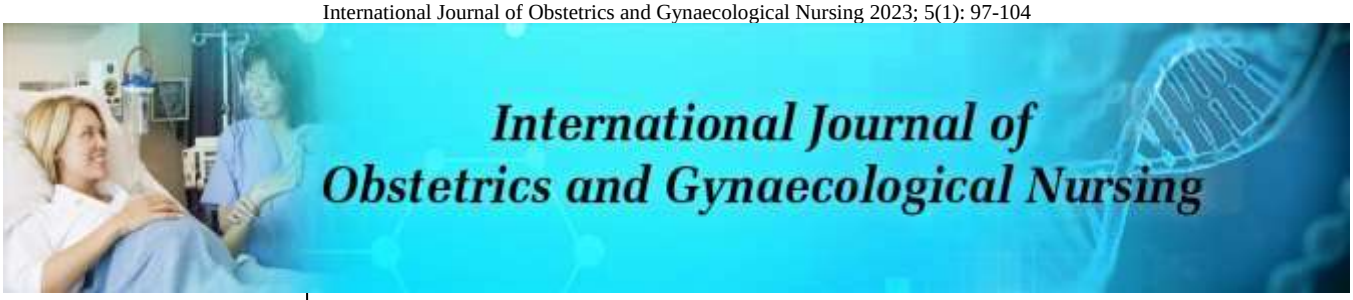

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Effect of implementing educational program on pregnant women's knowledge, and practice regarding cervical cerclage

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Abstract
Cervical cerclage is the principal treatment for women with a history of cervical insufficiency. In general, there are three major cerclage types: prophylactic, therapeutic, and emergency.
Aim of the study: To evaluate the effect of implementing an educational program on pregnant women's knowledge and practice regarding cervical cerclage.
Research design: Quasi-experimental design was used.
Setting: The study was conducted in outpatient departments at Minia university hospital for maternity and child health.
Subjects: A purposive sample of one-hundred pregnant women who had undertaken cervical cerclage were recruited and divided equally into study and control groups using a simple random sample.
Tools of data collection: Three tools were used: 1- A structured Interviewing Questionnaire, 2- knowledge Assessment, and 3- Assessment tool for practices.
Results: The current study reveals; that most of the study and control groups respectively had poor knowledge regarding cervical cerclage pre-program, decreased post-program, and the minority of study and control groups had a satisfactory level of practice regarding cervical cerclage procedure pre-program, compared to most and minority of study and control groups had a satisfactory level of practice regarding cervical cerclage procedure post-program, respectively.
Conclusion & Recommendation: Implementing the educational program effectively and significantly improved pregnant women's knowledge and practice regarding cervical cerclage. Women undergoing cervical cerclage should be provided with educational programming as part of their standard hospital care.

Keywords: Cervical cerclage, educational program, pregnant women

Introduction
True cervical insufficiency (CI) is a major cause of abortions in the second trimester and births before 34 weeks. It is suspected when there has been a miscarriage in the second trimester, a previous birth before 34 weeks, or a shortening of the cervix in the current pregnancy before 24 weeks [1]. Second-trimester miscarriage is a common trigger for this diagnosis to be made retroactively. Beginning in the early second trimester, most women experience either no symptoms at all or mild ones. Some of these symptoms are: bloating, pain in the lower back or pelvis, increased vaginal discharge, a change in the color of your vaginal discharge, and spotting [2].
Cervical cerclage, a general term for a family of surgical procedures that use sutures or synthetic tape to strengthen the cervix, is the surgical therapy of choice for CI. Transvaginal cervical cerclage is the most usual method; however, abdominal cervical cerclage is also an alternative (trans-abdominal or laparoscopic cervical cerclage). Cervical cerclage for preventative purposes is best done before pregnancy or very early in the pregnancy. There are benefits and drawbacks to both strategies. The transvaginal technique is the most usual, but laparoscopic cervical cerclage is the next best option if that happens [3].
Cervical cerclage is the surgical procedure of placing a suture around the cervix. The goal is to keep the cervix closed mechanically throughout the pregnancy. Three or four bites are removed from the cervix, and a stitch (often constructed from silk tape or another

non-absorbable material) is wrapped around the cervix. Rescue suturing calls for a fraction of deviation from the norm regarding how the suture is placed. The embryonic membranes should be moved above the intended suture site to prevent premature rupture [4].

Cervical cerclage is a surgical procedure done to stop the cervix from dilatation. Elective (prophylactic) cerclage is performed between 12 and 14 weeks of pregnancy in women with a history of cervical insufficiency. On the other hand, pregnant women whose cervixes are progressively shortening and expanding have the option of emergency cerclage [5].

Significance of the study

Around 15 million newborns and their families are impacted by preterm birth each year; in 184 countries, the rate of preterm delivery varies from 5 to 18 percent [6]. Preterm birth rates and death vary considerably between and even within nations. Nonetheless, ow- and middle-income countries, particularly those in Southeast Asia and sub-Saharan Africa, suffer a relatively heavy burden of preterm birth [7].

Cervical cerclage is a procedure that has been shown to reduce newborn morbidity and mortality and minimize preterm birth (PTB) by physically keeping a prolonged and closed cervix [8]. Around 85–90% of pregnancies are successfully carried to term after cervical cerclage is performed to treat cervical incompetence. When genuine cervical insufficiency is present, cervical cerclage is effective [9].

Furthermore, the recovery period after day surgery often comes to expectations. Women get a lot of tasks to do around the house after day surgery in order to get well. Women require information about what to expect during rehabilitation and how to provide for themselves at home after surgical treatment. After receiving training, participants in a study reported an increase in their overall knowledge about cerclage and self-care, and their self-care practices improved to a satisfactory level [10].

Aims of the study

This study evaluated the effect of implementing an educational program on pregnant women's knowledge and practice regarding cervical cerclage.

Specific objectives

- Assess the knowledge and practices of women regarding cervical cerclage.
- Design, implement and evaluate the effect of educational program on women's knowledge and practices regarding cervical cerclage.

Research hypotheses

H1: Health education program will improve women's knowledge and practices regarding cervical cerclage on the post-test than the pretest.

H2: There will be significant relation between women's pretest knowledge, practice scores, and socio-demographic characteristics.

Subject and Method

Research design

Quasi-experimental research design Pre & Post-test were utilized to achieve the aim of this study.

Setting

This study was conducted in outpatient departments at Minia university hospital for Maternity and Child Health.

Sampling

Sample type

The current study used a purposive sample to recruit participants, and then used a simple random sample to divide those participants into two groups: a study group with n = 50 cases and a control group with n = 50 cases. The first case was recruited as the study group, the second case-control group, and so on.

Sample size

The sample size was one hundred pregnant women undergoing cervical cerclage in the period of six months; it was determined in accordance with the following criteria:

Inclusion criteria

- Women who have been diagnosed with cervical incompetence and will be receiving cervical cerclage for the first time must meet certain criteria.

Be free of medical or obstetrical abnormalities.

Data Collection Tools

After conducting a comprehensive review of previous research and other studies that were similar, the researchers developed tools for the collection of data; these tools included the following three tools:

Tool I: A structured Interviewing Questionnaire: It consisted of two parts:

First part: The Socio-demographic characteristics: Of the studied sample, such as age, educational level, residence, occupation, and telephone no.

Second part: The Obstetric history of the studied sample, such as gestational age, number of pregnancies, number of parties, and a history of abortion.

Tool II: knowledge Assessment tool (pre and post-test)

The researchers developed this tool after reviewing related literature to assess women's knowledge regarding cervical cerclage. It consists of 14 questions about cerclage (definition, Types, Timing, Indications, symptoms can expect after it, Complication, warning signs, signs of infection, Position in the first 24 hrs. after the operation, Position after the operation**).**

Scoring system

The women's answers related to the knowledge were scored and conducted For each question, a score of one (1) was recorded when the response was correct, a score of zero (0) was recorded when the answer was wrong, and "don't know." The total knowledge score (14) is classified as, Poor knowledge if the total score was < 50% **(** <seven scores**)**, Average knowledge if the total score was 50-75% (7 < 10.5 score) and Good if the total score was > 75% **(**≥ 10.5 scores).

Tool III: Assessment tool for practices (pre and post-test)

The researchers developed this tool adopted from Mohamed *et al*. [10] to assess pregnant women's practices about cervical cerclage consists of five parts containing (42) questions related to nutritional health, (7 questions), psychological health, (8 questions), physical health and activity health (17 questions), treatment (2 questions), hygienic health (8 questions)

Scoring system

Each item done was given one score, item not done was given a zero score. Total score (42). It is classified less than 60% was referred as unsatisfactory (0 – 25 score), and equal / more 60% was referred as satisfactory practice (26 - 42 score).

Validity and Reliability

The questionnaire was tested by five obstetrics and gynecology staff experts and nursing professors who assessed its clarity, relevance, understanding, comprehensiveness, applicability, and ease of use to establish validity. Cronbach's alpha was used to examine the tools' consistency within themselves, and the results (0.875 and 0.910, respectively) were rather satisfactory.

Pilot Study

It was conducted on 10% of the total studied sample (10 pregnant women undergoing cervical cerclage) in the previous setting. The purpose of this pilot study was to test the effectiveness and clarity of the tools, evaluate the practicability of the fieldwork, identify any potential obstacles that might be encountered by the researcher, and restrict obstacles to data collection. Based to the findings of the pilot study, all of the essential and required adjustments have been made, such as removing some questions from the tools (removing two questions from women's knowledge about cervical cerclage) n order to strengthen their contents for greater simplicity and clarity. In addition, the women who were participated in the pilot study were excluded from the main study sample.

Data collection Procedure

The present research was accomplished through the following three phases: assessment phase (pretest), implementation (conducting the educational program), follow-up, and evaluation.

1. Assessment phase (pretest)

- The researcher greeted each of the women at the beginning of the interview and then continued by clarifying the aim of the study, how long it would last, and the activities that would be involved. They were made aware that their engagement with the research was entirely voluntary and that they retained the right to withdraw at any moment. Each participant was interviewed individually after taking the oral approval of the women to share in the study, and the researcher filled out the questionnaire.
- The researcher provided a description and clarified some of the questions on the assessment tools after first obtaining the women's permission to implement them in the current study and then receiving their agreement to participate in it. The researcher interviewed each woman to assess socio-demographic data and obstetric history; the time taken to complete the questionnaire was 20 – 30 minutes to be completed using the tool (No I). Then the researcher assesses women's knowledge and reported practices about cervical cerclage from both groups (pretest).

2. Implementation phase (conducting the educational program)

- After assessing knowledge and reported practice (pretest) regarding cervical cerclage, using the knowledge Assessment tool (2nd tool), and reported practices assessment tool (3rd tool) from both groups. The sample was taken two days to a week after the study began. from July 2021 through December 2021. The researcher attended the outpatient clinic from 9:00 a.m. to 12:40 p.m., and individuals were interrogated directly.
- Each woman in the study group was interviewed individually and received the knowledge and practice that should follow cervical cerclage. The educational program involved (3) sessions, one for knowledge and two for practice. Each session lasted 45 minutes to one hour, three sessions per day for each woman. Also, 15 minutes was assigned at the end of the discussion for more questions from participated women and to in order to get comments from the women to make sure they benefited as much as possible. The researcher filled out the questionnaire. Arabic booklet was distributed to all women in the study group, including knowledge and practice about cervical cerclage, such as definition, types, time, warning signs after cervical cerclage, Nutritional health, psychological, physical, treatment, and hygienic health practices about cervical cerclage.

For the control group, the pregnant women received the routine care of the hospital and were observed exactly the same way of the study group.

Follow up

The researcher followed up with the women by telephone until delivery and provided instruction to the women to Call the doctor when vaginal discharge occurs, vaginal bleeding, present uterine contraction, or any signs of preterm labor.

Evaluation phase

The researcher conducted three times of evaluations

- The pregnant women in the study and control groups were tested for the first time (pretest) to determine their level of knowledge and practice before the educational program was put into effect.
- The pregnant women in the study group performed a second time of evaluation (immediate post-test) to determine how much they had learned from the educational program.
- The impact of the educational program on the women in both groups was assessed a third time (post-test) after two months (before delivery) with tools I, III.

Administrative design

Before conducting the pilot study and the actual study, The Minia University hospital for Maternal and Child Health's director and the dean of faculty of nursing both gave their

official approval. The ethical committee approved the research proposal in the faculty of Nursing.

Ethical consideration

Obtaining official permission to conduct the study from the willing pregnant women after explaining the goal, nature, and purpose of the study and obtaining oral agreement from all women, all participants have the opportunity to withdraw or refuse participation or withdraw from the study at any time without any rationale, the data collection process took privacy into account, and no potential dangers to health. Participants were reassured that all of their information was kept strictly confidential. To maintain their privacy, each woman was given a number instead of a name, which helped maintain anonymity.

Statistical analysis

The collected Data were summarized, tabulated, and presented using the statistical package for the social science (SPSS) version (20) for statistical data analysis.

Results

Table 1: Distribution of the studied sample regarding their Socio-demographic characteristics (n=100)

Socio-demographic Characteristics	Study (n=50)		Control (n=50)		X^2	P-value
	No.	%	No.	%		
Age						
– 20 < 25	8	16.0	6	12.0	2.412	0.481
– 25 < 30	21	42.0	17	34.0		
– 30 < 35	18	36.0	20	40.0		
– 35-50	3	6.0	7	14.0		
Mean±SD	28.8±3.78		30.06±3.43		t (1.63)	0.106
Educational Level						
– Read and write	9	18.0	12	24.0	2.19	0.533
– Preparatory	10	20.0	12	24.0		
– Secondary	10	20.0	12	24.0		
– University	21	42.0	14	28.0		
Residence						
– Rural	21	42.0	18	36.0	0.378	0.539
– Urban	29	58.0	32	64.0		
Occupation						
– Work	8	16.0	12	24.0	0.990	0.317
– Housewife	42	84.0	38	76.0		

P-value not significant

Table (1) shows no statistically significant difference in socio-demographic characteristics between the study and control groups.

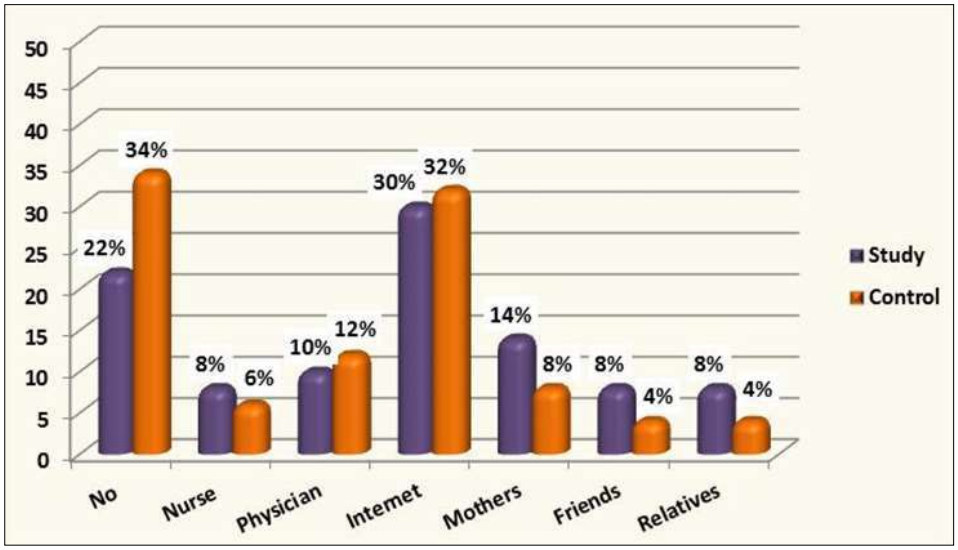

Fig 1: Distribution of the studied sample regarding the source of information about cervical cerclage (n=100)

Figure (1): illustrates that 34% & 22% of the study and control groups, respectively, didn't have previous knowledge about cervical cerclage, and (30.0% & 32.0%) of the remaining percentage of the study and control groups, respectively, have their knowledge from internet resources.

Table 2: Distribution of the studied sample regarding their knowledge about cervical cerclage pre and post program (n=100).

Items	Study (n=50)						Control (n=50)				X^2 (P1 Value)	X^2 (P2 Value
	Pretest		Immediate		Post 2 months		Pretest		Post 2 months			
	No.	%	No.	%	No.	%	No.	%	No.	%		
Definition of cervical cerclage	10	20.0	44	88.0	38	76.0	10	20.0	9	18.0	…… 1.000	33.761 0.0001**
Types of cervical cerclage	9	18.0	49	98.0	50	100.0	7	14.0	18	36.0	0.298 0.585	18.778 0.0015**
Time of cervical cerclage	32	64.0	45	90.0	46	92.0	30	60.0	32	64.0	0.169 0.680	11.422 0.007**
Indications of cervical cerclage	27	54.0	50	100.0	47	94.0	29	58.0	35	70.0	0.162 0.687	9.756 0.002**
Expected symptoms after cervical cerclage	12	24.0	46	92.0	46	92.0	12	24.0	20	40.0	…… 1.000	30.125 0.001**
Complications of cervical cerclage	7	14.0	47	94.0	46	92.0	4	8.0	8	16.0	0.919 0.338	58.132 0.0001**
Warning signs of cervical cerclage	6	12.0	49	98.0	41	82.0	7	14.0	10	20.0	0.088 0.766	38.455 0.0001**
Signs of infection	9	18.0	50	100.0	44	88.0	7	14.0	15	30.0	0.298 0.585	34.766 0.0001**
Position in the first 24 hrs. after an operation	5	10.0	48	96.0	47	94.0	10	20.0	12	24.0	1.961 0.161	50.641 0.0001**
Position after operation	11	22.0	49	98.0	46	92.0	9	18.0	16	32.0	0.025 0.617	38.200 0.0001**
Follow up at regular intervals to check the status of the cervix	12	24.0	50	100.0	48	96.0	15	30.0	21	42.0	0.456 0.499	34.081 0.0001**
Time for removing cervical stitches	13	26.0	49	98.0	38	76.0	12	24.0	15	30.0	0.053 0.817	21.267 0.0001**
Indication of removal of cervical cerclage	11	22.0	47	94.0	41	82.0	11	22.0	17	34.0	…… 1.000	23.645 0.001**
Contraindication of cervical cerclage	10	20.0	48	96.0	43	86.0	12	24.0	22	44.0	0.233 0.629	19.384 0.0001**

*: Statistically significant at $P \leq 0.05$; ** *P*-value is highly significant; *P*1: *P* value for comparing between the studied groups in pretest; *P* 2: *P* value for comparing between the studied groups in post 2 months

Table (2): Illustrate the improvement in the responses of the study group related to cervical cerclage knowledge (at the end of the program). Also, the table revealed a significant difference between the study and control groups regarding correct responses related to all items of knowledge about cervical cerclage from pre- to post-program, documented by *P*-value (0.001) for all items.

Table 2: Distribution of the studied sample regarding their total knowledge level about cervical cerclage pre and post program (n=100)

Level of Knowledge	Study (n=50)						Control (n=50)				X^2 (P1 Value)	X2 (MCP2 Value
	Pretest		Immediate		Post 2 months		Pretest		Post 2 months			
	No.	%	No.	%	No.	%	No.	%	No.	%		
Poor	47	94.0	0	0.0	0	0.0	46	92.0	35	70.0	0.825 0.345	82.314 0.001**
Average	3	6.0	0	0.0	3	6.0	4	8.0	15	30.0		
Good	0	0.0	50	100.0	47	94.0	0	0	0	0.0		

P-value was calculated by Montecarlo test. *: Statistically significant at $P \leq 0.05$; *P*1: *P* value for comparing between the studied groups in pretest; *P* 2: *P* value for comparing between the studied groups in post 2 months, ** *P*-value is highly significant

Table (2): The table revealed a highly statistically significant difference between the two groups regarding knowledge level from pre- to post-program, documented by P value (0.001)

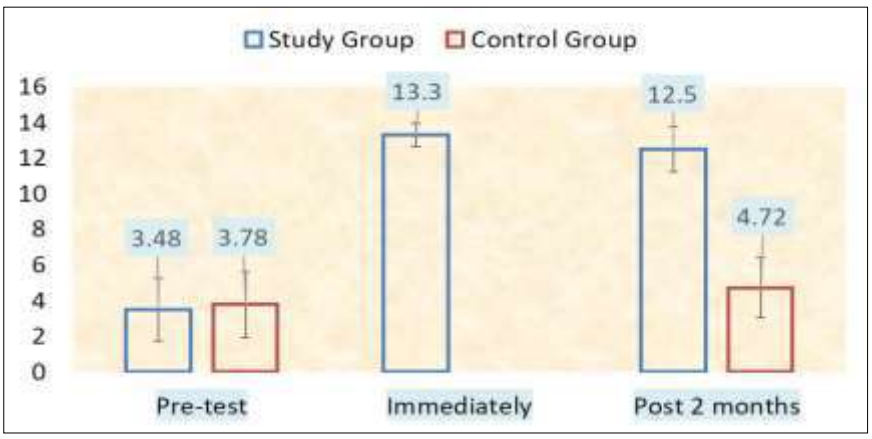

Fig 2: Mean Score of the studied sample regarding their Total Knowledge about cervical Cerclage Pre and Post program (n=100).

Figure (2) Illustrates mean scores of the study group regarding total knowledge about cerclage strongly improved from the pre- to post-educational program (3.48±1.77 & 12.5±1.26), respectively. Compared to less improvement of the control group (3.78±1.84 & 4.72±1.69) from the pre-and post-two months of educational program, respectively.

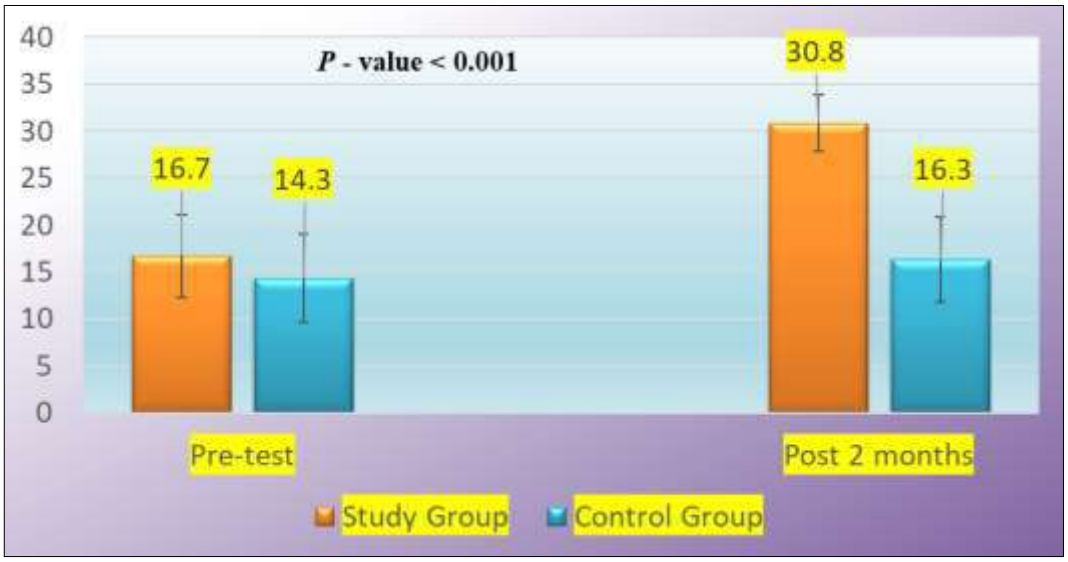

Fig 3: Mean scores of the studied sample regarding their Total Practice about cervical Cerclage Pre and Post program (n=100)

Figure (3) Illustrates mean scores of the study group regarding total practice about cerclage strongly improved from the pre- to post-educational program (16.7±4.40 & 30.8±3.02) respectively, Compared to the control group (14.3±4.73 & 16.3±4.49) from pre to post educational program respectively with highly statistically significant differences between the two groups documented by *P*-value 0.001

Table 3: Correlation between Knowledge and Practice Levels among the studied sample Pre and Post program (n=100)

Total knowledge								
Total practice	Study				Control			
	Pretest		Posttest		Pretest		Posttest	
	r	*p*	*r*	*p*	*r*	*P*	*r*	*p*
	0.259	0.069	0.431	**0.031***	0.103	0.475	0.212	0.139

* P-value is significant

Table (3) shows a significant correlation between total knowledge and practice levels among study subjects post-program documented by *P*-value (0.031).

Discussion

Cervical cerclage is a popular operation for women at high risk of cervical insufficiency, and it is highly effective in reducing mid-trimester losses. Cervical cerclage is a procedure that helps women regain their cervical length and the cervix's mechanical function. When there is a family history of premature birth, a cervix cerclage may be used in a singleton pregnancy was found to significantly reduce recurrent SPTB at 35 weeks by 30% and to reduce mortality and morbidity by 36% in a patient-level meta-analysis of five randomized studies [11].

Regarding the knowledge about cervical cerclage, the current study illustrated the improvement in the responses of the study group regarding knowledge about cervical cerclage after implementing an educational program, with a highly significant difference between the two groups regarding knowledge level from pre to post-program. This improvement might be accounted to the pregnant women interested to learn and acquired knowledge about cervical cerclage as well as the written booklet that was distributed to the women and employed as a constant guide, and it aided women in learning.

This comes in the same line with Mohamed & Hassan [12], found after the educational session and at the follow-up period, women demonstrated a significantly better understanding of the importance of dental care during pregnancy compared to their previous knowledge. This agreement might be because the largest possible proportion among the study and control groups had a university education, and the correlation between women's education and their knowledge of cervical cerclage. This study is congruence with the study of Abd Elmoniem *et al.* [13], revealed that more than three fourth of the studied pregnant women had inadequate pre-educational program knowledge, while the majority had good knowledge of post-educational programs. Also, Ali *et al.* [14], in Upper Egypt, illustrated expectant women's knowledge of obstetrical danger signs increased significantly after the implementation of educational program.

Concerning the total practices level of cerclage, the current study reveals that the majority of the study and control groups had an unsatisfactory level of practice regarding cerclage procedure pre-program, and almost of the study had a satisfactory level of practice regarding cerclage procedure post-program, with highly statistically differences between the two groups.

This result is in accordance with Rezaie *et al.* [15], conducted in Iran, indicated that the overall health practices of the

women in the intervention group was significantly higher after the intervention than that of the women in the control group, suggesting that self-care counseling has a positive effect on health practices and its subdomains, particularly attitudes towards motherhood and pregnancy. And in the same line with Ahmed *et al.* [16], in Beni- Suef University, pregnant working women showed considerable improvement in their testing behavior between pre- and post-test, according to the study. This agreement might be due to one of the most significant predictors was grade of education for the self-care practice among antenatal mothers and explained that antenatal mothers with a good education were associated with a higher-level score of their practice and enhanced their understanding and receiving of information about cervical cerclage and followed the instruction in the handout booklet.

On the other hand, this finding is contrary with the study of Rizk *et al.* [17], in Hodeida City "revealed that about three-fifths of participants in this study scored adequately on all measures of universal self-care, but only roughly two-fifths scored highly. The difference in the study subjects' cultures might explain their disagreement.

Regarding socio-demographic characteristics, less than half of the study and control groups were located in the age group (30 < 35) years with mean (28.8±3.78 & 30.06±3.43) years. Regarding educational level, the highest percentage among the study and control groups had a university education, respectively, and more than half lived in urban areas and were housewives, respectively. In addition, the majority of the participant have two routine visits and no significant difference between the study and control group. In contrast, Ara *et al.* [18], reported that more than half of cases 20 were between 20-29 years, and less than half of cases 15 were between 30-39 years. This difference might be due to an increase in sample size in the current study and the changing environment of the study sample.

In addition, this result is consistent with Mohamed [19] revealed that women's ages varied widely, from 14 to 41. Over half of the women in the study were under the age of 25, while more than a quarter were under the age of 20, and only approximately 20% had completed college. Moreover, greater than three-fourths of the studied participant were first pregnancy; the rest, more than one-fifth, had a history of previous abortion. Meanwhile, the majority had their first visit within the first trimester, and more than two third had more than four visits.

Regarding the source of information about cervical cerclage revealed that more than one-third of the study and less than one-fourth of the control group didn't have previous knowledge about cervical cerclage. One-third and more than one-third of the remaining percentage of the study and control group respectively have their knowledge from internet resources, followed by low percent (from their mothers, and the minority take their knowledge from nurses. This finding is matching with Ahmed *et al.* [16] confirmed that women relied primarily on their families and the media for updates and knowledge. And in the same line with Mohamed & Hassan [12], mentioned friends and relatives were the main source of information about dental health care, as mentioned by the studied sample. These results are not in harmony with the findings of Ali *et al.* [14] founded that illustrated that healthcare providers were the main source of information about obstetric danger signs among pregnant women in Upper Egypt.

Conclusion

Implementing the educational Program effectively improved Pregnant Women's Knowledge and Practice Regarding Cervical Cerclage. It found a statistically significant improvement in studied Pregnant Women's Knowledge immediately and two months after the educational program, as well as a statistically significant difference in studied pregnant women's practice pre and post-two months after implementation of the educational program in the control group.

Recommendations

- Educational program should be routine hospital care for women undergoing cervical cerclage.
- Maternity nurses' in-service training on postoperative self-care management for women who've had a cervical cerclage.
- Replicating the current study with a bigger sample across multiple hospitals would allow for more broad conclusions to be drawn.

Conflict of Interest

Not available

Financial Support

Not available

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