

Effect of Roy's Adaptation Model on Sexual Function for Women after Total Hysterectomy

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Abstract

Background: Hysterectomy is the most common gynecological surgery in the world in which uterus is removed surgically partially or totally through vaginal, abdominal or laparoscopic routes. **Aim of study:** Was to evaluate effect of Roy's Adaptation Model on sexual function for women after total hysterectomy. **Study design:** A quasi-experimental study design (pre & post-test design) was utilized to fulfill the aim of this study. **Setting:** The study was conducted at Obstetric and Gynecological department and the outpatient clinics in Benha University Hospital. **Sample:** A purposive sample of 80 women who undergo hysterectomy, chosen according to the main inclusion criteria (married with active sexual relationship and don't use drugs that affect the sexual health) and divided randomly into control group comprised (40) women and study group comprised (40) women. **Tools of data collection:** Four tools were utilized, I: Self-administered questionnaire, II: Female sexual function index (desire, arousal, lubrication, orgasm, satisfaction and pain), III: Roy's Adaptation Model Scale (physiologic, self-concept, role function and interdependence mode) and IV: Woman's satisfaction scale. **Results:** Almost two thirds of study group were highly satisfied of Roy's Adaptation Model. Total Roy's Adaptation Model improved from tenth at pre intervention phase to more than three fifths at post intervention phase among study group while there was no improvement in the control group. More than three fifths of study group had good knowledge score about hysterectomy at post intervention phase compared to only one quarter of control group. There was a highly positive significant correlation between total knowledge score and total score of sexual function and adaptation in study group at post intervention phase. **Conclusion:** Application of Roy's Adaptation Model had a positive effect on sexual function for women after total hysterectomy, therefore, the study hypothesis was supported. **Recommendation:** Increasing women sexual awareness after hysterectomy through distributing a simplified and comprehensive booklet and posters in all gynecological settings which include a clear, brief and simple explanation about post-hysterectomy sexual life to reduce hysterectomy related sexual problems.

Key words: Hysterectomy, Roy's Adaptation Model, Sexual function.

Introduction:

Sexuality is a basic need, which represents a fundamental aspect affecting all parts of life with important effects on physical and psychological health as well as quality of life. Female Sexuality is influenced by numerous factors such as gynecological

surgery, advanced age and hormonal changes, endocrine disorders, psychiatric and psychological dysfunctions as; depression, anxiety, negative body image and emotional neglect (Nemati & Weitkamp, 2020).

Hysterectomy on benign indication is the most common major gynecological

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operation worldwide. The aim of surgery for benign diseases is primarily to improve the health-related quality of life. More than 90% of hysterectomies are performed for benign reproductive issues such as abnormal uterine bleeding, dysmenorrhea, endometrial hyperplasia, uterine fibroids, pelvic organ prolapse, pelvic infection, and/or adnexal pathology (Ancuța et al., 2022).

Removal of the uterus and cervix in total hysterectomy affects this structural role which reduces the ability for women to achieve uterine orgasm. Because the uterus represents beauty, attractiveness and power that a hysterectomy removes; women are induced to perceive loss of youth, femininity, sexual identity and health, yielding feelings of weakness, fear of physical unattractiveness and depression after hysterectomy (Stanca et al., 2022).

Roy Adaptation Model (RAM) has been successfully applied to chronic illness generally and sexual adaptation specifically. The RAM is one of the basic nursing models, which examine coping with the disease, ability of the patients and adjustment in terms of bio-psycho-social aspects. According to the RAM, there are three stimuli that are shaped around the woman, which are Focal, Contextual and Residual Stimuli. The RAM has four adjustment modes, which are physiologic, self-concept, role function and interdependence mode (Heyes & Bond 2020).

Physiological mode is related with the bodily responses to the stimuli. It is the adjustment mode that is related with the physiological needs of the individual. Self-concept mode is the combination of the beliefs and emotions which are acquired by the individual within a certain time period. Role function mode defines that the individual shows the behaviors that are expected by the society in order to sustain

position within the society. Interdependence mode means attaching to one another and the relations of the individual with privileged individuals and support systems (Çömez & Karayurt, 2020).

Nurses must be well educated and find appropriate guidelines to promote physical, sexual and psychological recoveries after hysterectomy. Moreover, providing pre-operative teaching is cost effective, non-invasive, and would be a helpful tool and an efficient regimen of prophylaxis against sexual problems. Also increase woman satisfaction, shorten the length of hospitalization and promote physical wellbeing (Abd Al-Muhsen & Abdulwahid, 2021).

Significance of the study

Globally, the annual estimate of hysterectomy is over a million procedures performed worldwide. Nationally, annual incidence rate for hysterectomy in Egypt is 165,107 (Carlin et al., 2021).

The uterus is a very critical reproductive organ, especially for married women. Hysterectomy is associated with progressive sexual dysfunction. An international survey including 4,507 women aged 18-59 who underwent a hysterectomy revealed that 34% of participants experienced a sexual problems and 19% did not consider sexual relations necessary. Also, around 20–40% of women with benign disease experience a worsening of sexual function after hysterectomy and hysterectomy was found to be a factor associated with poorer sexual function in middle-aged women (Afiyah et al., 2020).

Aim of the study

The study aimed to evaluate effect of Roy's Adaptation Model on sexual function for women after total hysterectomy.

Study hypothesis

Application of Roy's Adaptation Model would have a positive effect on sexual function for women undergo total hysterectomy rather than who would not receive interventions.

Subjects and Method

Study design:

A quasi-experimental study design (pre & post-test design) was utilized to fulfill the aim of this study.

Setting:

This study was conducted at the Obstetric and Gynecological department and the outpatient clinics in Benha university hospital.

Type of Sample:

A purposive sample was chosen from the above mentioned study setting.

Sample Size: The sample consisted of 80 women who underwent total hysterectomy. The sample size was estimated using the following formula (**Yamane, 1967**):

$$n = \frac{N}{1 + N(e)^2}$$

Where "n" is the sample size

"N" is the total number of hysterectomy

"e" is coefficient factor (level of precision or sampling error) = 0,05.

Based on the previous year hysterectomy census report (**Benha University Hospital census, 2020**) (100 women).

Inclusion criteria:

Married with active sexual relationship, don't use drugs that affect the sexual health, not having history of addiction or drug abuse, women free from stressful events during the last six months or using antidepressant medications, women free from psychological disorders or chronic disease, women free from complications during or after the operation, read and write.

Exclusion criteria:

All women suffering from cancer and receiving chemotherapy treatment.

Tools of Data collection:

Tool (I): A self-Administered Questionnaire: it was constructed by researcher after reviewing a related literatures and translated into simple Arabic language. (**Ibrahim & Mohammed, 2020**) Data was collected by including two parts developed by researcher:

- **Part(1):** Socio-demographic characteristic as (Women's age, level of education, occupation, residence, telephone number, reason and type of hysterectomy).
- **Part (2):** Women's knowledge regarding hysterectomy, it included 12 questions.

Knowledge's scoring system:

All knowledge variables were weighted according to items included in each question. Each item was given a score (2) when the answer was complete correct answer, a score (1) when the answer was incomplete correct answer and a score (0) when the answer was (wrong answer & I don't know). The total score was calculated by summation of the scores of its items. The total score for the knowledge of each woman was calculated by the addition of the total score of all parts. The score of total knowledge was classified as the following:

- Good when the total score was 75% to 100%.
- Average when the total score was 50% to less than 75%.
- Poor when the total score was less than 50%.

Tool II: Female Sexual Function Index (FSFI): was adapted from (**Anis et al., 2011; Rosen et al., 2000**). The Female Sexual Function Index was translated into simple Arabic language to suit Egyptian culture. The Arabic FSFI is a validated, reliable, and locally accepted tool for use in the assessment

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of female sexual function in the Egyptian population. The FSFI is a brief six-item self-administered questionnaire designed to assess the core elements of sexual functioning: Desire, arousal, lubrication, orgasm, satisfaction and pain. It consists of 19 question, that's very useful to detect and follow-up female sexual dysfunction. Scores range from either 0 (no sexual activity) or 1 (suggestive of dysfunction) to 5 (suggestive of normal sexual activity), to which scores range from 1 = very dissatisfied to 5 = very

Scoring system:

Table 1: Distribution of the 6 domains of FSFI, the corresponding items, and their score range. Adapted from (Anis et al., 2011).

Domain	Questions	Score range	Factor	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
Full scale Score ranges = 1: 95				95

*Range for item 14=0-5; range for items 15 & 16 = 1-5.

A score ≤ 26.55 is classified as FSD.

Tool III: Roy's Adaptation Model Construct Scale (RAMS):

was adapted from (Roy and Andrews, 2009). The RAM construct scale was used to investigate the adaptation level of women through assessing women's maladaptive behaviors and corresponding focal, contextual, and residual stimuli. RAM containing 34 items in four adaptive modes. The physiological mode (9items), self-concept mode (9 items), role function mode (7 items) and the interdependence mode (9 items).

Scoring system:

The answer of each item was organized based on three point Likert (rating) scale. The minimum score was 1 indicates (strongly

satisfied. The minimum score possible is 2 and the maximum is 36, depending on the item and how confident were the women about becoming sexually aroused during sexual activity or intercourse. FSFI was used to evaluate women's sexuality within 2 stages. First evaluation was made 2 months post-operative (sexual intercourse is postponed for at least 6 weeks after hysterectomy). Second evaluation was made three months after first evaluation.

disagree), score 2 indicates (neither agree nor disagree) and the maximum score was 3 indicates (strongly agree). Total scores are obtained by adding the numeric responses on each item. The possible range of scores is from 34 to 102 with a high score indicating a more consistent use of coping strategies (highly adaptation). Overall scores ranged from:

- Highly adaptation when the total score was equal to or more than 75%.
- Moderately adaptation when the total score was ranged from 60% to less than 75%.
- Slightly adaptation when the total score was less than 60%.

Tool IV: woman's satisfaction sheet:

It was adopted from (Singer & Thode, 1998). It was evaluated by using a visual analog satisfaction scale. The visual analog

satisfaction scale was an instrument ranged from 0 - 10 in which 0 (zero) represented that the sample was unsatisfied with the Roy's Adaptation Model implementation and 10 represented fully satisfied.

Scoring system

- Unsatisfied =0
- Satisfied = 1-9
- Highly satisfied = 10

Tools validity

The validity of questionnaires were reviewed by a panel 3 jury experts in the field of Obstetrics & Gynecological Nursing at Benha University to ascertain clarity, relevance, comprehensiveness, and applicability of tools. Moreover, **Rosen et al., (2000)**, confirmed the validity of female sexual function index for English form and by **Anis et al., (2011)** for Egyptian Arabic form.

Tools reliability

Reliability was done by Cronbach's alpha coefficient to assess the reliability that indicated that each of the two tools which consisted of relatively homogenous items as indicated by the moderate to high reliability of each tool. The internal consistency of FSFI tool was $\alpha=0.851$. According to **(Cronbach, L., (1951)** value equal or greater than 0.70 considered satisfactory.

The Cronbach's alpha for the RAMS was 0.83. Additionally, item analysis was performed to determine whether individual items on the instrument should be retained or deleted. Reliability is measured by Cronbach's alpha in the form of a correlation coefficient, with 1.00 indicating perfect reliability and 0.0 indicating no reliability. A reliability coefficient of 0.7 is considered acceptable for newly developed psychosocial instruments.

Ethical consideration

Ethical aspects would be considered before starting the study as the following:

- Approval of the faculty ethics committee for scientific research was obtained for the fulfillment of the study.
- An official permission from the selected study settings was obtained for the fulfillment of the study.
- The aim of the study was explained to each woman before applying the tools at the beginning of interview and throughout the study to gain confidence and trust.
- The researcher obtained informed consent from women to participate in the study and confidentiality will be assured.
- Self-esteem, dignity and confidentiality of women was ensured throughout the study process, where personal data were not disclosed, and the women were assured that all data are used only for study purpose.
- All women were given the option to withdraw from the study at any time.
- Women in the control group also received an educational guidelines for an ethical consideration.
- The study causes no physical, social or psychological risk on the participants.

Pilot Study

The pilot study was carried out before starting data collection. It was done to estimate the time required for completing the sheets and also to check the simplicity, clarity, applicability and feasibility of the developed tools. The pilot study was conducted on 10 % of the total sample (8 women). There were no modifications done. Thus, women involved in the pilot study were included in the study.

Field work

The study was carried out from the beginning of June 2021 to the end of November 2021, covering six months.

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Women who attend at the Obstetric and Gynecological department and the outpatient clinics at Benha university hospital to receive required care were recruited by the researcher until the predetermined sample size was completed. The study was achieved through the following phases.

Assessment phase:

- The aim of this phase was to collect baseline women's data as well as to determine individualized educational needs and to design a suitable educational sessions.
- The researcher visited the previously mentioned study setting 2days/week from 9 am to 2 pm. At the beginning of interview the researcher introduced herself, greeted each women, explained the aim of the study, scheduled times and frequency of counseling sessions to selected women to assure adherence to interventions. The researcher took signed consent from women to participate in the study.
- The researcher distributed self-administered questionnaire to women (tool No. I) to assess socio-demographic data of women and women's knowledge regarding hysterectomy. The tool was collected at the end of the day (pretest).
- Female Sexual Function Index (FSFI) was distributed (tool No. II) (Pretest) to assess women's sexual function.
- Roy's Adaptation Model Construct Scale (RAM): was distributed (tool No. III) (Pretest) to assess women's maladaptive behaviors and corresponding focal, contextual, and residual stimuli and prioritizing through conducting personal face-to-face interviews with the women.
- The number of interviewed women per week was 4-6 women. The average time taken for completing each sheet was

around 20-30 minutes depending on the response of the women. Each woman was reassured that obtained information will be confidential and used only for the purpose of the study.

Pretests were conducted for women two months postoperatively (sexual relation is postponed for at least 6 weeks).

Planning phase:

Educational plan was designed based on RAM. Educational content was determined based on subjects' response in the intervention group to RAM for identifying maladaptive behaviors and the associated stimuli. Group educational methods were used to modify common stimuli of maladaptive behaviors among the group such as lectures, discussions, videos and role play. Educational aids such as computers, projectors and PowerPoint software were used. The control group receives routine hospital interventions regarding post hysterectomy care but not sexual education will be given.

Implementation phase:

The intervention included the application of Roy's Adaptation model (RAM) through determining steps of application of RAM, choose educational methods as discussion, role play and pictures used in an Arabic language and using educational media as lab top, written material as booklet to gain information and facilitate discussion. Use of virtual education during sessions to provide more clarification and the opportunity to receive social support for the development of consistent behaviors by supporting interaction between the researcher and women. The implementation phase was achieved through 3 sessions of 30–45 minutes for each, each woman attended three sessions either in a group or individually (three to five women can attend each session) Some women preferred to attend the session individually to

discuss openly own sexual issues, the sessions were classified as follows:

The first session: The following topics were discussed in the first session, sexual function, physiology of sexual response in men and women, societal myths related to sexuality after hysterectomy. This session included information about hysterectomy definition, types, techniques, indications, complications.

The second session: This session included skills to manage post hysterectomy sexual problems in relation to female sexual index and Roy Adaptation Model such as (strengthening exercises for pelvic muscles as Kegel exercises, use of lubricating gels and effective communication before having sexual intercourse and relaxation activities including walking). This step include the application of the six-step nursing process according to Roy's Adaptation Model (RAM).

- Assessment of the behaviors of women manifested from the four adaptive modes.
- Assessment of the stimuli and categorize them as focal, contextual, or residual.
- Make a statement or nursing diagnosis of the women's adaptive state.
- Set a goal to promote adaptation.
- Implement interventions aimed at managing the stimuli.
- Evaluate whether the adaptive goal has been met.

The third session: This session included skills for stress management and explaining the role of stress and its effects on women's health, fitness and coping. Some of these skills included positive thinking, re-framing, good assertiveness skills, developing a support network, humor, relaxation techniques as (meditation, massage, yoga, imagination) and lifestyle changes (healthy eating habits, exercising regularly, enough sleeping).

The course of the study intervention continued for three consecutive months. The break phase included telephonic contacts for answering women's questions and promoting adherence to the delivered education and counseling.

Evaluation phase:

Post-test was done after 3 months for both study and control groups to evaluate women's sexual function and adaptation state through the same format of pretest of FSFI and RAM. The researcher gave booklets to women in control group. Finally the researcher compared pretest and post test results of the two groups to evaluate the effectiveness of (RAM) interventions.

Statistical analysis

Data were verified prior to computerized entry. The Statistical Package for Social Sciences (SPSS version 21) was used followed by data tabulation and analysis. Descriptive statistics were applied (e.g., mean, standard deviation, frequency and percentages). Independent t-test, Chi-square test and Pearson correlation coefficients were used. A significant level value was considered when $p \leq 0.05$. And a highly significant level value was considered when $p < 0.001$.

Results

Table (1) clarifies that, more than one third and nearly half (37.5% & 47.5%) of both control and study groups were respectively in age group (≥ 50 years) with a mean age of 49.76 ± 6.58 years and 50.45 ± 7.85 years. Concerning level of education, it was clear that three-fifths and approximately two-fifths (60% & 42.5%) of the control group and study group had secondary education. According to occupation three-fifths and more than half (60% & 52.5%) of the control group and study group were housewives. Almost two thirds and more than two thirds (65.0% & 67.5 %) of both control and study groups

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lived in urban area respectively. Additionally there was no statistical significant difference between control and study groups regarding personal characteristics ($p > 0.05$) that reflected group homogeneity.

Figure (1) shows that, nearly three quarters of both study and control groups respectively had poor knowledge score about hysterectomy at pre intervention phase. While, nearly two thirds of study group had good knowledge score about hysterectomy and only one quarter of control group had good knowledge score about hysterectomy; at post intervention phase.

Table (2) shows no statistically significant differences between control and study groups regarding all items of sexual function domains ($P > 0.05$) with no statistically significant difference between control and study groups, that entails homogeneity of both groups.

Table (3) clarifies a highly statistically significant difference between the control and the study groups regarding all items of sexual function domains at post- intervention phase ($P < 0.001$).

Figure (2) reveals that, total Roy's Adaptation Model was tenth at pre intervention phase among study group. While, total Roy's Adaptation Model was more than

three fifths at post intervention phase among study group.

Table (4) shows that, there was a negative significant correlation between total knowledge score and total score of sexual function and adaptation in study group at pre intervention phase. While there was a highly positive significant correlation between total knowledge score and total score of sexual function and adaptation in study group at post intervention phase.

Table (5) shows that, there was a negative significant correlation between total knowledge score and total score of sexual function and adaptation in control group at pre and post intervention phases. While there was a positive significant correlation between total knowledge score and total score of sexual function ($P < 0.05$) in control group at post intervention phase.

Figure (3) reveals that, almost two thirds (65.8%) of study group were highly satisfied of Roy's Adaptation Model.

Table (1): Distribution of the Studied Women regarding Socio-demographic characteristics (n=80).

Socio-demographic characteristics	Control group N=40		Study group N=40		Chi square	P value
	Frequency	%	Frequency	%		
Age in years					5.39	>0.05
< 30 year	7	17.5%	3	7.5%		
30 < 40 years	8	20.0%	8	20.0%		
40 < 50 years	10	25.0%	10	25.0%		
≥ 50 years	15	37.5%	19	47.5%		
Mean ±SD	49.76±6.58		50.45±7.85			
Educational level					2.48	>0.05
Primary education	6	15.0%	8	20.0%		
Secondary education	24	60.0%	17	42.5%		
University education	10	25.0%	15	37.5%		
Occupation					1.25	>0.05
Employee	16	40.0%	19	47.5%		
Housewife	24	60.0%	21	52.5%		
Residence					0.56	>0.05
Rural	14	35.0%	13	32.5%		
Urban	26	65.0%	27	67.5%		

No statistically significant difference ($p > 0.05$)

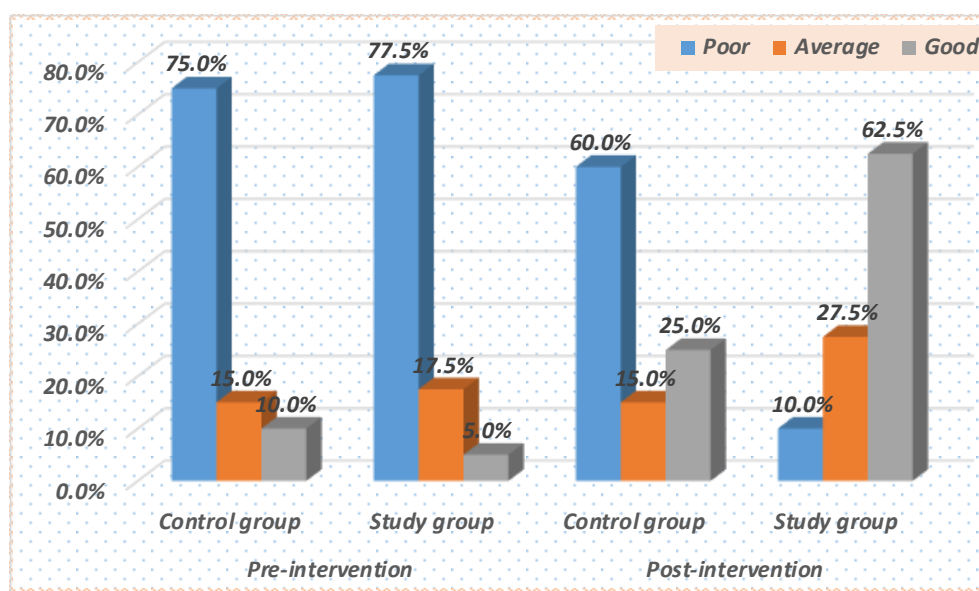


Figure (1): Distribution of studied women total knowledge level regarding hysterectomy at pre and post intervention phases.

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Table (2): Distribution of studied women regarding sexual function domains at pre intervention phase.

Sexual function domains	Control group Mean \pm SD	Study group Mean \pm SD	Independent t test	P value
Feel sexual desire	2.0 \pm .67	2.25 \pm .74	1.57	>0.05
Rate of sexual Desire	1.90 \pm .70	2.05 \pm .74	0.92	>0.05
Total desire	3.90 \pm 1.31	4.30 \pm 1.43	1.29	>0.05
Feel sexually aroused ("turned on")	1.40 \pm .54	1.52 \pm .50	1.06	>0.05
Rate of sexual arousal	1.82 \pm 3.15	1.45 \pm .59	0.73	>0.05
Confident about sexually aroused	1.52 \pm .75	1.82 \pm .81	1.71	>0.05
Satisfied with arousal (excitement)	1.42 \pm .54	1.52 \pm .50	0.84	>0.05
Total arousal	6.17 \pm 3.43	6.32 \pm 1.99	0.23	>0.05
Lubricated ("wet")	1.80 \pm .75	2.05 \pm .59	1.63	>0.05
Difficult to become lubricated	1.95 \pm 1.08	2.37 \pm 1.27	1.60	>0.05
Maintain lubrication until completion of sexual activity	1.47 \pm .67	1.62 \pm .49	1.13	>0.05
Difficult to maintain your lubrication until completion of sexual activity	1.47 \pm .71	1.75 \pm .89	1.5	>0.05
Total lubrication	6.70 \pm 2.66	7.72 \pm 2.82	1.6	>0.05
Reach orgasm (climax)	1.12 \pm .33	1.20 \pm .40	0.90	>0.05
Difficult to reach orgasm	1.17 \pm .38	1.20 \pm .40	0.28	>0.05
Total orgasm	2.30 \pm .60	2.40 \pm .70	0.67	>0.05
Satisfied with ability to reach orgasm	1.15 \pm .36	1.20 \pm .40	0.58	>0.05
Satisfied with emotional closeness with husband	1.92 \pm .82	2.02 \pm .69	0.58	>0.05
Satisfied with your sexual relationship with husband	1.77 \pm .76	1.92 \pm .91	0.79	>0.05
Satisfied with your overall sexual life	1.62 \pm .62	1.57 \pm .59	0.36	>0.05
Total satisfaction	6.47 \pm 2.06	6.72 \pm 2.26	0.51	>0.05
Experience discomfort or pain	4.07 \pm .94	4.05 \pm 1.06	0.11	>0.05
Experience discomfort or pain following penetration	4.47 \pm .71	4.42 \pm .81	0.29	>0.05
Rate your degree of discomfort or pain during or following penetration	4.22 \pm .69	4.15 \pm .66	0.49	>0.05
Total pain	12.77 \pm 1.34	12.62 \pm 1.31	0.50	>0.05

No statistically significant difference ($p > 0.05$)

Table (3): Distribution of studied women regarding sexual function domains at post intervention phase.

Sexual function domains	Control group Mean ±SD	Study group Mean ±SD	Independent t test	P value
Feel sexual desire	2.01±.70	3.76±.71	-16.28	<0.001**
Rate of sexual Desire	1.90±.72	3.83±.73	-18.58	<0.001**
Total desire	3.91±1.36	7.60±1.32	-18.64	<0.001**
Feel sexually aroused ("turned on")	1.47±.55	2.97±1.07	-10.62	<0.001**
Rate of sexual arousal	1.65±2.25	2.98±1.20	-4.85	<0.001**
Confident about sexually aroused	1.72±.77	3.23±1.11	-9.95	<0.001**
Satisfied with arousal (excitement)	1.47±.57	3.06±1.12	-10.69	<0.001**
Total arousal	6.32±2.77	12.26±4.12	-10.82	<0.001**
Lubricated ("wet")	1.92±.67	3.40±.82	-11.84	<0.001**
Difficult to become lubricated	2.11±1.01	3.57±.80	-10.70	<0.001**
Maintain lubrication until completion of sexual activity	1.48±.52	3.2750±.8415 6	-16.15	<0.001**
Difficult to maintain your lubrication until completion of sexual activity	1.71±.81	3.45±.74	-14.76	<0.001**
Total lubrication	7.23±2.51	13.70±2.85	-15.43	<0.001**
Reach orgasm (climax)	1.10±.30	2.50±.98	-12.50	<0.001**
Difficult to reach orgasm	1.18±.39	2.91±1.24	-11.51	<0.001**
Total orgasm	2.28±.59	5.41±2.16	-12.44	<0.001**
Satisfied with ability to reach orgasm	1.18±.39	3.01±1.33	-11.14	<0.001**
Satisfied with emotional closeness with husband	2.03±.71	3.62±.87	-12.17	<0.001**
Satisfied with your sexual relationship with husband	1.82±.75	3.25±.94	-10.63	<0.001**
Satisfied with your overall sexual life	1.63±.60	3.45±1.13	-12.82	<0.001**
Total satisfaction	6.68±1.91	13.33±3.79	-13.87	<0.001**
Experience discomfort or pain	4.25±.84	2.31±.90	13.79	<0.001**
Experience discomfort or pain following penetration	4.42±.82	2.12±.99	19.40	<0.001**
Rate your degree of discomfort or pain during or following penetration	4.35±.63	2.30±1.08	15.01	<0.001**
Total pain	6.73±2.65	13.02±1.25	21.30	<0.001**

**Highly statistically significant (P ≤ 0.001).

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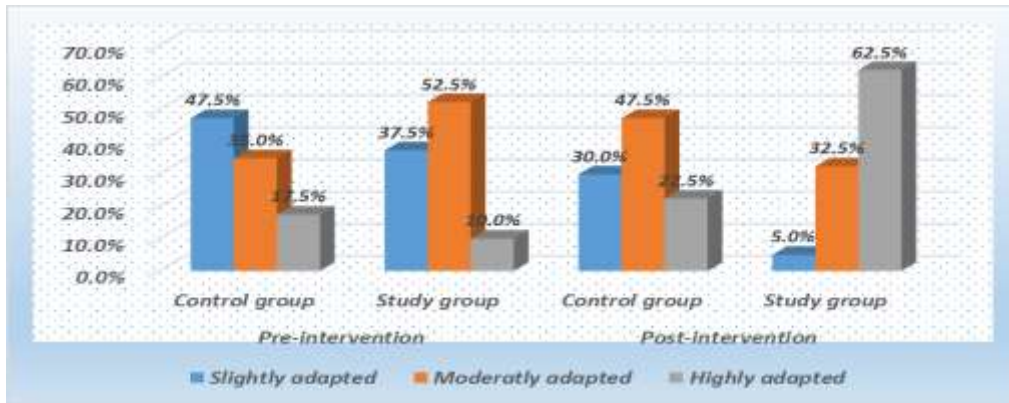


Figure (2): Distribution of studied women regarding total Roy's Adaptation Model score at pre and post intervention phases.

Table (4): Correlation between total knowledge score and total score of sexual function and adaptation among study group.

Times of assessment	Variables	Knowledge	
		r	P value
Pre-intervention	Sexual function	0.043	>0.05
	Adaptation	0.057	>0.05
Post-intervention	Sexual function	0.42	<0.001**
	Adaptation	0.35	<0.001**

Table (5): Correlation between total knowledge score and total score of sexual function and adaptation among control group.

Times of assessment	Variables	Knowledge	
		r	P value
Pre-intervention	Sexual function	0.06	>0.05
	Adaptation	0.12	>0.05
Post-intervention	Sexual function	0.32	<0.05*
	Adaptation	0.20	>0.05

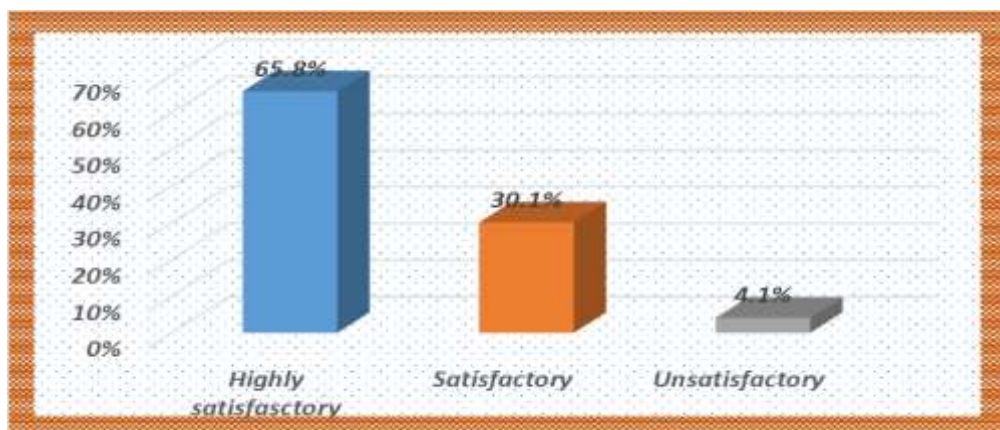


Figure (3): Distribution of studied women at study group regarding their satisfaction of Roy's Adaptation Model

Discussion

The uterus is a very valuable reproductive organ, in addition to reproductive function it is also linked to sexuality and feminine identity. Hysterectomy means the removal of the uterus, is the leading reason for non-obstetric surgery among women. There is a growing interest in the effect of a hysterectomy on sexual function in women. The experience of negative sexual function after hysterectomy is mainly due to physical, functional and anatomical changes, health challenges, the possible surgery complications and feedback from significant others (**Barber et al., 2022**).

The current study was aimed to evaluate the effect of Roy Adaptation Model on sexual function for women after total hysterectomy. It will be discussed under the following sections; Socio-demographic characteristics of the studied groups, knowledge of studied groups regarding hysterectomy at pre and post intervention phases, Sexual function domains of studied groups at pre and post intervention phases, Roy's Adaptation Model scale of studied groups at pre and post intervention phases and the correlations between total knowledge score and total score of sexual function and adaptation.

Age is the most important factor that affects health of women. In the present study, the finding revealed that, more than one third of control group and nearly half of study group were in age group (≥ 50 years) with a mean age of 49.76 ± 6.58 years and 50.45 ± 7.85 years respectively, nearly two thirds of control and more than two-fifths of study group had secondary education, nearly two thirds of control group and more than half of study group were housewives. Nearly two thirds of control group and more than two thirds of study group lived in urban area respectively.

Additionally, there was no statistically significant differences between control and study groups regarding their socio-demographic characteristics (age, educational level, occupation, residence). This reflected homogeneity of the studied groups.

The above mentioned results were in accordance with **Elmoneim et al., (2017) in Egypt** who studied "Effect of Roy Adaptation Model on Sexual Function and Spousal Support among Women after Total Hysterectomy", revealed that the age ranged from 30-50 years old with average mean of 43.7 ± 10.1 for the study group & 44.3 ± 9.8 for the control one, without any significant differences between both group ($p > 0.05$).

These results were in agreement with **Mohamed et al., (2020) in Egypt** who studied "Comparative Study of Electrosurgical Bipolar Vessel Sealing Using Ligasure versus Conventional Suturing for Total Abdominal Hysterectomy", showed that there was no statistically significant differences between control and study groups regarding personal characteristics, majority of women were in age group (35-55 years) with the mean age of the women were (44.3 ± 3.8 years).

The results of current study found that there was no statistical significant difference between control and study groups in all items related to knowledge about hysterectomy at pre intervention phase ($p > 0.05$). On the other hand, there was a highly statistical significant difference between study and control groups in all items related to knowledge about hysterectomy at post intervention phase ($p < 0.001$).

These results were in agreement with **Elgi & Viswanath, (2019) in India** who studied "Knowledge of Women on Hysterectomy", reported that nearly two thirds of women had poor knowledge, two fifths had average knowledge, and none of them had

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good knowledge about the various aspects of hysterectomy knowledge, majority were having inadequate knowledge regarding exercise (85%), diet (80%), management (75%), investigations (82.5%) and complications (56.25%) before intervention.

The results of current study were consistent with **Hosseini et al., (2016)** who studied "Application of the PRECEDE model to improve sexual function among women with hysterectomy" who reported that in the experimental group, the knowledge score after the intervention was significantly higher than that before the intervention, whereas the difference in scores before and after the intervention was not significant in the control group.

Regarding total knowledge score of the studied groups, the present study indicated that nearly three quarters of both study and control groups respectively had poor knowledge score about hysterectomy at pre intervention phase. Meanwhile, nearly two thirds of study group had good knowledge score about hysterectomy and only one quarter of control group had good knowledge score about hysterectomy; at post intervention phase.

The current study results clarified no statistically significant difference between control and study groups at pre intervention phase in all items of sexual function domains. In addition, women showed no statistically significant differences between control and study groups related to (desire, arousal, vaginal lubrication, orgasm, satisfaction and pain) that entails homogeneity of both groups ($P > 0.05$).

The results of the present study were supported by **Adelman & Sharp (2018) in America** who studied "Ovarian conservation vs. removal at the time of benign hysterectomy", reported a significant reduction in FSFI scores after abdominal or vaginal

hysterectomy, presented with sexual dysfunction 1 year after hysterectomy, with or without oophorectomy. Estrogen hormone therapy (HT) after surgery did not affect FSFI total scores.

Also Berlitz et al., (2018) in Germany who studied "Sexual functioning after total versus subtotal laparoscopic hysterectomy", it was found that total hysterectomies by abdominal or vaginal routes reduced FSFI scores significantly ($p < 0.05$) and reported that hysterectomy causes unfavorable effects on sexual functions at least in the first 6 months postoperative and this negative effect cannot be repaired by estrogen replacement therapy.

These results were congruent with **Cruz et al., (2020) In Brazil**, who studied "Sexual function and stress urinary incontinence in women submitted to total hysterectomy with bilateral oophorectomy", was observed that women who have undergone total hysterectomy, had FSFI scores below cutoff point and at a higher risk of developing sexual dysfunction.

The present study results are also supported by a study carried out by **Goudarzi et al., (2021) in Iran** who studied "Iranian women's self-concept after hysterectomy" and reported that hysterectomy was associated with problems about femininity and sexual function, decreased feminine emotions and feelings.

On the other hand current study displayed a highly statistical significant difference in all items of sexual function domains between the control and the study groups at post-intervention phase ($P < 0.001$).

In addition, these results agreed with **Farrag et al., (2018) in Egypt** who studied "Effect of an Educational Supportive Program on Self-Esteem and Marital Relation among Women Undergoing Hysterectomy",

illustrated a high statistically significant difference in pre-intervention stage 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.

Also the present study results are nearly similar to a study carried out by this study results were consistent with **Ali et al., (2021) in Egypt** who studied "Impact of an Educational Program on Sexual Distress Associated with Cervical Cancer", 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.

Present study not supported by a study carried out by **Lauterbach et al., (2021) in Israel** under the title of "The impact of vaginal hysterectomy and utero-sacral ligament suspension on vaginal elasticity and sexual function", who showed improvements in vaginal elasticity, mobility and FSFI scores following hysterectomy. The studies pointing out to positive results, the main reason from the researcher point of view may be due to relieve from gynecological pathology which treated by hysterectomy as the decrease of dyspareunia, relief from dysmenorrhea, absence of vaginal bleeding and thus the existence of more time for relationship, also disappearance of pregnancy anxiety.

Concerning total Roy's Adaptation Model score at pre and post intervention phases, the results of current study clarified that there were no a statistical significant difference between study and control groups regarding all items of Roy's Adaptation Model at pre intervention phase ($P > 0.05$). Meanwhile, there was a highly statistical

significant difference regarding all Roy's Adaptation Model items at post intervention phase ($P < 0.001$).

The results of current study were in the same line with **Abdel-Mordy, et al.,(2021)** who conducted a study "Effect of Application Roy's Adaptation Model on Women's Satisfaction and Quality of Life after Mastectomy", illustrated that there was no significant differences between control and study groups pre implementation of the program while, there was a highly significant differences between both groups after three months of follow up phase ($P \leq 0.001$) and demonstrated the positive effect of the RAM on improving women's mal-adaptive behaviors.

The result of current study showed that total Roy's Adaptation Model improved from tenth at pre intervention phase to more than three fifths at post intervention phase among study group while there was no improvement in the control group. This may be due to implementing Roy's Adaptation Model had a positive effect on sexual function for women after hysterectomy.

The result of current study was supported by **Gamal et al., (2019) in Egypt** who studied "Effect of Nursing Care Guided by Roy's Adaptation Model on Self-Evaluation of Women After Caesarean Section", revealed 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.

These results were in accordance with **Elmoneim et al., (2017)** in Egypt who studied "Effect of Roy Adaptation Model on Sexual Function and Spousal Support among Women after Total Hysterectomy", revealed that the RAM has positive effects on women's self-concept (physical and interpersonal self)

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adaptation to post-hysterectomy sexual related problems with high statistical significance difference.

In addition, **ShariatPanahi et al., (2020) in Iran** who conducted a study to evaluate "Application of Roy adaptation model on adherence to treatment in patients with heart failure", demonstrated that there was a statistically significant difference in all items related to role function mode and increased adherence behaviors to treatment regimen by patients with heart failure after intervention, confirmed that RAM provided certain strategies and assessment criteria for facilitating adaptation and adherence to treatment.

The results of current study was in the same line with **Shahed et al., (2016) in Iran** who studied "Effect of an educational-supportive program based on Roy adaptation model on marital satisfaction in mastectomy patients receiving chemotherapy" who presented a comparison of marital satisfaction scores between the intervention and control groups revealed an improvement of maladaptive behaviors in relation to interdependence mode along with increase adaptive behaviors and marital satisfaction after the intervention.

The finding of the present study showed that there was a negative significant correlation between total knowledge score and total score of sexual function and adaptation in study group at pre intervention phase. On the other hand there was a highly positive significant correlation between total knowledge score and total score of sexual function and adaptation in study group at post intervention phase ($P \leq 0.001$).

The results of current study were consistent with **Abdel-Mordy, et al., (2021) in Egypt** who conducted a study titled "Effect of Application Roy's Adaptation Model on

Women's Satisfaction and Quality of Life after Mastectomy", illustrated that there was a positive statistical correlation was found in the study group between total knowledge and total quality, total quality and total Roy's and between total satisfaction and total Roy's after program implementation.

Conclusion:

Application of Roy's Adaptation Model had a positive effect on sexual function for women after total hysterectomy. There were a highly statistically significant differences in all elements of female Sexual Function index including (desire, arousal, lubrication, orgasm, satisfaction and pain) in study group compared with control one at post intervention phase ($P < 0.001$), which achieved present study hypothesis. Additionally, there was a highly statistical significant difference regarding all Roy's Adaptation Model modes (physiologic, self-concept, role function and interdependence mode) between control and study groups at post intervention phase ($P < 0.001$).

Recommendations:

- Increasing women sexual awareness after hysterectomy through distributing a simplified and comprehensive booklet and posters in all gynecological settings which include a clear, brief and simple explanation about post-hysterectomy sexual life to reduce hysterectomy related sexual problems.
- Provide post-hysterectomy educational guidelines to promote adaptation with sexual problems after hysterectomy.
- Replication of Roy's Adaptation Model on wide range of women complaining post-hysterectomy sexual problems. Roy's Adaptation Model can be used as a standard practice to increase adaptation to the disease and improving the quality of life. Furthermore; Roy's Adaptation Model can

be a suitable framework in investigating the stimuli and the behaviors of patients, care, interventions and eventually controlling chronic diseases.

Further studies:

1-Further prospective research is needed concerning application of Roy's Adaptation Model for providing decisive evidence in this area.

2-Further research is needed to distinguish between the general influences of women's sexual function and sexual side effect of hysterectomy.

3- Encourage the hospital policies for integration of sexual function into a multidisciplinary care.

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تأثير نموذج رُوي للتكيف على الوظيفة الجنسية للسيدات بعد إستئصال الرحم الكلي

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استئصال الرحم يقصد به إزالة الرحم جراحياً الذي يمكن أن يتم إجراؤه جزئياً أو كلياً. إستئصال الرحم هو العملية الجراحية الأكثر شيوعاً لأمراض النساء وثاني أكثر العمليات الجراحية شيوعاً في جميع أنحاء العالم بعد الولادة القيصرية. لذا هدفت الدراسة الحالية إلى تقييم تأثير نموذج رُوي للتكيف على الوظيفة الجنسية للسيدات بعد استئصال الرحم الكلي. وقد أجريت هذه الدراسة في القسم الداخلى لأمراض النساء و العيادات الخارجية في مستشفى بنها الجامعي على ٨٠ سيدة بعد عملية إستئصال الرحم الكلي. (٤٠ سيدة مجموعة الدراسة و ٤٠ سيدة المجموعة الضابطة). وفي ضوء نتائج هذه الدراسة ، تم استنتاج أن تطبيق نموذج رُوي للتكيف له تأثير إيجابي على الوظيفة الجنسية للسيدات بعد استئصال الرحم الكلي. كانت هناك فروق ذات دلالة إحصائية عالية في جميع عناصر مؤشر الوظيفة الجنسية للإناث بما في ذلك (الرغبة الجنسية، الإثارة ، البلب المهبل ، النشوة ، الرضا والألم) في مجموعة الدراسة مقارنة مع المجموعة الضابطة في مرحلة ما بعد التدخل ($P < 0.001$). ، والتي حققت فرضية الدراسة الحالية. علاوة على ذلك ، كانت هناك فروق ذات دلالة إحصائية عالية فيما يتعلق بجميع عناصر نموذج رُوي للتكيف والتي تشمل الوضع الفسيولوجي ، وضع مفهوم الذات ، وضع وظيفة الذات ، ووضع الترابط المتبادل بين المجموعة الضابطة ومجموعة الدراسة في مرحلة ما بعد التدخل ($P < 0.001$). واوصت الدراسة بأن هناك حاجة إلى مزيد من البحوث المستقبلية فيما يتعلق بتطبيق نموذج رُوي للتكيف لتقديم أدلة حاسمة في هذا المجال