

Educational Nursing Program for Improving Nonmedical Students' Awareness toward Endometriosis at Zagazig University

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Abstract

Background: Endometriosis is a gynecological disorder identified by the presence of ectopic endometrial tissue outside the uterus. Largely, it affects reproductive-aged women and it is a major cause of infertility and chronic pelvic pain. **Aim of the study** was to evaluate the impact of educational nursing program on improving nonmedical students' awareness toward endometriosis at Zagazig University. **Research design:** A quasi- experimental design with pre/posttest and follow up was used in the current research. **Setting:** The study was conducted in two nonmedical faculties at Zagazig University. **Subjects:** 200 university non-medical female students were included in the study from the previously mentioned settings. **Tools of data collection:** Two tools were applied in the current study; **Tool I:** a structured interview questionnaire. **Tool II:** assessment of nonmedical students' awareness about Endometriosis (Pre/Post and follow up test). **Results:** A statistically significant improvements was observed in total level of awareness mean score after program implantation compared to its level before intervention, where it was 18.095 ± 5.36 for the studied students in pretest which improved to 89.51 ± 30.07 and 74.77 ± 35.88 at posttest and after one month of interventions respectively. **Conclusion:** Implementation of the educational nursing program had highly statistically significant effect on improving nonmedical students' awareness toward endometriosis at Zagazig University. **Recommendations:** Implementation of the educational nursing program with a learning booklet for nonmedical university female' students in various institutions should be conducted in order to increase their level of awareness related to endometriosis.

Keywords: Nursing Program, Nonmedical students, Endometriosis, Students' awareness

Introduction

Endometriosis is a chronic gynaecological disorder that affects women directly and indirectly, as well as healthcare institutions and society (Culley et al., 2013 and Ferreira et al. 2016). It affects 7.0 and 15.0% of women of childbearing age, including between 30.0% and 50.0% of infertile women and almost 50.0% of women with chronic pelvic pain syndrome. Because a clear diagnosis can only be made after a laparoscopy, prevalence estimates in Egypt are unknown. (Soliman et al., 2017 and Bourdel et al., 2019). It's a long-term, estrogen-dependent inflammatory condition that mostly affects pelvic tissues, particularly the ovaries (Vercellini et al., 2014).

Early menarche and short menstrual cycle duration are linked to a higher risk, whereas parity and current oral contraceptive use are linked to a lower risk. Circulating estradiol and

estrone, which stimulate ectopic endometrial tissue, are higher among women with an earlier age at menarche and in nulliparous women (Farland et al., 2017). While there is no cause of endometriosis, there are several theories regarding how endometriotic lesions develop.

Retrograde menstruation, which is the outflow of the uterine lining through the patent fallopian tubes into the pelvic region, is one probable explanation (Giudice, 2010). Endometrial tissue may be seeded in ectopic areas as a result of retrograde flow and possible hematogenous or lymphatic circulation. Retrograde menstruation, on the other hand, is common, although endometriosis is uncommon. Therefore, other factors, such as hormonal, inflammatory, or immunologic milieu may determine whether lesions deposited in the pelvic cavity implant and persist (Culley et al., 2013 and Lovkvist et al., 2016).

Dyuria, dyschezia, hematochezia, haematuria, lethargy, profound dyspareunia, infertility, primary dysmenorrhea, noncyclical pelvic pain, and infertility are the main symptoms that clinicians must examine while diagnosing endometriosis (*Dunselman et al., 2014*). Endometriosis can only be seen visually during a laparoscopic procedure, with histology confirming the diagnosis in the best case scenario. The gold standard for disease confirmation is visual examination (laparoscopy) and histological confirmation, which often causes delays in the diagnosis of endometriosis. Delays like these can have a negative impact on reproductive capacity and overall function (*Janssen et al., 2013*).

Endometriosis is classified as I-IV (I-minimal, II-mild, III-moderate, and IV severe) by the American Society of Reproductive Medicine, based on the location, extent, and depth of endometrial implants, the presence and severity of adhesions, and the size of the ovarian endometrium (*Giuliani et al., 2016*). As a diverse element of women's lives, endometriosis has an impact on social and sexual interactions, work, and study. Furthermore, endometriosis patients are more likely to experience psychological issues such as depression, anxiety, eating disorders, and psychosexual dysfunction, all of which can negatively impact their quality of life. It's also likely to have an impact on women's partners. Therefore, it is vital for the women to know about the appearances, dangers, and preventive measures of this disease and optimize the management of these women, reduce personal and social burden from disease by increasing the awareness and continuous education (*De Graaff et al., 2013*).

In evidence based guideline explained, management of endometriosis focuses on prevention of the dangers and reliving patient's complain this can be achieved through education, lifestyle modification and medical therapy. Treatment success is determined by patient compliance, which is impacted by women's knowledge of the disease. Health education is seen to be an effective health promotion technique for teenagers. So, educating the target population and creating awareness about the disease is an integral part of prevention or early detection that ultimately

reduces the health problems associated with endometriosis (*Price and Knibbs, 2009*).

Maternity nurse plays a crucial role in counseling and educating woman with endometriosis. Through education, nurses help women to understand the disease and its connected risk agents to avoid long-term complications, encouraging women to make positive and healthy life-style changes. Also, the nurse provides psychological support makes community referrals to local support groups to help women physique their coping skills (*Norton, 2016*).

Significance of the study: Endometriosis is a chronic disease affecting approximately 10.0% of fertile women and also presents among adolescent females. These women often have negative health care experiences (*Bach et al., 2016*). Educating nonmedical university girls and increasing their awareness regarding endometriosis help them to acquire knowledge, early detect and avoid major problems as infertility in the future. So, there was immense need for implementation of health educational intervention for early detection and management of the disease in female students.

Aim of the study:

Was to evaluate the impact of educational nursing program on improving nonmedical students' awareness toward endometriosis at Zagazig University.

Research Hypothesis:

Implementation of educational nursing program will be effective in improving Zagazig University nonmedical students' awareness about endometriosis.

Subjects and Methods:

The approach was provided in four different designs to achieve the study's goal: technical, administrative, operational, and statistical designs. **Technical Design:** It included description of the research design, study setting, sample and tools for data collection.

Research Design:

The current study utilized a quasi-experimental– one group pre/posttest and follow up.

Setting: The study was conducted at different faculties of Zagazig University among nonmedical students. Two faculties were selected randomly to collect data, which were: Faculty of Arts and Faculty of Specific Education.

Sample size: By using the Epi-Info software program, version 3, the present study sample size was calculated. Assuming; Mean \pm Sd of students' awareness about endometriosis as cause of infertility at pre intervention phase was (0.51 \pm 0.42) but it was (0.62 \pm 0.36) post intervention phase (pilot study). The sample size was calculated to be 200 students attending the selected faculties at confidence interval 95.0% with power of study 80.0%.

Subjects: Two hundred students of the 1st, 2nd, 3rd and 4th academic years of different colleges were selected from the previously mentioned setting by using simple random sampling technique according to the following standard:

- Age of female students was 18-23years old.
- Female students who were willing to involve in the research.

Tools of data collection:

Based on the related literature; Two tools were developed by the researchers to meet the purpose of the current study.

Tool 1: A structured Interview questionnaire: It divided into two parts which includes;

Part (I): Demographic characteristics: It included 6 questions related Socio-demographic data about female students as age, educational year, social status and residence.

Part (II): Family History for endometriosis.

Tool II: Assessment of nonmedical students' awareness about Endometriosis (Pre/Post and follow up test): It divided into three parts which includes;

Part I: Assessment of nonmedical students' awareness about anatomy and physiology of female genital system: It included 9 open ended questions about main points in anatomy and physiology of female genital system as parts of female genital system,

composition of vulva, internal genitalia, layers and function of the uterus...Etc.

Part II: Assessment of nonmedical students' awareness about menstrual cycle: It included 4 questions about normal character of menstruation as age at menarche (years), days & length of menses (days)...etc.

Part III: Assessment of nonmedical students' awareness about endometriosis: It included 15 open ended questions about all data regarding endometriosis such as; definition, sites, risk factors, causes, signs and symptoms, classification complications, investigations, prevention and management. **Awareness** is perceiving, knowing, feeling or being conscious of events, objectives, thoughts, emotions, or sensory patterns.

Scoring system for awareness

parts: The students' answers concerning to awareness was record and calculated. Appropriate to the answers, students' responses were estimated utilizing the model key answer sheet that was prepared previously by the researchers. All students were tested using the same format for the pre, post-test and follow up test using the following score: For each area of awareness, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into a percent score, means and standard deviations were computed. Awareness was considered satisfactory if the percent score was 50.0 % or more and unsatisfactory if it was less than 50.0%.

A) Operational design: It included preparatory phase, tools validity, reliability and fieldwork.

Preparatory phase: • In order to gain in-depth theoretical knowledge of the many facets of the problem, the researchers conducted a review of past and present available literature related to the study topic. This was accomplished through the use of books, journals, textbooks, scientific journal articles, the internet, newspapers, and magazines. This aided in the identification of relevant and validated data as well as a data gathering method.

Content validity and reliability: An expert panel of five professor experts in the field of obstetrics and gynecologic nursing examined

the two tools and the educational nursing programme for comprehensiveness, appropriateness, and legibility. The panel determined the tools' face and content validity. Minor needful modifications were done mainly in the form of rephrasing some sentences and changing some items. The Alpha Cronbach test was used to assess tool dependability. Cronbach's Alpha is a measure of alertness (0.485). Percent of improvement = (pre intervention score- post intervention score)/ pre intervention score multiply by 100.0%.

Administrative Design: The study setting's relevant authorities received formal approval by delivering an official letter from the Faculty of Nursing Zagazig University to secure their data collection permit. **Ethical consideration:** In all phases of the study all ethical concerns were taken into consideration; the researchers maintained the subject's anonymity and confidentiality. Before attendance, they introduced themselves to the female students and briefly discussed the scope and purpose of the study to each student, and students were freely enrolled following the oral agreement process. Non-medical female students were also informed that all information gathered during the study was confidential and used exclusively for research purposes and had the ability to withdraw from the study whenever they wished.

Pilot study was carried out on 10.0% (20 non-medical female students) who were excluded from the sample. The main purpose of the pilot study was to assess the clarity, feasibility, applicability of the data collection tools, arrangements of items and estimate the time needed for each form.

Field work: The study was carried out through four phases: assessment, planning, implementation and evaluation.

Assessment phase: This phase included the pre intervention data collection for baseline estimation. The researchers first introduced themselves and interpret the objective of the research briefly to the Dean and Vice Dean for education and students' affairs of

each faculty. Data collection occurred at the first semester in the academic year 2020/2021. The formerly mentioned settings were visited by the researchers two days/week (2 days for each faculty) sometimes in the morning or afternoon alternatively according to the students' lectures during study period. All the students were met and their written approvals for involvement were obtained. At the starting of interview the researchers welcomed the girls, introduced themselves to all girls included in the study and distributed the questionnaire to them and answered any explanation needed. The pretest questionnaire was distributed and self-administered by the students themselves and then the same questionnaire was used immediately after the intervention implementation for post assessment (post-test) and for follow up (one months later). The time used for answering the study questionnaire ranged from 20-25 minutes.

Planning and implementation phase:

Based on a review of the literature, sample characteristics, and findings from the assessment phase. The contents of the endometriosis educational nursing programme sessions were developed as a coloured lecture (power point), Arabic endometriosis handout (educational booklet), and provided to the female participants.

General objective: The general objective of the educational intervention was to improve nonmedical students' awareness toward endometriosis at Zagazig University.

Specific objectives: The students should be able to do the following by the end of the intervention:

- Identify anatomy and physiology of female genital system.
- Identify natural characteristics of menstruation.
- Define endometriosis
- List causes of endometriosis
- Enumerate risk factors for Endometriosis.
- List symptoms associated with endometriosis.
- Enumerates stages of endometriosis

- Recognize the complications and dangers of endometriosis.
- Identify methods of prevention and management of endometriosis.

The researchers divided the participants into small groups of 25 students each, and then met with each group in their faculty according to the circumstances of their lectures. Each group received the intervention for four interactive sessions (2 days/week), with each session lasting one hour. Students were offered health education courses in the form of lectures and group discussions utilising audio-visual aids, with an emphasis on increasing student awareness of endometriosis. In order to establish the best connection, the first meeting began with an orientation to the educational intervention, including the motivation, importance of the themes, contents, time, and place. The anatomy and physiology of the female genital system, as well as the natural aspects of menstruation, were covered in the first session. In the second session, endometriosis was defined, risk factors were reviewed, and causes were discussed. The signs and symptoms of endometriosis, as well as the stages of the disease, were discussed in the third session, while complications, prevention, and treatment of endometriosis were covered in the fourth session.

To ensure that the students comprehended the material. Each session began with an outline of what had been covered in the previous one, followed by the next one's goals. In addition, towards the end of the class, 15 minutes were set aside for an open discussion with the students on this topic. At the conclusion of the class, students were given an informative Arabic booklet with brief information regarding endometriosis.

Evaluation phase: For each student three evaluations were done, the first one was at the starting of the study as baseline information (pre-test). The second assessment (posttest) was performing immediately after the intervention and third assessment (follow up) after one month. The same assessment tools were used during the first, second and third evaluations.

Statistical analysis: SPSS 20.0 for Windows (SPSS Inc., Chicago, IL, USA 2011)

was used to gather, tabulate, and statistically analyse all data. The mean and standard deviation (SD) were used to convey quantitative data, while absolute and relative frequencies were used to express qualitative data (percentage). When appropriate, percentages of categorical variables were compared using the Chi-square test or Fisher's exact test. Wilcoxon Signed Ranks Test was used to compare two dependent Quantitative variables MC Nemar Test was used to compare two dependent categorical variables variable . All tests were two sided. p-value < 0.05 was considered statistically significant (S), p-value < 0.001 was considered highly statistically significant (HS), and p-value \geq 0.05 was considered statistically insignificant (NS). % of improvement = (pre intervention score- post intervention score)/ pre intervention score multiply by 100%.

Results:

Table 1 showed the demographic characteristics of the studied students. It revealed that nearly two thirds of them (60.5%) were young in their early reproductive years. Meanwhile, 32.5% of them in third grade, 76.5% were single and 67.5% were from rural residence.

Figure 1 illustrated that the majority of the studied group (91.0%) needed the Educational Nursing Program about Endometriosis.

Table 2 revealed that there was highly significant difference of the studied group awareness level pre & post intervention regarding anatomy and physiology of female genital system, menstrual cycle and insignificant difference between post& follow up phase (P=value > 0.05).

Table 3 showed that all the participants had low mean awareness score pre-intervention phase in all parameters related to data about endometriosis (18.095 ± 5.36) such as definition, sites, causes, and complications ...etc. These were upturned post& follow up phases. Additionally, the percent of change in awareness score concerning pre/ post & post/follow up intervention was 394.64 & 16.47 respectively .This change was high statistically significant difference at post phase (P = 0.001).

Table 4 showed that all the students had low awareness mean score pre-intervention phase in all parameters regarding symptoms of endometriosis such as cyclical intestinal complaints, depression and bleeding ($.00\pm 0.000$, $.12\pm 0.33$ & $.27\pm 0.62$ respectively). These were upturned post & follow up phases with highly statistically significant at post phase ($p > 0.001$).

Figure 2 pointed out that there was a statistically more significant awareness level score among the studied group regarding types of pain due to endometriosis after the educational session and at follow up time compared to their awareness level before it. Statistically improvement was noticed in area of awareness regarding pain during bowel movements, painful urination & cyclic shoulder pain which was 0,0% during pre- test and they had been improved at post & follow up test (77,0%, 81,0% & 69,5%) and (75,0%, 78,5% & 67,5%) respectively.

Figure 3 illustrated that there was a improvement in awareness score among the studied group about types of bleeding that occurs in endometriosis after the educational sessions and at follow up time compared to their awareness before it. It showed that there was highly satisfactory change during post -test in area of awareness regarding heavy period, cyclical hematuria & rectal bleeding (93.0 %, 89.0 % and 86.5% respectively) compared to pre intervention phase (15.0 %, 4.0% and 8.0% respectively).

Figure 4 showed that students awareness improved from (21.5%, 6.0%, 10.0% and 6.0%) pretest to (99.5%, 98.5, 97.0% and 98.0%) respectively posttest regarding time of starting dysmenorrhea and intensity of pain (increase with menstruation, reach its peak at the end of menstruation and gradually decrease).

Figure 5 showed that there was a statistically improvement in all areas of

awareness regarding types of complications of endometriosis during phases of educational nursing program. The highest improvement was noticed post- test in area of chronic pelvic pain, elevated blood pressure & type 2 DM complications (87.5%, 78.5% & 73.5% respectively) compared with (15.0%, 0.0% & 3.0% respectively) pre -test while the rest of complications had nearly an equal percentages. While there was no difference between post & follow up phases.

Table 5 showed that; there was highly significant relation between demographic characters of studied students especially in area of previous awareness about endometriosis & family history of endometriosis and their awareness level post intervention phase ($P = 0.0001$).

Table (1): Frequency & Percentage Distribution of the Studied Group According to Their Demographic Data (n= 200).

Socio-Demographic Data	No.	Percent (%)
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Age per years	≤20	121	60.5
	>20	79	39.5
Educational year	First grade	53	26.5
	Second grade	42	21.0
	Third grade	65	32.5
	Fourth grade	40	20.0
Social status	Single	153	76.5
	Engaged	38	19.0
	Married	9	4.5
Residence	Urban	65	32.5
	Rural	135	67.5
Family history of endometriosis	No	192	96.0
	Yes	8	4.0

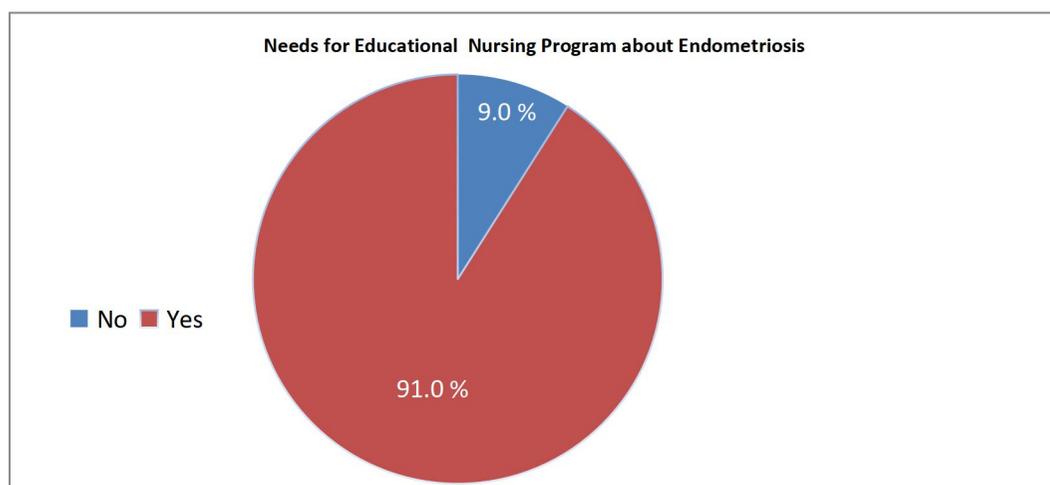


Figure (1): Percentage distribution of Studied Group regarding their Needs for Educational Nursing Program about Endometriosis (n=200).

Table 2: Total Satisfactory level of the Students' Awareness Regarding Anatomy and Physiology of Female Genital System and Menstrual cycle Parameters throughout the study phases (n= 200).

Items		Time						Mc ² p-value	
		Pre Intervention		Post Intervention		Follow up		pre& post	post& follow up phase
		No.	%	No.	%	No	%		
Anatomy and physiology of female genital system parameters	Satisfactory	0	0.0	169	84.5	166	83.0	<0.001	0.25
	Unsatisfactory	200	100.0	31	15.5	34	17.0		
Menstrual cycle parameters	Satisfactory	20	10.0	177	88.5	172	86.0	<0.001	0.063
	Unsatisfactory	180	90.0	23	11.5	28	14.0		
Total awareness level	Satisfactory	0	0.0	167	83.5	162	81.0	<0.001	0.063
	Unsatisfactory	200	100.0	33	16.5	38	19.0		

Mc Nemar Test. P < 0.001 highly significant. P < 0.05 statistically significant. P > 0.05 statistically insignificant.

Table 3: Mean of the Students Awareness Regarding Endometriosis Throughout The Study Phases (n= 200).

Variables	Time			Percent of change		P	
	pre intervention	Post Intervention	Follow up phase	pre& post	post& follow up phase	pre& post	post& follow up phase
	Mean ± SD	Mean ± SD	Mean ± SD				
Definition	.24±0.43	.87±0.34	.78±0.42	262.50	10.34	0.0001	.239
Site of endometriosis	2.26±1.4	9.51±3.37	8.36±3.76	320.80	12.09	.000	0.14
Risk factors	1.2±1.33	5.67±2.14	5.06±2.42	372.50	10.76	.000	0.26
Causes	.08±0.43	4.75±2.09	4.07±2.51	5837.50	14.32	.000	0.135
Prevention	.07±0.29	1.64±0.74	1.41±0.89	2242.86	14.02	.000	0.14
Investigations	.27±0.78	4.69±2.01	3.01±1.63	1637.04	35.82	.000	.003
Classification	0.16±0.47	4.08±1.77	3.36±2.09	2372.73	17.52	.000	0.037
Management	.07±0.29	2.46±1.05	2.14±1.26	3414.29	13.01	.000	0.16
Complications	.92±1.04	4.19±1.97	3.59±2.16	355.43	14.32	.000	0.13
Total awareness score	18.095±5.36	89.51±30.07	74.77±35.88	394.64	16.47	.000	0.001

P < 0.001 highly significant. P < 0.05 statistically significant. P > 0.05 statistically insignificant.

Table 4: Mean Distribution of the studied Group Regarding their Awareness about Signs & Symptoms of Endometriosis Throughout the study Phases (n = 200).

	Time			Percent of change		P	
	Pre intervention	post intervention	Follow up phase	pre& post	post& follow up phase	pre& post	post& follow up phase
	Mean ± SD	Mean ± SD	Mean ± SD				
Pain	.95±1.82	7.79±3.89	6.93±4.3	720.00	11.04	.000	0.21
Infertility	.48±0.5	.93±0.26	.87±0.34	93.75	6.45	.000	0.33
Bleeding	.27±0.62	2.36±1.08	2.05±1.24	774.07	13.14	.000	0.17
Depression	.12±0.33	.64±0.48	.52±0.5	433.33	18.75	.000	0.034
Cyclical intestinal complaints	.00±0.000	.78±0.41	.66±0.48	Mean of change = 0.78	15.38	.000	0.082
Dysmenorrhea	.44±0.81	3.39±1.38	2.97±1.63	670.45	12.39	.000	.000
Total awareness score	18.095±5.36	89.51±30.07	74.77±35.88	394.64	16.47	.000	0.001

P < 0.001 highly significant.

P < 0.05 statistically significant.

P > 0.05 statistically insignificant.

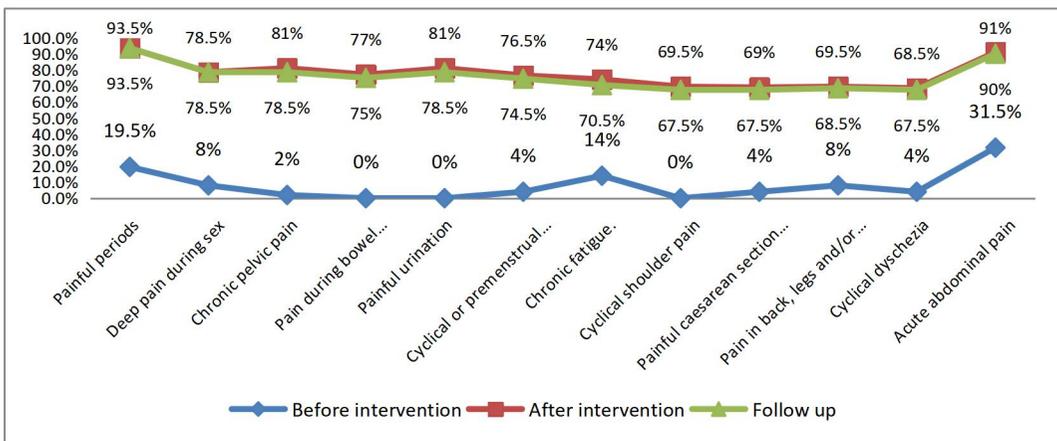


Figure (2): Percent distribution of the Studied Students Regarding their Awareness about Types of Pain due to endometriosis Throughout the study Phases (n = 200).

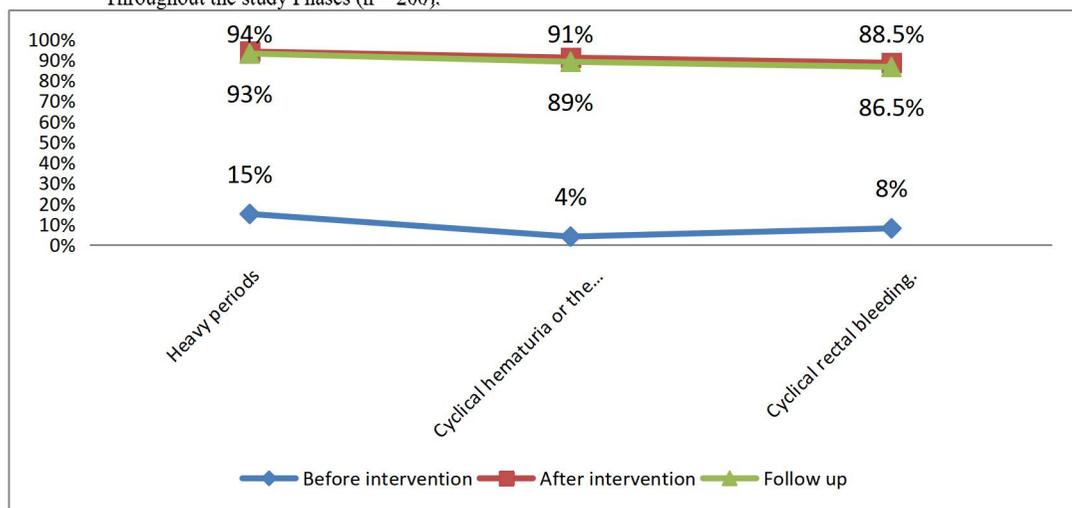


Figure (3): Percent distribution of the Studied Students Regarding their Awareness about Types of Bleeding due to endometriosis before and after Educational Nursing Program (n = 200).

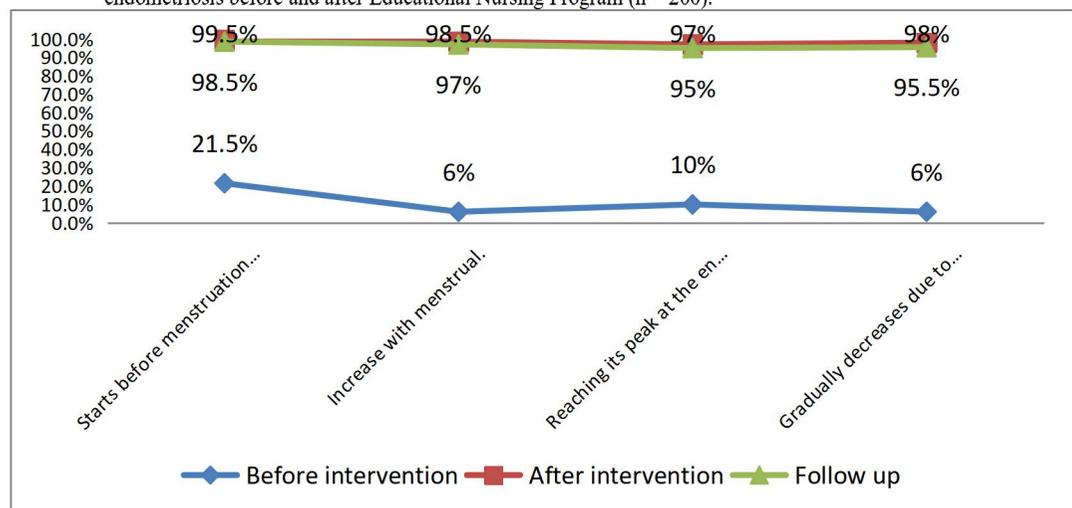


Figure (4): Percent distribution of the Students Regarding their Awareness about Characteristics of dysmenorrhea due to endometriosis Throughout the study period (n = 200).

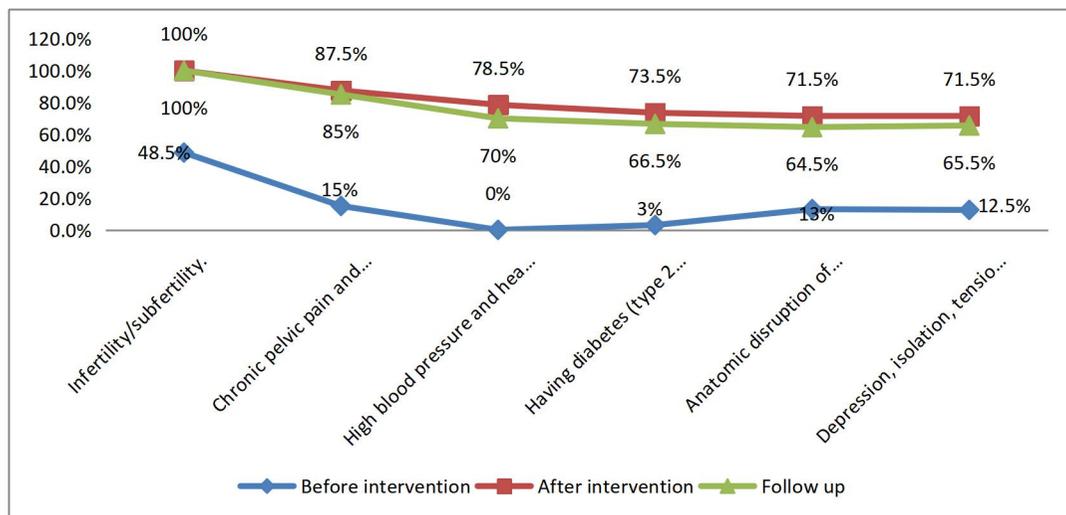


Figure (5): Percent distribution of the Studied Students regarding their Awareness about Types of Complications for Endometriosis Throughout the study phases.

Table 5: Relation between Demographic Characters of Studied Students' and their Satisfactory Awareness level Post Intervention Phase (n= 200).

Variables		Students Total Satisfactory Awareness Level Post Intervention				n.	χ ²	P-value	
		Satisfactory (n=167)		Unsatisfactory (n=33)					
		No.	%	No.	%				
Age	≤20	100	82.6	21	17.4	121	0.16	0.78	
	>20	67	84.8	12	15.2				79
Educational year	First grade	45	84.9	8	15.1	53	5.14	0.16	
	Second grade	35	83.3	7	16.7				42
	Third grade	58	89.2	7	10.8				65
	Fourth grade	29	72.5	11	27.5				40
Residence	Urban	52	80.0	13	20.0	65	.86	0.36	
	Rural	115	85.2	20	14.8				135
Family history of endometriosis	No	165	85.9	27	14.1	192		.0001	
	Yes	2	25.0	6	75.0				8
Previous knowledge about endometriosis	No	158	86.8	24	13.2	182		.001	
	Yes	9	50.0	9	50.0				18

P <0.05 statistically significant.

Discussion

Endometriosis is a prevalent gynaecological illness that has medical, psychological, and social consequences for women. It also has an impact on women's safety and well-being, as well as their physical quality of life (Metwally and Desoky, 2018). Prevalence of endometriosis from January 2012 to October 2014 in Dakahlia Governorate in Egypt for adolescents with severe dysmenorrhea was 12.3% (Ragab et al., 2015).

Through scientific research, a lot of misconceptions and myths about endometriosis were discovered, and both healthcare professionals and the general public continue to spread them to women (Mohamed and Hassan, 2020). It is vital to utilize an educational nursing programme to raise female awareness of endometriosis and to aid them in learning about it, maintaining early detection, and preventing future development. therefore, the current study aimed to improve nonmedical students' awareness toward endometriosis at Zagazig University.

According to the results of the current study, it can be noticed that nearly two thirds of them were young in their early reproductive years. Meanwhile, less than one third of them in third grade, most of them were single and coming from rural residence. This was partially in contrast with *El-Maraghy et al., (2017)* who reported that the mean age of the women was 37.3 years. Also, *Mohamed & Hassan, (2020)* reported that; the mean age of the studied women was 30.45 ± 6.29 . This may be related to the difference in age group of target population under the study. But, on the other hand they were consistent with the present study findings related to area of residence revealed that around two-thirds (65.0%) of their participants were also lived in a rural area. This point made them shameless to discuss issues related to reproductive organ among them.

Concerning the need for the educational nursing program about Endometriosis, the present study showed that; majority of the studied group needs the program. This was in agreement with *Fourquet et al., (2010)* who stated that their participants were in a high need for more forceful awareness session about endometriosis. These findings highlighted the willingness of the participant's students to achieve more information about the diseases.

The results of the present study revealed satisfactory significant difference of the students' awareness about anatomy and physiology of female genital system, menstrual cycle after the educational session compared to their awareness before it (P -value < 0.001). In similar line bringing issues to light is the initial step to decrease the postponement in determination over all age groups. This was in agreement with *Abd El-Mouty et al., (2016)* who observed in their study that; with post intervention educational session the majority of their participants women had corrected their awareness regarding data about endometriosis.

The finding of the present study was consistence with *Abd El-Mouty et al., (2016) & Mohamed and Hassan, (2020)* which had revealed that all studied students had low of total awareness mean score pre-intervention phase in all parameters (18.095 ± 5.36) as definition, sites, risk factors, causes and

complications. This demonstrated that the Egyptian women had little knowledge of endometriosis or had never heard of it before. This lack of awareness could possibly be attributable to the fact that this ailment affects a small percentage of women. The results showed that students' awareness increased significantly after attending the educational nursing programme. This improvement was also maintained up to the follow-up test through the observed results. This improvement could be attributed to the attendance the educational sessions and positive reinforcement or the long-term retention of knowledge, as well as wide verities of the educational used methods.

Regarding students' awareness about signs& symptoms of endometriosis the present study findings showed that all students had low of awareness mean score pre-intervention phase in all parameters regarding signs & symptoms such as cyclical intestinal complaints, depression and bleeding ($.00 \pm 0.000$, $.12 \pm 0.33$, & 27 ± 0.62 respectively). These were upturned post& follow up phases with highly satisfactory change post phase in all parameters. This was in accordance with *Abd El-Mouty et al., (2016) & Mohamed and Hassan, (2020)* who reported that there was a statistically significant difference of the studied women's knowledge about endometriosis symptoms after the educational session and at follow up time compared to their knowledge before it (p -value < 0.001). It is critical and necessary for students to be informed of endometriosis symptoms because they are the first step in diagnosing the condition because its symptoms are similar to those of other disorders. Egyptian women are capable of tolerating discomfort and do not require assistance or annual follow-up. Furthermore, diagnosing endometriosis is complicated and time-consuming.

Percent distribution of the studied students regarding their awareness about types of pain and types of bleeding due to endometriosis were very low before educational nursing program but it significantly improved after the educational sessions and at follow up time. This was in the line with *Abd El-Mouty et al., (2016)* who reported that; subsequent to the educational session the majority of the participant's women had

knowledge about endometriosis. This implies that the educational nursing programme was quite efficient in raising student understanding of the most common endometriosis complaints. Furthermore, The educational session's clarity and consistency, as well as the appropriate media used, increased their understanding and recognition of the study topic.

Dysmenorrhea is one of the most diagnostic criteria of endometriosis thus educational nursing program raise student awareness about it. This was contradicted with a study conducted in the region of Arnhem, the Netherlands by *Staal et al ., (2016)* who reported that; most of participants in their study had a proper knowledge regarding signs & symptoms of endometriosis as they mentioned that cyclic symptoms and dysmenorrhea were the most specific signs and symptoms of endometriosis. This may be related to that the participants were coming from developed country and had previously heard about endometriosis in mass media or books.

The current findings pointed out that there was a statistically improvement in awareness mean score regarding complications of endometriosis throughout the study phases. There was no statistically difference between post& follow up phase due to persistent improvement of awareness which confirmed the success of the educational nursing program. This was in accordance with *Fourquet et al.,(2010) and Abd El-Mouty et al ., (2016)* who accounted that the participants had poor level of knowledge regarding symptoms, risk factors, diagnosis, treatment, consequences and complications of endometriosis which had been improved after the program.

Also, the present study showed a significant relation between students' awareness level and previous awareness about endometriosis& family history of endometriosis (P = 0.0001). This was in the line of *Abd El-Mouty et al ., (2016)* who showed the relationship between socio demographic characteristics and average score of women's knowledge about endometriosis. The average score of knowledge was significantly different age groups before education session and after education, while it became not significantly different at follow up

time. Additionally, *Mohamed and Hassan ,(2020)* findings displayed that there were statistically significant relations between the women's total level of correct and incorrect knowledge and their age, women's educational level, residence , occupation, and family income, with p-value<0.05. These findings are also supported by *Medical-Research-Funding (MRF) to accelerate action on endometriosis, (2018)* which stated that; There was a relation between the patient's characteristics, a lack of awareness and understanding of endometriosis, and the disease's progression.

Limitations of this study

Included limited number of the studied nonmedical female students from Zagazig University. This is due to ministry decisions about postponing the study due to the Corona crisis and the precautionary measures. Therefore, to strengthen the study, other groups of health care providers should be included, such as large number of nonmedical female students.

Conclusions:

The finding of the study concludes that:

Implementation of the educational nursing program had highly statistically significant effect on improving nonmedical students' awareness toward endometriosis at Zagazig University.

Recommendations:

Based on the results of the present study, the researchers suggested the following recommendations:

- Implementation of the educational nursing program with a learning booklet for nonmedical university female' students in various institutions should be conducted in order to increase their level of awareness related to endometriosis. Furthermore, media enlightenment campaigns about this subject should also be emphasized.
- Participation in a health education programme with schools and employers to raise endometriosis awareness and its impact on reproductive health. Further studies can be

replicated on a larger sample size for popularize the findings.

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