

Assessing awareness of non-Medical Students at Menoufia University toward Endometriosis

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Abstract: Background: Endometriosis is a chronic, progressive disease of unclear etiology and is one of the most common gynecological diseases. The purpose of the study was to assess the awareness of nonmedical students at Menoufia University towards endometriosis. **Design:** A descriptive (cross-sectional) research design was used in this study. **Settings:** The study was conducted in different faculties of Menoufia University among nonmedical students, namely the Faculty of Arts, Faculty of Specific Education, Faculty of Commerce, Faculty of Law, and Faculty of Mass Communication. The instrument of this study was a structured interview questionnaire that included socio-demographic characteristics of the nonmedical students, family history of endometriosis, and an assessment of the nonmedical students' awareness regarding endometriosis. **Results:** It shows that 84.0% of them had poor awareness scores, 14.0% had fair awareness scores, and 2.0% had good awareness scores regarding endometriosis. **Conclusion:** Most of the nonmedical students at Menoufia University had poor awareness scores regarding endometriosis. **Recommendations:** Increasing the availability of health education programs for non-medical students to increase their public awareness and fundamental knowledge of endometriosis.

Keyword: *Awareness, Endometriosis, Non-medical Students*

Introduction

Since endometriosis is a chronic, progressive disease of unclear etiology, it is one of the most common gynecological diseases (Mińko et al., 2021). Also, they reported that it is characterized by the growth of endometrial tissue outside the uterine cavity and chronic inflammation of the affected anatomical structures. Meanwhile, it is estimated that the

incidence of endometriosis ranges from 2 to 17% of women of reproductive age, which represents over 170 million women globally (Kotowska et al., 2023).

Endometriosis affects roughly 10% of reproductive-age women and girls globally. Endometriosis prevalence in Egypt is difficult to estimate due to a lack of documentation or a filing

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system for instances of endometriosis, and the only reliable diagnostic test is laparoscopy. As a result, the prevalence of endometriosis in a one-year period in Zagazig Governorate is estimated to be 11.8%. There were 636 candidates for laparoscopy at the endoscopic unit in Zagazig University Hospitals. 85 cases out of them were diagnosed with endometriosis (Abd El-Kader et al., 2022).

In addition, regarding recent literature, the non-modifiable risk factors for endometriosis include age, family history, education level, and the age of the first menstruation (Hemmert et al., 2019; Yu & Joo, 2023). Additionally, they mentioned that there was no association between lifestyle factors, such as alcohol or caffeine consumption or smoking, and the incidence of endometriosis.

According to Cope et al. (2020), a weak correlation between a lack of physical activity and an increased risk of endometriosis has been demonstrated. They also concluded that the most common symptoms of the disease include dysmenorrhea (60–80%), chronic pelvic pain (30–50%), infertility (30–40%), and dyspareunia (25–40%). There are four stages of endometriosis, according to the classification introduced by the American Society for Reproductive Medicine (ASRM) (Imanaka et al., 2022). Similarly, they stated that the relationship between the staging of endometriosis and pain severity remains unclear.

Alasser et al. (2022) concluded that women suffering from endometriosis can experience a variety of non-clinical

symptoms. Also, they reported that endometriosis has been found to have a negative impact on physical, mental, and social well-being. As a result, they explained that the pain associated with endometriosis is the key factor that reduces the quality of life because it can lead to reduced sleep quality, more perceived stress, lower levels of physical activity, and mental disorders such as anxiety and depression. Moreover, they mentioned that it negatively influences sexual activity, which has further consequences for intimate and social relations.

Additionally, La Rosa et al. (2020) added that the adverse effects experienced by patients with endometriosis significantly contribute to problems with productivity, relationship difficulties, and social dissatisfaction. Therefore, endometriosis is a pathology that can significantly affect the quality of women's lives in multiple dimensions. Also, modern treatment of endometriosis should be personalized using a patient-centered, interdisciplinary approach. Meanwhile, they noted that pharmacological treatment may not be sufficient. Furthermore, they added that, complementary to the therapy, a psychological, dietary, urological, and physiotherapy intervention is recommended.

Significance of the study

Endometriosis is a gynecological disease of pathological endometrial-like tissue growing outside the uterine cavity. It is the most common cause of pelvic pain and infertility (Bach et al.,

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2016). It affects approximately 190 million reproductive women and girls worldwide (Zondervan et al., 2020).

Identifying the prevalence of endometriosis in Egypt is difficult due to insufficient data and a deficiency of documentation or filing systems for cases of endometriosis, and the only reliable diagnostic test is laparoscopy (Gad et al., 2018).

Many studies have been published on physician awareness of endometriosis and the experiences of women with the condition, but few studies have been conducted to assess the awareness of nonmedical students regarding endometriosis. So, the researcher found that it is important to assess the awareness of non-medical students to identify if they need health education in this aspect to increase their awareness, as insufficient awareness about endometriosis among young women is one of the causes of its delayed diagnoses.

Purpose of the Study

To assess the awareness of nonmedical students at Menoufia University towards endometriosis

Research Question

1) What is the awareness level of nonmedical students at Menoufia University of endometriosis?

Definitions of variables

Awareness is theoretically defined as the quality or state of being aware: knowledge and understanding that something is happening or exists (Agarwal et al., 2019), while it is operationally defined as the familiarity

or understanding of nonmedical students with facts, information, and descriptions about endometriosis.

Non-Medical Students are operationally defined as the students who are not involved in, related to, or concerned with medical care or the field of medicine.

Method

Research design:

A descriptive (cross-sectional) research design was used in this study.

Research Settings:

This study was conducted in different faculties of Menoufia University, which consists of 11 practical faculties and 9 theoretical faculties. These faculties were selected randomly to collect data, which were: the Faculty of Arts, the Faculty of Specific Education, the Faculty of Commerce, the Faculty of Law, and the Faculty of Mass Communication. These faculties offer academic degrees of bachelor, master, and doctorate in different specialties.

Sampling:

- **Sample type:** A purposive sample of nonmedical students was recruited.
- **Sample size:** The sample was calculated at a confidence level of 95% and a margin of error of 5. The calculated sample consisted of 357 nonmedical students.

The equation for calculating sample size is:

Where

n and **n'** are sample sizes.

z is the z score.

ε is the margin of error.

N is the population size.

p̂ is the population proportion.

Z for a 95% confidence level is 1,96 with a margin of error of 5%, a population proportion of 5, and the population size are 5000. The calculated sample was

$$n' = \frac{(1.96)^2 \times .5 (1 - .5) / (.05)^2}{1 + ((1.96))^2 \times .5 (1 - .5) / (.05)^2 \times 5000}$$

Thus, a sample size of 357 students.

Instruments for Data Collection

The instrument of data collection consisted of:

A structured interview questionnaire that is divided into four parts:

- **Part I:** Socio-demographic characteristics of the studied students, which consisted of six items (age, academic year, marital status, smoking, making exercise, and faculty name).
- **Part II:** Family history of the studied students, which consisted of 3 items (Have you had endometriosis? Has anyone in your family been diagnosed with endometriosis? (What is the degree of kinship to this person?) and menstrual history, which consisted of 5 items (age of menarche, length of menstrual cycle, duration of the menstrual period, amount of blood during the menstrual period, and

symptoms associated with the menstrual period).

- **Part III:** Menstrual History of the Nonmedical Students
- **Part IV:** Assessment of nonmedical students' awareness regarding endometriosis. It included 19 items (previous background regarding endometriosis; do you know what endometriosis is?), the meaning of endometriosis, background about endometriosis, high risk group for endometriosis, cause of endometriosis, symptoms of endometriosis, cessation of endometriosis symptoms after menopause, presence of endometriosis outside the pelvic cavity, age when endometriosis is diagnosed, the sites of endometriosis, methods of endometriosis diagnosis, endometriosis progress in stages, the complications of endometriosis, the stages of endometriosis, the goal of endometriosis treatment, curing from endometriosis, effect of endometriosis on the sexual intercourse, the goal of endometriosis treatment, early detection of endometriosis , the treatment options of endometriosis).

Scoring system:

The scoring system for the non-medical students' level of awareness was calculated as follows: (1) for the correct answer and (0) for the incorrect answer. For each question of knowledge, the score of the items was summed up, and the total was divided by the number of items. These scores were converted into a percent score.

The total knowledge score is 19 points and is classified as the following:

- Good: when the total score was >75%, more than 15 points.
- Average: when the total score was 60-75%, it was 11-14 points.
- Poor: when the total score was < 60% less than 11 points.

Validity of the instrument:

The validity of the instrument was checked by three experts (two professors from maternal and newborn health nursing and one from obstetrics and gynecology) who reviewed the instruments for content accuracy and internal validity. Also, professors were asked to judge the items for completeness and clarity (content validity). Suggestions were incorporated into the instrument.

The reliability of the instrument was tested by the researcher for internal consistency using test-retest reliability, and this method was done through the administration of the same instruments to the same participants under similar conditions on one or more occasions. Results from repeated testing were compared. The reliability was determined by Cronbach's alpha coefficient test, which revealed which of the two tools consisted of relatively homogenous items, as indicated by the moderate to high reliability of each tool. The internal consistency of the knowledge was 0.757.

Pilot study:

A pilot study will be carried out before data collection on 10% of the female nonmedical students in the previously

mentioned settings (36 students). This will be done to evaluate the applicability and clarity of the instrument, and these will be excluded from the sample to ensure the stability of the answers.

Ethical considerations:

An approval from the Committee of Ethics and Research was obtained from the Faculty of Nursing at Menoufia University. Written consent was obtained from all female nonmedical students regarding their approval to share in the study. They assured of the confidentiality and anonymity of the collected data.

All subjects were informed that participation in the study is voluntary; the anonymity and confidentiality of each participant were respected and protected; confidentiality was assured; and subjects were informed that the content of the tool was used for research purposes only, and they have the right to refuse to participate in the study or withdraw at any time without any consequences.

Procedure

- Official permission to carry out the study was obtained from the director of each setting after submitting an official letter from the Dean of the Faculty of Nursing explaining the purpose of the study and the method of data collection.
- At the beginning of the study, the researcher introduced herself and explained the purpose and nature of the study to nonmedical students. The study was conducted at

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different faculties in the previously mentioned settings.

- During the assessment, all the nonmedical students were interviewed individually to clarify the purpose of the study through the structured interview questionnaire.
- The collected data was coded and analyzed.

Statistical Analysis

All the collected data were organized, tabulated, and analyzed using appropriate statistical tests. The data were analyzed using the Statistical Package for Social Science (SPSS) version 21, which was applied to calculate frequencies and percentages, mean and standard deviation, as well as test statistical significance and associations by using the Chi-square test (X^2), linear correlation coefficient (r), and matrix correlation to detect the relation between the variables (P value).

Significance levels were considered as follows:

- Highly significant (HS) $P \leq 0.001^{**}$
- Statistically Significant (S) $P \leq 0.05^*$
- Not significant (NS) $P > 0.05$

Results

Table 1:- displays the socio-demographic data of the nonmedical students. Regarding age, 42.3% of them are 19–20 years old. Concerning the academic year, 26.9% of them were regarding the third year. According to their marital status, 96.1% of them are

single. In addition, 13.1% did not smoke. Additionally, 75.4% did not exercise.

Table 2:- shows the awareness of nonmedical students regarding endometriosis. It was reported that 89.4% of them heard about endometriosis. Also, 91.9% of them did not know what endometriosis is. Moreover, 4.5% of them answered that endometriosis occurs when uterine tissue begins growing in areas outside the uterus.

Table 3:- shows the correlations between the name of the college and the total awareness scores of the nonmedical students regarding endometriosis. It shows that there was a significant positive correlation between the name of the college and the total awareness scores of the nonmedical students regarding endometriosis.

Figure 1:- displays the name of the college among the nonmedical students. Around 25% come from the Faculty of Law, 20% from the Faculty of Arts, 20% from the Faculty of Mass Communication, 18% from the Faculty of Specific Education, and 17% from the Faculty of Commerce.

Figure 2:- displays the background information for the nonmedical students about endometriosis. It shows that 89.4% of them had background knowledge about endometriosis, and 10.6% had no background knowledge about endometriosis.

Figure 3:- displays the level of awareness of the nonmedical students regarding the cause of endometriosis. It shows that about one-half of them (52.7%) did not know the cause of

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endometriosis, 16.2% answered obesity, and 12.6% answered unknown.

Figure 4:- displays the level of awareness of the nonmedical students regarding sites of endometriosis. It shows that 7.3% of them answered that endometriosis is in the rectum, 5.0% in the vagina, 3.4% in the bladder, and 3.1% in the intestine.

Figure 5:- displays the level of awareness of nonmedical students

regarding the treatment options for endometriosis. It shows that 62.7% of them did not know the treatment options for endometriosis; 13.4% answered that hormonal, medical, and surgical treatments are the treatment options for endometriosis; 8.7% answered surgical treatment; 8.4% answered hormonal treatment; and 6.7% answered medical treatment.

Table 1: Socio-demographic Data of the Non-Medical Students (N = 357)

| Variables | N0. | % |
|--------------------------------|-----|------|
| <u>Age groups:</u> | | |
| 19-20 Y | 151 | 42.3 |
| 21-22 Y | 148 | 41.5 |
| > 22 Y | 58 | 16.2 |
| <u>Academic year:</u> | | |
| First | 82 | 23.0 |
| Second | 91 | 25.5 |
| Third | 96 | 26.9 |
| Fourth | 88 | 24.6 |
| <u>Marital status:</u> | | |
| Married | 14 | 3.9 |
| Single | 343 | 96.1 |
| <u>Smoking:</u> | | |
| Yes | 88 | 86.9 |
| No | 38 | 13.1 |
| <u>Making exercise:</u> | | |
| Yes | 88 | 24.6 |
| No | 269 | 75.4 |

Table 2: The Non-Medical Students' Awareness regarding Endometriosis (N = 357)

| Variables | No. | % |
|-------------------------------------------------------------------------------------|-----|------|
| 1. Having previous background regarding endometriosis | | |
| Yes | 319 | 89.4 |
| No | 38 | 10.6 |
| 2. Do you know what endometriosis is? | | |
| Yes | 29 | 8.1 |
| No | 328 | 91.9 |
| 3. The meaning of endometriosis | | |
| 1- A benign tumor affecting the uterine tissue of women during the fertility period | 2 | .6 |
| 2- Fertile ovum sticks outside the uterine cavity | 3 | .8 |
| 3- Uterine tissue begins growing in areas outside the uterus. | 16 | 4.5 |
| 4- The growth of abnormal cells in the cervix of the uterus | 3 | .8 |
| 5- An inflammation affecting the lower part of the uterus | 5 | 1.4 |

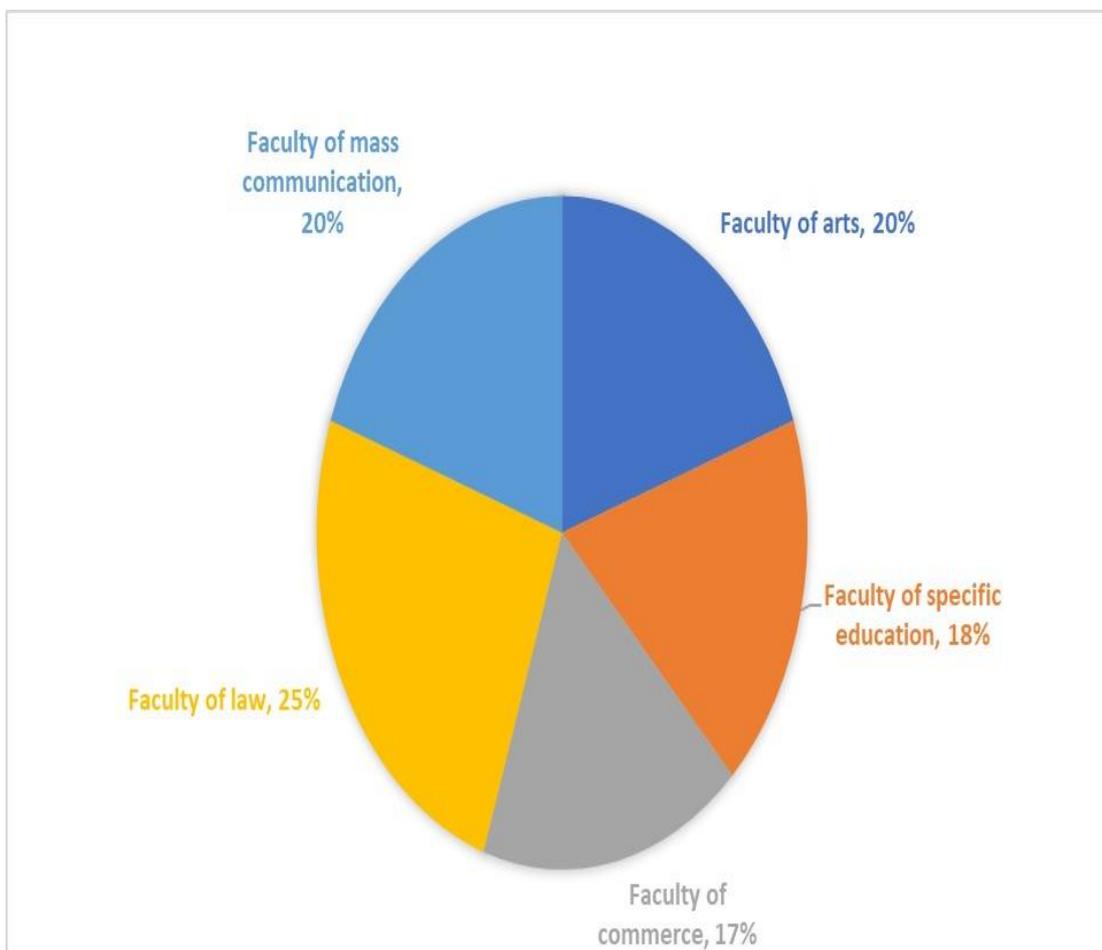
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Table 3: Correlations between the Name of the College and the Total Awareness Scores of the Non-Medical Students regarding Endometriosis (N = 357)

| Name of college | | age | Total awareness scores |
|------------------------|---------------------|--------|------------------------|
| | Pearson Correlation | 1 | .567** |
| Sig. (2-tailed) | | .000 | |
| N | 357 | 357 | |
| Total awareness scores | Pearson Correlation | .567** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 357 | 357 |

** The correlation is significant at the 0.01 level (2-tailed).

Figure 1: Name of College among the Non-Medical Students



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Figure 2: Background of the Non-Medical Students about Endometriosis

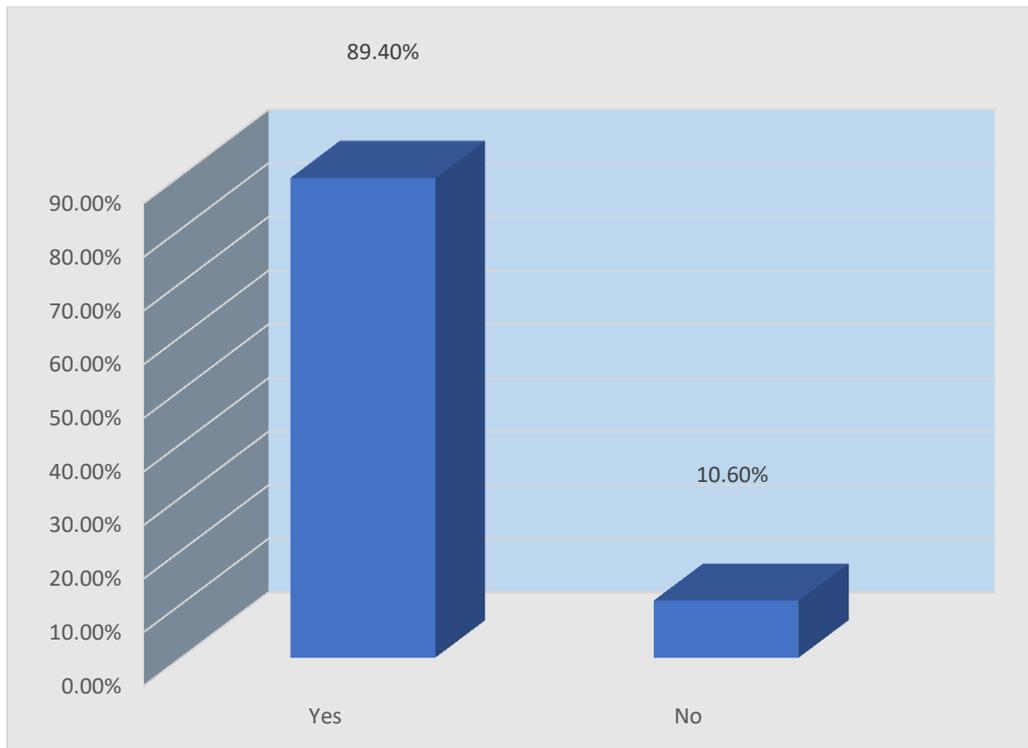
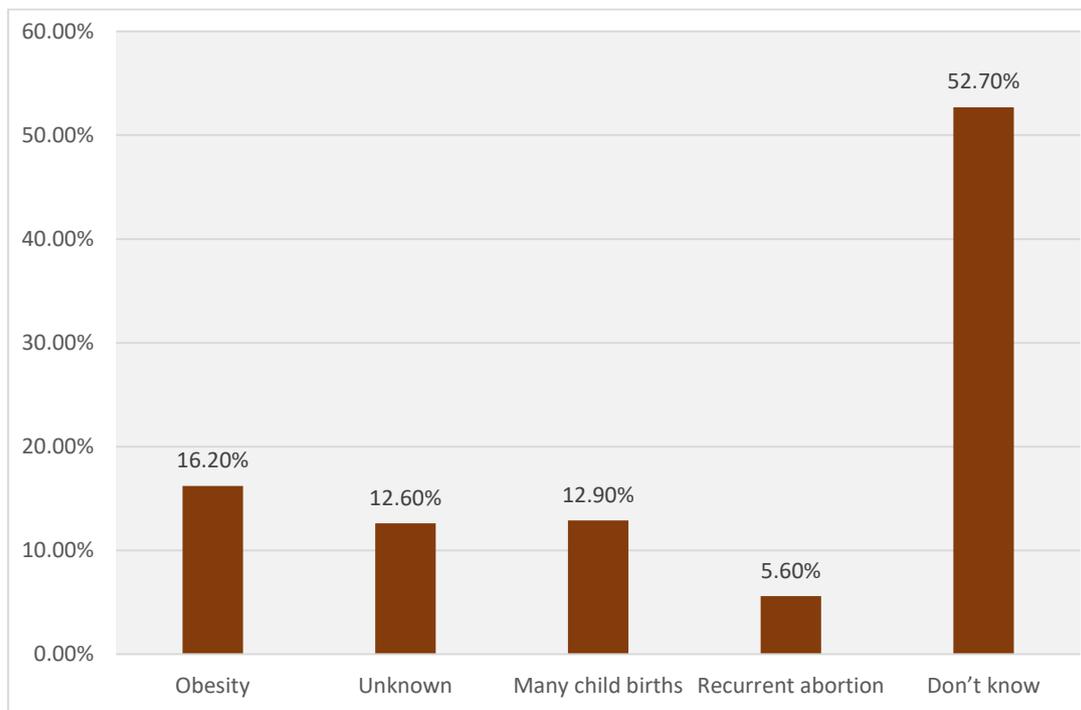


Figure 3: Level of awareness of the Non-Medical Students regarding the Cause of Endometriosis



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Figure 4: Level of Awareness of Non-Medical Students regarding the Sites of Endometriosis

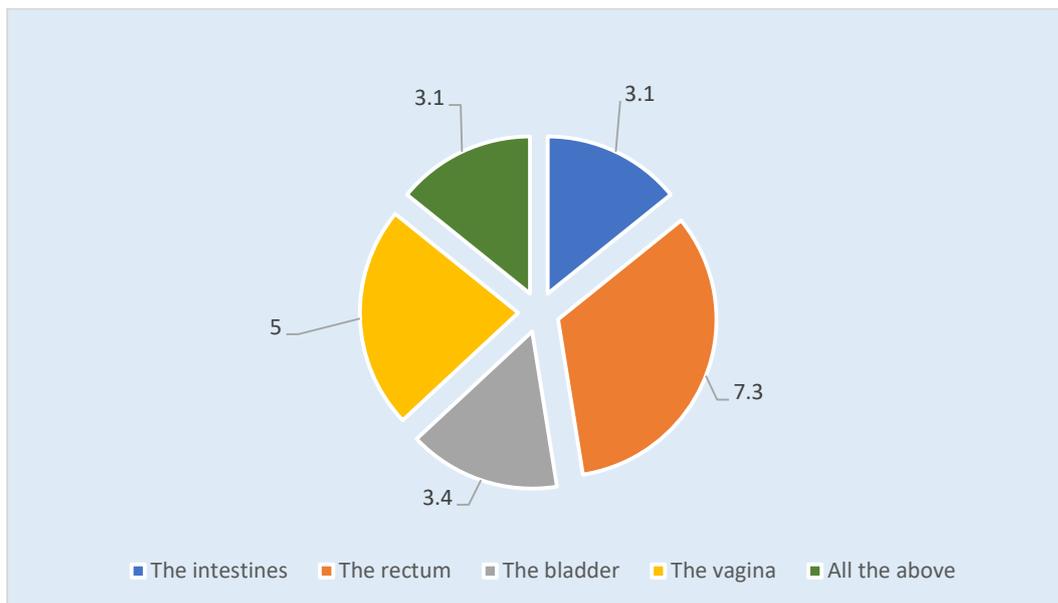
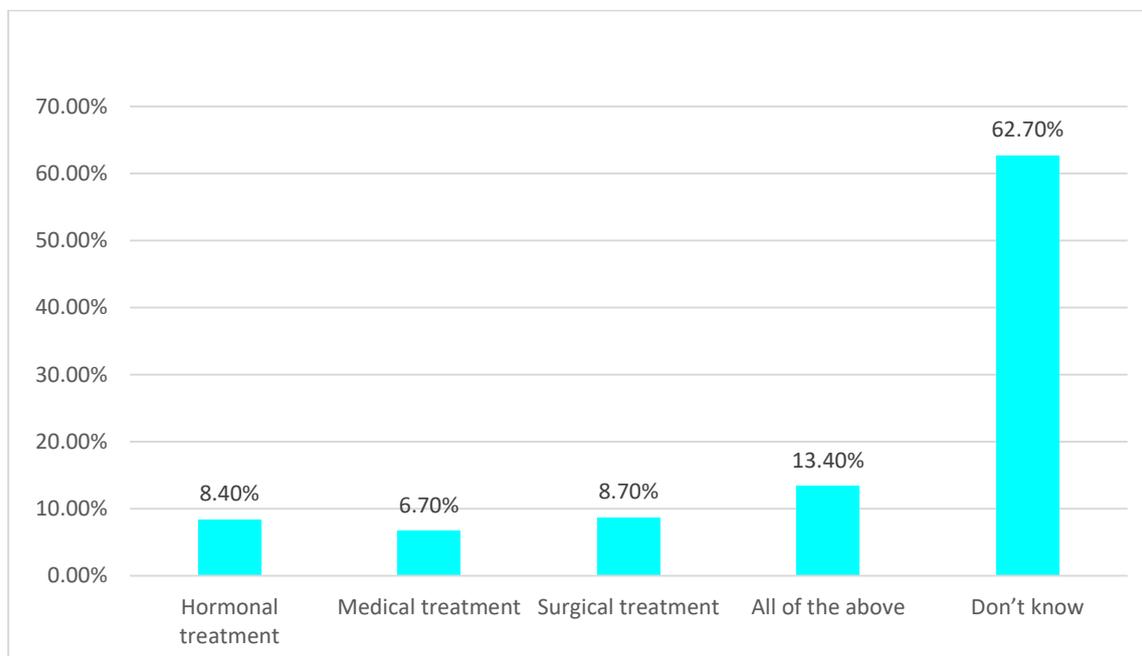


Figure 5: Level of awareness of Non-Medical Students regarding Treatment Options for Endometriosis



Discussion

Endometriosis is an estrogen-dependent, chronic, inflammatory disease diagnosed with the presence of endometrial glands and/or stroma outside the uterine cavity. Aside from its physical effects, it can alter the quality of life, mental health, relationships, and sexuality. Around 10% of women will develop it at some point in their lives, and it typically affects them from menarche through menopause. This chronic disease may affect all organ systems and may cause organ-related symptoms, including dysmenorrhea, dyspareunia, chronic fatigue, chronic pelvic pain, and subfertility, while only 20–25% of endometriosis carriers are asymptomatic. For patients with infertility, endometriosis prevalence increases by up to 30%, and for those with chronic pelvic pain, the prevalence increases by up to 45%. Moreover, the delay in the diagnosis of endometriosis causes a loss of labor, a decrease in productivity, and excessive costs.

Furthermore, the current study findings showed that more than half of them did not know what the goal of endometriosis treatment was. Also, more than one-half of them did not know if endometriosis could be cured. Moreover, more than one-half of them did not know if endometriosis affects sexual intercourse. In addition, the current study findings showed that about two-thirds of them did not know if endometriosis could be early detected. Also, more than two-thirds of them did not know what the treatment

options for endometriosis were. Additionally, the current study findings showed that most of them had poor awareness scores regarding endometriosis. These findings are possibly caused by the lack of information among individuals who have not studied sufficient medical resources. Notably, the increasing number of websites that provide non-evidence-based information plays a significant role in this phenomenon. In addition, using reliable medical databases is challenging for non-medical students.

These results agreed with Missmer et al.'s study (2021), entitled "Impact of Endometriosis on Life-Course Potential: A Narrative Review, USA," who mentioned that medical students had a higher awareness of endometriosis than non-medical students, but they still delayed the commencement of childbearing and wanted to have fewer children, and this was similar to what has been reported, particularly among highly educated students in other studies.

Also, they found that endometriosis awareness in general and the knowledge of specific factors that have an effect on fertility in particular are unreliable among many young non-medical students, and in addition, they underestimated the effect of age on fertility while overestimating the length of the female reproductive period, as demonstrated in a previous study. This overestimation may be one factor contributing to the finding that a large proportion of female students will postpone the first pregnancy. Then the

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necessity of education about the leading factors for infertility is mandatory, particularly among non-medical students. From the researchers' point of view, this lack of knowledge may be attributed to the fact that this disease is not common among a large proportion of females.

Meanwhile, the results of the present study were consistent with those of Lim et al. (2023), who studied "Endometriosis and Adverse Pregnancy Outcomes: A Nationwide Population-Based Study in the Republic of Korea." They found that the majority of women with endometriosis had poor knowledge and needed education as they did not immediately recognize the symptoms that may be caused by endometriosis, which led to a diagnostic delay.

Moreover, this is ascertained by Breintoft et al. (2021), who studied "Endometriosis and Risk of Adverse Pregnancy Outcome: A Systematic Review and Meta-Analysis in Denmark," and Bakr et al. (2022), who studied "Effectiveness of Lifestyle Modification on Endometriosis Symptoms among Reproductive Age Women, Egypt." They mentioned that the majority of the studied women had incorrect knowledge about the definition, risk factors, symptoms, prevention, and treatment, which means that there was a statistically significant difference among the studied women regarding their knowledge about endometriosis symptoms after the educational sessions.

Furthermore, this is in agreement with Gremillet et al. (2023), who conducted

a study in Marseille, France, entitled "Endometriosis, infertility, and occupational life: women's plea for recognition. BMC women's health," and stated that in gynecological practice, special attention should be given to educate the women with endometriosis, as the early onset of endometriosis symptoms and a long delay in diagnosis may increase the risk of an unfavorable course of the patient's medical and socio-medical history over time. So, education is imperative for women with endometriosis.

Meanwhile, the previous findings were consistent with Kotowska et al. (2021), who studied "Awareness of Endometriosis Symptoms: A Cross-Sectional Survey among Polish Women, Poland," and Alasser et al. (2022), who studied "Effect of Instructional Supportive Guidelines on Quality of Life among Women with Endometriosis" in Menoufia, Egypt. They stated that there were significant changes in the level of knowledge of the studied women regarding all items of the educational session about endometriosis after the education and at follow-up compared to their knowledge before the educational session. This might be due to the clarity of nursing strategies, which can be clearly understood by the study sample and enhance their awareness of endometriosis.

In addition, the previous findings were not in line with As-Sanie et al.'s (2020), entitled "Healthcare utilization and cost burden among women with endometriosis by opioid prescription status in the first year after diagnosis: a

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retrospective claims database analysis.” They documented that both medical and non-medical students were able to describe infertility as a biomedical health problem and could identify multiple risk factors for endometriosis, but they still lacked significant knowledge regarding age-related decline in female fertility. This confusion could be released through a basic understanding of the female reproductive system, sexual education, puberty, and menopause. So, health care professionals, especially family physicians, must be aware of the importance of providing comprehensive reproductive health counselling to young women, and this education should be offered to all women seen in routine screening.

Additionally, this was contradicted by a study conducted in the region of Arnhem, the Netherlands, by Eljamay et al. (2023) entitled "Awareness and Knowledge of Libyan Women about Endometriosis, Derna." They reported that most of the participants in their study had proper knowledge regarding signs and symptoms of endometriosis, which means that cyclic symptoms and dysmenorrhea were the most specific signs and symptoms of endometriosis. This may be related to the fact that the participants were from developed countries and had heard previously about endometriosis via mass media or books.

Description of the findings related to the correlations between the studied variables among the nonmedical students. According to the findings of the current study, there was a significant positive correlation between

the name of the college and the total awareness scores of the nonmedical students regarding endometriosis. Also, there was a significant relationship among the nonmedical students regarding their name of college, age, academic year, making exercise, and the total awareness scores. Additionally, there was no relationship among the nonmedical students regarding their marital status, smoking, or total awareness scores. A possible explanation for these findings is that college students have varying access to general health education because of widespread internet availability. Moreover, differences in personality traits might be found among generations of students.

The previous results agreed with Gete et al. (2023), who studied "Impact of endometriosis on women's health-related quality of life: A national prospective cohort study, Australia," and reported that there was a significant relationship between education and total awareness scores. Also, the present study findings were comparable with those of Mińko et al. (2021), who illustrated "Endometriosis: A Multifaceted Problem of a Modern Woman, Poland" and mentioned that endometriosis is associated with worse physical well-being.

In addition, these findings were similar to a study performed by Andrew et al. (2022), who studied "Pathophysiology, diagnosis, and management of endometriosis," and Saunders & Horne (2021), who studied "Endometriosis: A etiology, Pathobiology, and Therapeutic

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prospects." They suggested that there was no relationship among marital status, smoking, or total awareness scores.

Therefore, the findings of this study answered the research question. The current study aimed to assess the awareness of endometriosis among nonmedical students at Menoufia University. The purpose was met by the findings of the current study, which showed that the level of awareness among nonmedical students at Menoufia University about endometriosis was poor. Recently, several studies were conducted on the awareness of endometriosis among married women during reproductive age. To our knowledge, this survey is one of the very few studies that has assessed the awareness of endometriosis among nonmedical students. The use of validated questionnaires (e.g., an interview questionnaire and an observational checklist) is another strength of this study. Despite the strengths of the study, some limitations should be noted. Like other case-control studies, selection and recall bias are concerns for this study.

Conclusion

According to the present study findings, which were conducted to assess the awareness of endometriosis among nonmedical students at Menoufia University, it could be concluded that most of the nonmedical students at Menoufia University heard about endometriosis and knew what endometriosis was.

On the other hand, most of them did not know that endometriosis occurs when uterine tissue begins growing in areas outside the uterus, who was considered a high-risk group for endometriosis, what the causes and the symptoms of endometriosis were, if endometriosis symptoms decrease after menopause, if endometriosis could appear outside the pelvic cavity, when most cases of endometriosis were diagnosed, how endometriosis is diagnosed, that endometriosis progresses in stages, what the complications of endometriosis were, what the goal of endometriosis treatment was, if endometriosis could be cured, if endometriosis affects sexual intercourse, if endometriosis could be early detected, what the treatment options for endometriosis were.

In conclusion, most of the nonmedical students at Menoufia University had poor awareness scores regarding endometriosis. Therefore, the findings of this study answered the study question.

Recommendations

Based on the findings of the present study, the following recommendations are suggested:

- 1) Increasing the availability of health education programs for non-medical students to increase their public awareness and fundamental knowledge of endometriosis.
- 2) Using a health education campaign to elevate awareness and recognition of endometriosis among all females.

Further research:

- Further studies that analyze longitudinal quantitative and qualitative data that measure all the affected life domains are needed to fully understand the life-course impact that endometriosis has on the life course.
- Replication and further research using a larger sample size in a variety of college settings are recommended to generalize these findings.
- Educational booklets in Arabic should be available for female students to increase their awareness regarding endometriosis.

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