control group n=45		Study group n=45		X <sup>2</sup>	P value
	No	%	No	%		
<b>Age in years</b>						
< 30 year	8	17.8	6	13.4	0.53	0.91 <sup>ns</sup>
30 < 40 years	9	20.0	10	22.2		
40 < 50 years	11	24.4	13	28.8		
≥ 50 years	17	37.8	16	35.6		
<b>Mean ±SD</b>	45.66±10.18		46.33±9.94			
<b>Educational level</b>						
Primary education	8	17.8	10	22.2	1.11	0.57 <sup>ns</sup>
Secondary education	24	53.3	19	42.2		
University education	13	28.9	16	35.6		
<b>Occupation</b>						
Employee	18	40.0	21	46.7	0.40	0.52 <sup>ns</sup>
Housewife	27	60.0	24	53.3		
<b>Residence</b>						
Rural	14	31.1	15	33.3	0.05	0.82 <sup>ns</sup>
Urban	31	68.9	30	66.7		

Chi-square test (x<sup>2</sup>); ns

Non statistical significant;

P-value&gt;0.05.

Table (2): Distribution of the studied women regarding the history of hysterectomy (n=90).

History of hysterectomy	Control group n=45		Study group n=45		X <sup>2</sup>	P value
	No	%	No	%		
<b>Mode of hysterectomy</b>						
Abdominal	33	73.3	26	57.8	2.74	0.25 <sup>ns</sup>
Vaginal	5	11.1	10	22.2		
laparoscopy	7	15.6	9	20.0		
<b>Indication of hysterectomy</b>						
Abnormal uterine bleeding	22	48.9	20	44.4	0.49	0.77 <sup>ns</sup>
Uterine fibroids	12	26.7	11	24.4		
Pregnancy or delivery-related causes	11	24.4	14	31.2		

Chi-square test (x<sup>2</sup>); ns

Non statistical significant;

P-value&gt;0.05.

Table (3): Comparison of the mean scores of sexual function domain regarding hysterectomy in both groups before the intervention, three and six months after the intervention (n=90).

Dimensions	Maximum score	Control group n=45	Study group n=45	t-test	P value
		Mean ±SD	Mean ±SD		
<b>Total desire</b>					
Before-intervention	10	3.82±1.19	4.04±1.26	0.85	0.39 <sup>ns</sup>
3 months after the intervention		3.77±1.12	8.13±1.93	13.0	0.000**
6 months after the intervention		4.04±1.26	9.08±1.63	16.3	0.000**
<b>Total arousal</b>					
Before-intervention	20	6.53±1.14	6.82±1.31	1.11	0.26 <sup>ns</sup>
3 months after the intervention		6.68±1.18	12.42±1.23	22.4	0.000**
6 months after the intervention		6.93±1.17	13.48±1.60	22.1	0.000**
<b>Total lubrication</b>					
Before-intervention	20	6.75±1.26	7.17±1.31	1.55	0.12 <sup>ns</sup>
3 months after the intervention		7.33±1.08	13.35±1.40	22.7	0.000**
6 months after the intervention		7.42±1.09	14.46±1.21	28.8	0.000**
<b>Total orgasm</b>					
Before-intervention	15	2.40±1.49	2.64±1.90	0.67	0.50 <sup>ns</sup>
3 months after the intervention		2.31±1.48	5.93±1.21	11.8	0.000**
6 months after the intervention		2.55±1.54	7.51±3.43	8.8	0.000**

Dimensions	Maximum score	Control group n=45	Study group n=45	t-test	P value
		Mean ±SD	Mean ±SD		
<b>Total satisfaction</b>					
Before-intervention	15	6.26±1.43	6.55±1.63	0.89	0.37 <sup>ns</sup>
3 months after the intervention		6.20±1.32	13.82±1.38	26.6	0.000**
6 months after the intervention		6.37±1.35	14.53±1.17	30.4	0.000**
<b>Total pain</b>					
Before-intervention	15	12.71±1.67	12.88±2.26	0.42	0.67 <sup>ns</sup>
3 months after the intervention		12.08±3.57	6.57±1.05	9.92	0.000**
6 months after the intervention		11.86±3.59	6.24±1.15	10.0	0.000**
<b>Total score</b>					
Before-intervention	95	38.48±4.41	40.13±6.70	1.37	0.88 <sup>ns</sup>
3 months after the intervention		38.46±3.51	60.24±3.33	30.1	0.000**
6 months after the intervention		39.20±3.73	65.33±4.94	28.2	0.000**

t=independent t-test <sup>ns</sup> No statistical significant difference (p >0.05) \*\*Highly statistically significant (P ≤ 0.001).

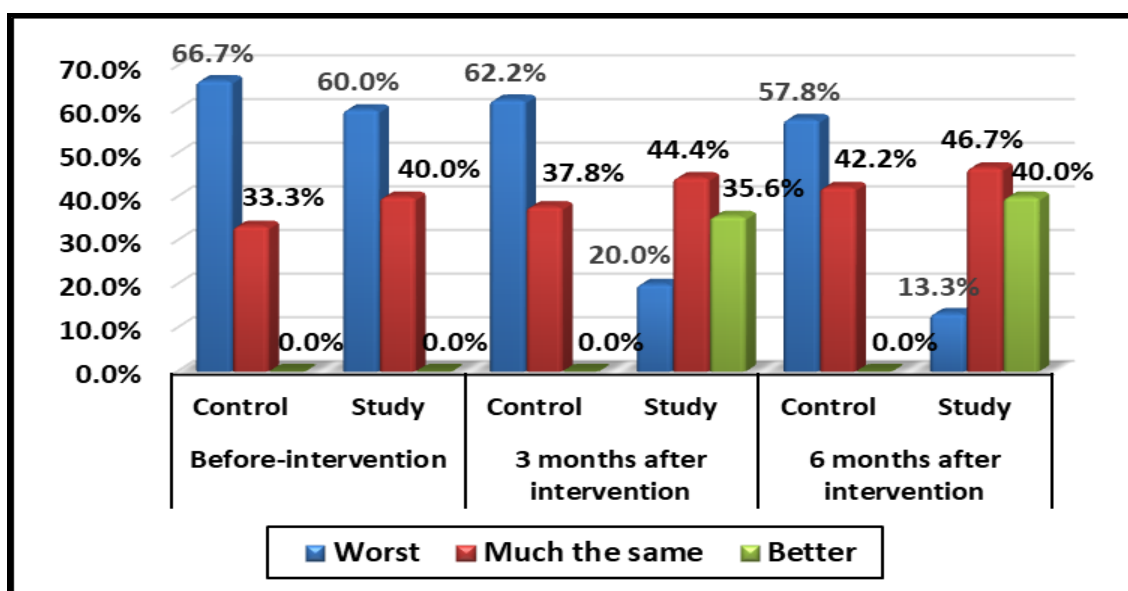


Figure (1): Distribution of studied women's total sexual function score before the intervention, three and six months after the intervention (n=90).

Table (4): Comparison of the mean scores of Roy's adaptation model regarding hysterectomy in both groups before the intervention, three and six months after the intervention (n=90).

Dimensions	Maximum score	Control group n=45	Study group n=45	t-test	P value
		Mean ±SD	Mean ±SD		
<b>Physiologic Mode</b>					
Before-intervention	9-27	15.08±2.81	15.20±2.95	0.18	0.85 <sup>ns</sup>
3 months after the intervention		14.88±1.99	21.02±4.00	9.19	0.000**
6 months after the intervention		14.73±1.94	23.20±4.89	10.7	0.000**
<b>Self-Concept Mode</b>					
Before-intervention	9-27	14.68±2.78	14.48±3.15	0.31	0.75 <sup>ns</sup>
3 months after the intervention		14.22±2.09	20.91±4.18	9.57	0.000**
6 months after the intervention		14.68±2.05	22.97±5.28	9.81	0.000**
<b>Role Function Mode</b>					
Before-intervention	7-21	12.57±4.05	12.71±4.41	0.14	0.88 <sup>ns</sup>
3 months after the intervention		12.44±3.59	16.35±5.32	4.0	0.000**
6 months after the intervention		12.91±2.98	18.22±3.97	7.17	0.000**



Dimensions	Maximum score	Control group n=45	Study group n=45	t-test	P value
		Mean ±SD	Mean ±SD		
<b>Interdependence Mode</b>					
Before-intervention	9-27	16.44±4.28	16.53±4.30	0.09	0.92 <sup>ns</sup>
3 months after the intervention		17.00±4.16	21.88±3.55	5.99	0.000**
6 months after the intervention		17.11±4.18	23.26±4.31	6.86	0.000**
<b>Total score</b>					
Before-intervention	34-102	58.80±10.48	58.93±12.12	0.05	0.95 <sup>ns</sup>
3 months after the intervention		58.55±8.26	81.40±14.25	9.29	0.000**
6 months after the intervention		59.44±7.30	87.66±15.77	10.8	0.000**

t= independent t-test <sup>ns</sup> No statistical significant difference (p > 0 .05) \*\*Highly statistically significant (P ≤ 0.001).

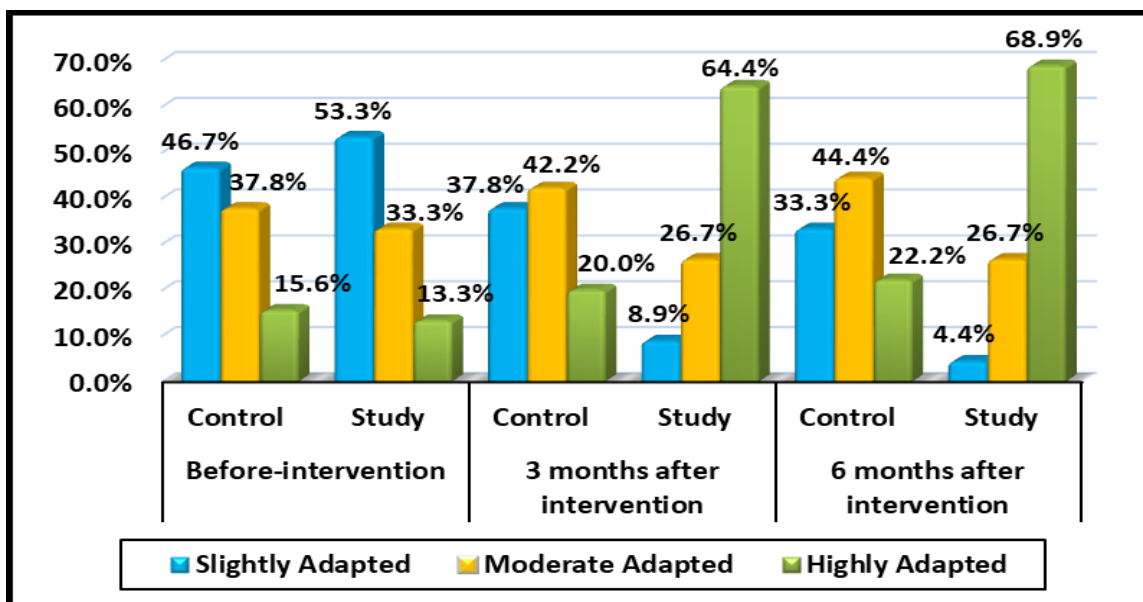


Figure (2): Distribution of studied women regarding total Roy's Adaptation Model score before the intervention, three and six months after the intervention (n=90).

Table (5): Comparison of the mean scores of health-promoting behaviors regarding hysterectomy in both groups before the intervention, three and six months after the intervention (n=90).

Dimensions	Possible score	Control group n=45	Study group n=45	t-test	P value
		Mean ±SD	Mean ±SD		
<b>Nutrition</b>					
Before-intervention	9-36	22.42 ± 1.77	22.13 ± 2.31	0.66	0.50 <sup>ns</sup>
3 months after the intervention		22.73 ± 1.87	28.62 ± 1.86	14.9	0.000**
6 months after the intervention		23.20 ± 1.45	29.17 ± 1.36	20.0	0.000**
<b>Physical activity</b>					
Before-intervention	8-32	12.44 ± 1.43	12.62 ± 1.51	0.57	0.56 <sup>ns</sup>
3 months after the intervention		12.20 ± 2.65	16.48 ± 1.14	9.9	0.000**
6 months after the intervention		12.68 ± 2.39	17.95 ± 3.66	8.0	0.000**
<b>Stress management</b>					
Before-intervention	8-32	19.26 ± 1.37	18.88 ± 2.39	0.91	0.36 <sup>ns</sup>
3 months after the intervention		21.35 ± 2.23	26.68 ± 2.46	10.7	0.000**
6 months after the intervention		21.84 ± 1.88	27.40 ± 2.70	11.3	0.000**
<b>Health responsibility</b>					
Before-intervention	9-36	20.77 ± 1.47	20.31 ± 2.49	1.08	0.28 <sup>ns</sup>
3 months after the intervention		21.48 ± 0.53	24.68 ± 3.75	4.9	0.000**
6 months after the intervention		21.48 ± 2.18	26.53 ± 2.64	9.8	0.000**

Dimensions	Possible score	Control group n=45	Study group n=45	t-test	P value
		Mean ±SD	Mean ±SD		
<b>Spiritual growth</b>					
Before-intervention	9-36	22.57 ± 1.76	22.46 ± 1.65	0.30	0.75 <sup>ns</sup>
3 months after the intervention		22.77 ± 2.18	26.82 ± 3.49	6.5	0.000**
6 months after the intervention		23.24 ± 1.70	27.82 ± 2.66	9.7	0.000**
<b>Interpersonal relations</b>					
Before-intervention	9-36	23.62 ± 2.18	23.02 ± 2.18	1.30	0.19 <sup>ns</sup>
3 months after the intervention		23.02 ± 1.88	27.42 ± 2.77	8.7	0.000**
6 months after the intervention		23.60 ± 1.62	28.04 ± 2.62	9.6	0.000**
<b>Total score</b>					
Before-intervention	52-208	121.11 ± 5.77	119.44 ± 9.96	0.97	0.33 <sup>ns</sup>
3 months after the intervention		123.57 ± 11.13	150.73 ± 8.77	12.8	0.000**
6 months after the intervention		126.06 ± 9.22	156.93 ± 7.09	17.7	0.000**

t= independent t-test <sup>ns</sup> No statistical significant difference (p > 0.05) \*\*Highly statistically significant (P ≤ 0.001).

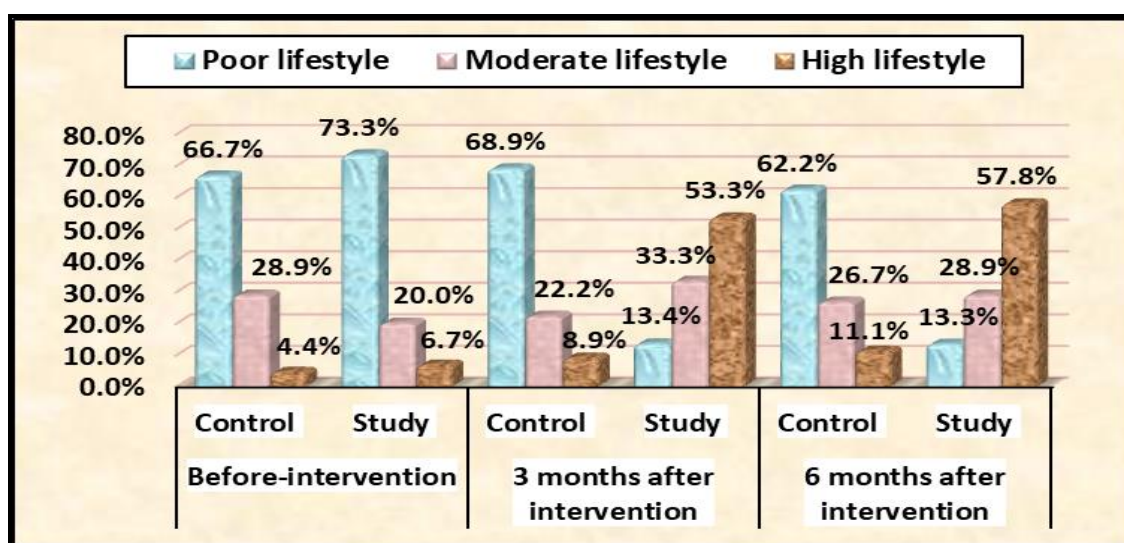


Figure (3): Distribution of studied women regarding total health promoting score before the intervention, three and six months after the intervention (n=90).

Table (6): Correlation between total adaptation score and total score of sexual function as well as total health-promoting behaviors before the intervention, three and six months after the intervention (n=90).

Variables	Total Roy's adaptation model score											
	Control group (n= 45)						Study group (n= 45)					
	Before intervention		3 months after the intervention		6 months after the intervention		Before intervention		3 months after the intervention		6 months after the intervention	
	r	P value	r	P value	r	P value	r	P value	r	P value	r	P value
Total sexual function score	0.451	0.000**	0.411	0.000**	0.522	0.000**	0.414	0.000**	0.647	0.000**	0.731	0.000**
Total health-promoting behavior score	0.399	0.000**	0.382	0.000**	0.408	0.000**	0.476	0.000**	0.564	0.000**	0.357	0.000**

\*\*A high statistically significant difference (P ≤ 0.001)

**Table (1):** Clarifies that (37.8% & 35.6%) of both control and study groups respectively were in the same age group ( $\geq 50$  years) with a mean age of  $45.66 \pm 10.18$  and  $46.33 \pm 9.94$  years old. Concerning the level of education, it was clear that (53.3% & 42.2%) of both control and study groups respectively had secondary education. According to the occupation (60% & 53.3%) of both control and study groups were housewives. Also, (68.9% & 66.7%) of both control and study groups respectively lived in the urban area. Additionally, there was no statistically significant difference between both control and study groups regarding personal characteristics ( $p > 0.05$ ) that reflected group homogeneity.

**Table (2):** Reveals that (73.3% & 57.8%) of both control and study groups respectively performed abdominal hysterectomy. And (48.9% & 44.4%) respectively had abnormal uterine bleeding as indications of hysterectomy operation with no statistically significant difference between control and study groups regarding the history of hysterectomy ( $p > 0.05$ ). Which reflects homogeneity between both groups according to the inclusion criteria that were selected.

**Table (3):** Presented, there is no statistically significant difference in the mean score of the overall sexual function and its dimensions between the both groups in the pre-intervention phase ( $p > 0.05$ ). However, after three and six months of intervention, the mean difference score for overall and dimensions of sexual function in the study group was higher than the control group scores ( $P \leq 0.001$ ). In the study group, the mean sexual function domain before the intervention were  $4.04 \pm 1.26$  in terms of desire,  $6.82 \pm 1.31$  in arousal,  $7.17 \pm 1.31$  in lubrication,  $2.64 \pm 1.90$  in orgasm,  $6.55 \pm 1.63$  in satisfaction and  $12.88 \pm 2.26$  in pain. After three and six months of the intervention the mean score of sexual function in its dimensions (desire, arousal, orgasm, lubrication, satisfaction, and pain) respectively, had increased to  $8.13 \pm 1.93$  &  $9.08 \pm 1.63$ ,  $12.42 \pm 1.23$  &  $13.48 \pm 1.60$ ,  $13.35 \pm 1.40$  &  $14.46 \pm 1.21$ ,  $5.93 \pm 1.21$  &  $7.51 \pm 3.43$ ,  $13.82 \pm 1.38$  &  $14.53 \pm 1.17$ , and  $6.57 \pm 1.05$  &  $6.24 \pm 1.15$ .

**Figure (1):** Shows that none of the women in both study and control groups had a better sexual function before intervention. While, at three and six months after the intervention, 35.6% and 0.0% versus 40.0% and 0.0% of women in the study and control groups respectively expressed better sexual function.

**Table (4):** Elaborates that there is no statistically significant difference in the mean score of the total Roy's adaptation model and its dimensions between the two groups in the pre-intervention phase ( $p > 0.05$ ). meanwhile, after three and six months of intervention, the mean difference for the total score

and dimensions of Roy's adaptation model in the study group was higher than the control group the scores ( $P \leq 0.001$ ). In the study group, the mean Roy's adaptation model before the intervention was  $15.20 \pm 2.95$  in terms of physiologic mode,  $14.48 \pm 3.15$  in self-concept mode,  $12.71 \pm 4.41$  in role function mode, and  $16.53 \pm 4.30$  in interdependence mode. After three and six months of the intervention the mean score of roy's adaptation model in its dimensions (physiologic mode, self-concept mode, role function mode, and interdependence mode) respectively, had increased to  $21.02 \pm 4.00$  &  $23.20 \pm 4.89$ ,  $20.91 \pm 4.18$  &  $22.97 \pm 5.28$ ,  $16.35 \pm 5.32$  &  $18.22 \pm 3.97$ , and  $21.88 \pm 3.55$  &  $23.26 \pm 4.31$ .

**Figure (2):** Illustrates that 13.3% and 15.6% of women in both study and control groups respectively were highly adapted to hysterectomy before the intervention. Meanwhile, elevated at three and six months after the intervention, from 64.4% and 20.0% to 68.9% and 22.2% of women of the study and control groups respectively be highly adapted to hysterectomy.

**Table (5):** Shows that there is no statistically significant difference in the mean score of the total health-promoting behaviors scores and its domains between the two groups in the pre-intervention phase ( $p > 0.05$ ). However, after three and six months of intervention, the mean difference score for overall and domains of health-promoting behaviors in the study group was higher than the scores in the control group ( $P \leq 0.001$ ). In the study group, the mean health-promoting lifestyle behaviors before the intervention were  $22.13 \pm 2.31$  in terms of nutrition,  $12.62 \pm 1.51$  in physical activity,  $18.88 \pm 2.39$  in stress management,  $20.31 \pm 2.49$  in health responsibility,  $22.46 \pm 1.65$  in spiritual growth and  $23.02 \pm 2.18$  in interpersonal relations. After three and six months of the intervention the mean score of health-promoting behaviors in its domains ( nutrition, physical activity, stress management, health responsibility, spiritual growth, and interpersonal relationships) respectively, had increased to  $28.62 \pm 1.86$  &  $29.17 \pm 1.36$ ,  $16.48 \pm 1.14$  &  $17.95 \pm 3.66$ ,  $26.68 \pm 2.46$  &  $27.40 \pm 2.70$ ,  $24.68 \pm 3.75$  &  $26.53 \pm 2.64$ ,  $26.82 \pm 3.49$  &  $27.82 \pm 2.66$ , and  $27.42 \pm 2.77$  &  $28.04 \pm 2.62$ .

**Figure (3):** Illustrates that 6.7% and 4.4% of both the study and control groups respectively had a high health-promoting behaviors regarding hysterectomy before the intervention. Meanwhile, at three and six months after the intervention, 53.3% and 8.9% versus 57.8% and 11.1% of both the study and control groups respectively had a higher promoting behavior regarding hysterectomy.

**Table (6):** Shows the presence of a highly statistically significant positive correlation between total adaptation score and total sexual score as well as total

health-promoting behaviors scores in both groups at pre-intervention, post-intervention, and also follow-up phases ( $P \leq 0.001$ ).

### Discussion

The impact of a hysterectomy on women's sexual function and healthy behaviors is a topic of growing interest. Negative sexual function after hysterectomy is mostly brought on by physical, functional, and anatomical changes, lifestyle challenges brought on by possible surgical complications (Barber et al., 2022). The woman, as a bio-psychosocial entity with bodily, psychological, and social needs, must continually adjust to shifting internal and external environmental stimuli, whether they are harmful or helpful, in accordance with Roy's Adaptation Model (RAM). RAM seeks to change nursing care from one that is service-centered to one that is patient-centered (Sheikhalipour et al., 2021).

The current research aimed to evaluate the effect of the nursing approach based on Roy's adaptation model on sexual function and health-promoting behaviors of women after hysterectomy.

Concerning socio-demographic characteristics, the results of current research revealed that more than one-third of the control and study groups respectively were in the same age group ( $\geq 50$  years) with a mean age respectively  $45.66 \pm 10.18$  and  $46.33 \pm 9.94$  years. Also, more than half and approximately two-fifths of both control and study groups had secondary education. Three-fifths and more than half of both control and study groups were housewives. More than two-thirds of both control and study groups lived in urban areas. Additionally, there was no statistically significant difference between both control and study groups regarding personal characteristics ( $p > 0.05$ ) that reflected group homogeneity. These results agreed with Mahmoud et al., (2020) that showed that there were no statistically significant differences between control and study groups concerning personal characteristics, and the majority of women were in the age group (35-55 years) with the mean age of the women were  $44.3 \pm 3.8$  years).

The above-mentioned results also were agrees with Afify, (2022) who stated that there were no statistically significant differences between the control and study groups' socio-demographic characteristics, and nearly half of the study group were in age group ( $\geq 50$  years) with a mean age of  $49.76 \pm 6.58$  years and  $50.45 \pm 7.85$  years respectively, about two-thirds of control and more than two-fifths of the study group had secondary education, nearly two-thirds of the control group and more than half of study group were housewives. Nearly two-thirds of the control group and more than two-thirds of the study group lived in urban areas respectively. from the researchers' point of

view, this accordance was related to the same demography of the studies which reflects the same cultures and characteristics.

On the other hand, the results of the current study contradict with Essa et al., (2017) results which showed that regarding the level of education and residence around one-half of the intervention and the control group respectively, had primary and preparatory levels of education, also the majority of the intervention and control groups respectively were rural residents. These dissimilarities with present results may be due to the time between the two-study conduction as today large sector of the women preferred to continue education to secondary education at least and the other study setting were conducted at National Medical Institution in Damanshour where received women of different villages in around .

Regarding the history of hysterectomy, the current research findings clarified that nearly three-quarters and more than half of both control and study groups respectively undergo an abdominal hysterectomy. Nearly half of both control and study groups respectively had abnormal uterine bleeding as hysterectomy indications with no statistically significant difference between control and study groups regarding the history of hysterectomy. Which reflects homogeneity between both groups and confirmed the inclusion criteria that were selected based on it. These findings were in accordance with Afify, (2022) who represented that, more than three-quarters of the control group and more than half of the study group undergo abdominal hysterectomy with half of the control group and more than two-fifths of the study group had abnormal uterine bleeding as a hysterectomy. Also, these results were supported by Ibrahim & Mohammed, (2020) who revealed that three-quarters had abnormal uterine bleeding as a hysterectomy indication and the majority of the studied woman undergo an abdominal hysterectomy. Additionally, Webb-Tafoya, (2021) explored that, nearly half of the studied women also had a diagnosis of abnormal uterine bleeding as the main cause of hysterectomy. These similarities in results may be due to the homogeneity of inclusion criteria that women selected based on it.

Related to the mean scores of sexual function domain regarding hysterectomy in both groups before the intervention, three and six months after the intervention, the current research results elaborated that, there was no statistically significant difference in the mean score of the overall sexual function and its dimensions between the two groups before the intervention. These findings were congruent with Cruz et al., (2020) who observed that women who had undergone total hysterectomy, had female sexual function index (FSFI) scores below the cutoff point

and were at a higher risk of developing sexual dysfunction. Moreover, **Goudarzi et al., (2021)** reported that hysterectomy was associated with problems with femininity and sexual function, and decreased feminine emotions and feelings.

However, the findings of the current study showed that the study group's mean difference score for total and aspects of sexual function were higher than the scores in the control group at three and six months of intervention ( $P = 0.001$ ). The study group's improvements in sexual function may be attributed to the women's active participation in the practical sessions where they learned how to manage post-hysterectomy sexual problems including (effective communication before having sexual intercourse and relaxation activities including walking, strengthening pelvic muscles, utilizing Kegel exercises, and use of lubricating gels). As a result, the women were able to adapt to change and communicate their emotions regarding new sexual adaptation.

The above-mentioned results were consistent with **Ali et al., (2021)** who showed that more than three-quarters of the investigated women had pre-program sexual distress and all of them (100%) had no post-program sexual distress. The overall sexual distress measure shows a highly statistically significant difference for women. Also, these findings were supported by **Farrag et al., (2018)** who presented, a high statistically significant difference between the pre-intervention phase and three months after intervention in the two groups. The total sexual functions score was improved with a highly statistically significant difference in the mean score of sexual functions between the control and experimental groups.

On the other hand, the present research findings are not supported by the results of **Lauterbach et al., (2021)** who showed improvements in vaginal elasticity, mobility, and FSFI scores following hysterectomy. The studies point out positive results, the main reason from the researcher's point of view this difference may be due to relief from gynecological pathology which is treated by hysterectomy as the decrease of dyspareunia and relief from dysmenorrhea. The above-mentioned results supported the first study hypothesis which stated that "Implementation of a nursing approach based on Roy's Adaptation Model will have a positive effect on the sexual function of women after hysterectomy than those who will not receive it".

On investigating the of Roy's adaptation model constructs' mean scores. The current research results showed that there was no statistically significant difference between control and study groups regarding the mean total score of physiologic mode in the pre-intervention phase. While there was a highly

statistically significant difference between control and study groups concerning physiologic mode at three- and six-months post-intervention phase. The result of the current research was supported by **Gamal et al., (2019)** who stated that, after nursing care guided by Roy's adaptation model, there were statistically significant improvements ( $p < 0.000$ ) regarding all items of the physiologic mode such as the risk for infection, change in comfort pain, disturbed sleep pattern, constipation, urinary retention.

Concerning the mean total score of self-concept mode before and after the intervention phase, there was no statistically significant difference between the control and study groups regarding self-concept mode in pre-intervention. Meanwhile, there was a highly statistically significant difference at three- and six-months post-intervention phase. These results were in accordance with **Elmoneim et al., (2017)** who showed that Roy's adaptation model has positive effects on women's self-concept (physical and interpersonal self) adaptation to post-hysterectomy sexual-related problems with a high statistical significance difference.

Regarding the mean total score of role function mode in the pre and post-intervention phase, there were no statistically significant difference between control and study groups regarding all items of role function mode in the pre-intervention. Meanwhile, there was a highly statistically significant difference between control and study groups concerning role function mode at three months and six months post-intervention respectively. These results were consistent with **Mansouri et al., (2019)** who indicated that training based on Roy's adaptation model caused a significant improvement in the role function mode. Also indicated that scores increased in the intervention group with a statistically significant difference.

Concerning the mean total score of interdependence mode, the study results showed that there was no statistically significant difference in the control and study groups regarding all items of interdependence mode in the pre-intervention phase. Meanwhile, there was a highly statistically significant difference in control and study groups regarding interdependence mode at post-intervention phases with mean scores of three- and six-months post-intervention. The results of the current research were in the same line as **Shahed et al., (2016)** who revealed an improvement of maladaptive behaviors concerning interdependence mode along with increased adaptive behaviors and marital satisfaction after the intervention.

The current results showed that there were considerable improvements in the overall Roy adaptation model of the study group, with less than one quarter in the pre-intervention phase increasing to

more than half at three months post-intervention and more than three quarters at six months post-intervention. This finding was in line with that of **Afify, (2022)**, who demonstrated that the study group's total Roy's Adaptation Model improved while there was no improvement in the control group which rising from the tenth percent in the pre-intervention phase to more than three-fifths in the post-intervention phase. From the researchers' point of view, these improvements could be because using Roy's Adaptation Model effectively has a favorable impact on how women adapt to their hysterectomy experiences. And also, these findings achieved the second study hypothesis which showed that "Implementation of a nursing approach based on Roy's adaptation model will have a positive effect on the adaptation of women to hysterectomy than those who will not receive it".

As regard investigating health-promoting behaviors among women after a total hysterectomy, the results of the present research demonstrated that the mean scores of the total health-promoting behaviors and its domains were partially the same between both groups, with no statistically significant difference before the intervention ( $p > 0.05$ ). This might be due to poor awareness, limited access to healthcare services, and poor education as more than two-fifths of study groups had secondary education. The results of the current study agreed with **Malik et al., (2021)** who represented that, health-promoting behaviors profile, health responsibility, and physical activity were quite low among women. Also, **Amine et al., (2017)** explained that the mean score of health-promoting behaviors was 2.49 with a standard deviation of 0.47 which was moderate. Moreover, **Asrami, (2016)** reported that health-promoting behaviors were relatively low after hysterectomy and recommended that women necessitate greater attention from policymakers and health care services to promote health-promoting teaching programs targeting them. These similarities with our results return to the other studies were descriptive ones utilized to assess the score of health-promoting behaviors after hysterectomy operations and their findings reinforcements the importance of integrating such models or guidelines in post hysterectomy operation to favor more health-promoting behaviors.

Additionally, after three and six months of intervention, the mean difference score for overall and dimensions of health-promoting behaviors in the study group was higher than the scores in the control group. This is attributed to the knowledge and behavioral skills that women were taught during the sessions based on of Roy adaptation model that plays an important role in encouraging and motivating women to change un healthy behaviors. Besides, intervention

booklets play a very important role in helping women to acquire knowledge regarding healthy behaviors.

These findings were consistent with **Elkhesheh et al., (2022)** who emphasised that there was no statistically significant difference in any aspect of pre-intervention health promotion behaviors between the study and control groups. However, there was a highly statistically significant difference between the post-intervention and follow-up results for all health promotion behaviors items. Also, **Heidari et al. (2018)** stated that there was a significant difference in the mean score of health-promoting behaviors in the case group before and after the intervention ( $P = 0.001$ ).

Moreover, the current research results showed that the total health promotion behaviors score had improved from less than a tenth in the pre-intervention phase to more than half at three months and six months post-intervention phase among the study group while there was no improvement among the control group. This reflects the effect of the application of Roy's Adaptation Model which attains more positive effects on improved lifestyle behaviors for women after hysterectomy. These results were similar to **El-Hosary & El-Salam, (2018)** results which presented after the interventions, the mean total score of the "health-promoting behavioral profile" was highly significantly different between the study and control groups. From the above-mentioned results, it had been proved that the third study hypothesis were supported which stated that "Implementation of nursing approach based on Roy's adaptation model will have a positive effect on health-promoting behaviors of women after total hysterectomy than those who will not receive it".

Concerning the correlation between total Roy adaptation model score and total score of sexual function as well as total health-promoting behaviors, the current research results showed that there was a highly statistically significant positive correlation between the total adaptation score and total sexual score as well as total health-promoting lifestyle behavior scores in both groups before the intervention, three and six months after the intervention. These findings were congruent with **Afify, (2022)** who illustrated there was a highly positive significant correlation between the total score of sexual function and adaptation in a study group in the post-intervention phase.

## Conclusion

Based on the results of the current study, it was concluded that: the implementation of the nursing approach based on Roy's adaptation model had a highly significant improvements in women' sexual function, the women became highly adapted with hysterectomy and showed high level of health-

promoting behaviors scores related to hysterectomy in (three and six months) after the intervention among the study group as compared to the control group. Which achieved the current study aim and hypotheses.

### Recommendations

- Provide post-hysterectomy instructional guidelines to promote adaptation to sexual problems after hysterectomy.
- Design and implement awareness programs that highlight the importance of promoting a healthy lifestyle and behaviors after a hysterectomy operation.

### Further researches

- Offer teaching programs for maternity nurses about Roy adaptation model to encourage adjusting to sexual problems after hysterectomy.
- Integrate sexual health and health promotion behaviors as the main component of routine nursing care provided for women after hysterectomy

### References:

- **Abd Al-Muhsen, D., & Abdulwahid, H. (2021):** Evaluation of Post-operative Nursing Care of Psychological Support and Discharge Plan for Women Undergone Hysterectomy at Maternity Wards in Baghdad City's Teaching Hospitals. Iraqi National Journal of Nursing Specialties, 34(1), 69-75.
- **Abdel-Mordy, M., Atta Mohammed, W., & Rabea Abd Elmordy, Z. (2021):** Effect of Application Roy's Adaptation Model on Women's Satisfaction and Quality of Life after Mastectomy. Egyptian Journal of Health Care, 12(4), 745-761.
- **Abo-Ali E, & Oka, A., (2021):** Health-promoting lifestyle behaviors among women in Tanta, Egypt: an analytic cross-sectional study. Egypt Family Medical journal, No5:125-40. DOI: 10.21608/efmj.2021.34033.1037.
- **Afify, S., Abdel salam, R., Mostafa H., & Abdel Alim, R., (2022):** Applying Roy's Adaptation Model on Sexual Function for Women after Total Hysterectomy. Master thesis, Faculty of Nursing Benha University.
- **Ali, R., Hassan, H., & Abd El Salam, S. (2021):** Impact of an Educational Program on Sexual Distress Associated With Cervical Cancer. Journal of Applied Health Sciences and Medicine, 1(1), 30-42.
- **Amine, A., Marhamat, F., Sara, J., & Hamid, H., (2017):** Relationship Between Health-Promoting Behaviors and Quality of Life in Postmenopausal Women Volume 3, Issue 4 (Autumn 2017 -- 2017). JCCNC 2017, 3(4): 269-276.
- **Anis, T., Gheit, A., Saied, S., & Al\_kherbash, S. , (2011):** Arabic translation of Female Sexual Function Index and validation in an Egyptian population. The journal of sexual medicine, 8(12), 3370-3378.
- **Asrami, FS., Hamzehgardeshi, Z., Shahhosseini, Z. (2016):** Health-promoting lifestyle behaviors in menopausal women: a cross-sectional study. Glob J Health Sci. (2016) 8:53486. DOI: 10.5539.v8n8p128.
- **Barber, M., Walters, M., Karram, M., Bradley, C., & Msce, M. (2022):** Female sexual function & dysfunction, Walters & Karram Urogynecology and Reconstructive Pelvic Surgery-E-Book. Elsevier Health Sciences, (5<sup>th</sup> edition), 138.
- **Bolin, A., Whelehan, P., Vernon, M., & Antoine, K. (2021):** Human sexuality: Biological, psychological, and cultural perspectives, New York, Routledge,(2ndedition),144,<https://books.google.com/books?hl=ar&lr=&id=eoAxEAAQBAJ&oi=fnd&pg=PT14&dq=definition+of+sexuality+2021&ots=iORs85gKe1&sig=N5MbtGOrrgHxi3mLySYu3pKHQU>.
- **Buckner, E. B. (2020):** The Roy Adaptation Model as Theoretical Underpinning for DNP Education. Samford University, 1(2), 5-27. <http://hdl.handle.net/10755/19349>.
- **Callis, A., (2020):** Application of the Roy Adaptation Theory to a care program for nurses. Applied Nursing Research, 56 (18), 1-6.
- **Carlin, G., Bodner-Adler, B., Husslein, H., Ritter, M., & Umek, W. (2021):** The effectiveness of surgical procedures to prevent post-hysterectomy pelvic organ prolapse: a systematic review of the literature. International urogynecology journal, 32(4), 775-783.
- **Cruz, S., Santos, V., Nunes, E., & Rodrigues, C. (2020):** Sexual function and stress urinary incontinence in women submitted to total hysterectomy with bilateral oophorectomy. Fisioterapia e Pesquisa, 27(1), 28-33.
- **El-Hosary E., & El-Salam A., (2018):** Effect of Health Promoting Lifestyle Modifications on Quality of Life among Menopausal Women, Menoufia Nursing Journal, Vol. 3, No. 1, Nov 2018, PP: 39-47 10.21608/menj.2018.121862
- **El kheshen, A., Salam, M., & Elbana, M., (2022):** Effect of Health Promoting behaviors Educational Intervention on Knowledge and Quality of Life of Menopausal Women.
- **Elmoneim, E., Ghonemy, G., & Hassan, N. (2017):** Effect of Roy Adaptation Model on Sexual Function and Spousal Support among Women after Total Hysterectomy. IOSR Journal of Nursing and Health Science, 6(2), 130-140.

- **Essa, R., Ismail, N., & Hassan, N., (2017):** Effect of progressive muscle relaxation technique on stress, anxiety, and depression after hysterectomy. *Journal of Nursing Education and Practice*, 7(7), 77.
- **Farrag, R., Aboushady, R., & Mohamed, H. (2018):** Effect of an Educational Supportive Program on Self-Esteem and Marital Relation among Women Undergoing Hysterectomy. *The Malaysian Journal of Nursing (MJN)*, 10(2), 11-23.
- **Gamal, A., Ayoub, G., Khalil, A., & Hussein, A. (2019):** Effect of Nursing Care Guided by Roy's Adaptation Model on Self-Evaluation of Women after Caesarean Section. *Journal of Health, Medicine and Nursing*, 67(1), 33-42.
- **Gokyildiz, S., Alan, S., Elmas E., Bostanci, A., & Kucuk, E., (2017):** Health-promoting behaviors in pregnant women in Turkey. *Int J Nurs Pract.* 2017; 20:390-397.
- **Gopalan, M., Rosinger K., & Ahn J., (2021):** Use of Quasi-Experimental Research Designs in Education Research: Growth, Promise, and Challenges; Volume: 44 issue: 1, page(s): 218-243 <https://doi.org/10.3102/0091732X20903302>.
- **Goudarzi, F., Khadivzadeh, T., Ebadi, A., & Babazadeh, R., (2021):** Iranian women's self-concept after hysterectomy: A qualitative study. *Iranian Journal of Nursing and Midwifery Research*, 26(3), 230-237. DOI:[http://dx.doi.org/10.4103/ijnmr.IJNMR\\_146\\_20](http://dx.doi.org/10.4103/ijnmr.IJNMR_146_20)
- **Hatami, F., & Hojjati, H., (2019):** Effect of Roy's Adaptation Model on the Care Burden of Mothers of Children under Chemotherapy (A Quasi-Experimental Study). *Medical-Surgical Nursing Journal*, 8(1), 1-7.
- **Heydari, A., & Khorashadizadeh. F., (2017):** "Pender's health promotion model in medical research," *Journal of the Pakistan Medical Association*, vol. 64, no. 9, pp. 1067-1074, 2017.
- **Heyes, S., & Bond, M., (2020):** Pathways to psychological wellbeing for patients with bladder cancer and their partners-in-care. *European Journal of Oncology Nursing*, 46(10), 2.
- **Ibrahim, W., & Mohammed, H., (2020):** Effect of Nursing Instructional Guideline on Women's Quality of Life after Hysterectomy. *International Journal of Novel Research in Healthcare and Nursing*.7(2), 439-451.
- **Kassymova, G., Sydsjö, G., Borendal Wodlin, N., Nilsson, L., & Kjølhed, P. (2021):** The Effect of Follow-Up Contact on Recovery after Benign Hysterectomy: A Randomized, Single-Blinded, Four-Arm, Controlled Multicenter Trial. *Journal of Women's Health*, 30(6), 872-881.
- **Lauterbach, R., Gruenwald, I., Matanes, E., Matar, K., Weiner, Z., & Lowenstein, L. (2021):** The impact of vaginal hysterectomy and uterosacral ligament suspension on vaginal elasticity and sexual function. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, 258(20), 29-32. <https://doi.org/10.1016/J.EJOGRB.2020.12.015>.
- **Mahmoud, A., El-Bassioun, W., Abdelmaksoud, A., & Abd-Eltawab, A. (2020):** Alteration of Sexual Function among Females after Laparoscopic and Abdominal Hysterectomy. *International Journal of Medical Arts*, 2(2), 442-450.
- **Malik, M., Mehjabin, Hussain, A., Hashmi, A., (2021):** Health Promoting Lifestyle Behaviors and Sleep Quality among Post-Menopausal Women in Pakistan *Sys Rev Pharm* 2021; 12(03):691-697 A multifaceted review journal in the field of pharmacy.
- **Mansouri, A., Baraz, S., Elahi, N., Malehi, A., & Saberipour, B. (2019):** The effect of an educational program based on Roy's adaptation model on the quality of life of patients suffering from heart failure: A clinical trial study. *Japan Journal of Nursing Science*, 16(4), 459-467.
- **Marni, H., & Adnani, S. (2020):** Women's Sexuality and Relationship with Hysterectomy. *Journal Obgin Emas*, 4(2), 270-279. <https://doi.org/10.25077/aoj.4.2.270-279.2020>.
- **Masumeh Hemmati Maslakpak, Esmail Maghsoodi, & Siyamak Sheikhi (2015):** The Effects of a Care Program Based on the Roy Adaptation Model on Nursing Home Residents' Quality of Life, 2015 October; 12(4):e8671, DOI:10.17795/modernc.8671.
- **Papadopoulou, C., Sime, C., Rooney, K., & Kotronoulas, G. (2019):** Sexual health care provision in cancer nursing care: A systematic review on the state of evidence and deriving international competencies chart for cancer nurses. *International journal of nursing studies*, 100, 103405.
- **Pender N., Murdaugh C., Parsons M., (2015):** *Health Promotion in Nursing Practice*. 7th ed. Pearson Prentice Hall: Upper Saddle River; 2015. [Google Scholar].
- **Roy C. & Andrews H., (2009):** *Nursing theory, The Roy adaptation model*, Upper Saddle River, New Jersey: Pearson Prentice Hall, (3<sup>rd</sup> edition), 35-50.
- **Shahed, S., Vanaki, Z., & Tahmasebi, M. (2016):** Effect of an educational-supportive program based on Roy adaptation model on marital satisfaction in mastectomy patients receiving chemotherapy. *Evidence-Based Care*, 6(1), 71-78.
- **Sheikhalipour, Z., Ghahramanian, A., Fateh, A., & Onyeka, T. (2021):** Functional status of women after cancer and its related factors: A study based on Roy adaptation model. *European Journal of Cancer Care*, 30(2), 67-68.
- **Sobhani, R., Zebardast, A., & Rezaei, S. (2020):** Cognitive Emotion Regulation Strategies, Body



Image, and Sexual Satisfaction in Women with and without a History of Hysterectomy and Mastectomy Surgeries. *Scientific Journal of Nursing, Midwifery and Paramedical Faculty*, 6(1), 72-87.

- **Walker S. Sechrist K. & Pender J. (1987):** The Health-Promoting Lifestyle Profile: development and psychometric characteristics. *Nurs Res.* 36:76–81. DOI: 10.1097/00006199-198703000-00002
- **Wan, S., Zhao, X., Pei, J., Han, Z., Che, R., Qin, S., & Hua, X. (2022):** Association of age at benign hysterectomy with leukocyte telomere length in a nationally representative population. *Maturitas.*159 (1), 46-51.
- **Webb-Tafoya, M. (2021):** Exploring Postsurgical Decision Attitudes among Young Women Electing Hysterectomy. *Walden ScholarWorks*, 12(7), 87.