Impact of the Teaching Program on Cardiac disease women's Awareness and their pregnancy outcomes

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Abstract

Background: High rates of maternal and neonatal illness and mortality are reported due to cardiac disease during pregnancy. Proper care and teaching plays a crucial role in preventing these problems and enhance outcomes. **Aim of the study:** evaluate the Impact of Teaching Program on Cardiac disease women's Awareness and their pregnancy outcomes. **Research Design:** quasi-experimental research design. **Setting:** Conducted at the antenatal inpatient department and antenatal outpatient clinics on Maternity and Child Minia University Hospital. **Sample:** A purposive sample composed of (30 pregnant women in case group and 30 in control group) was used in this research. **Tool of data collection**: four tools were used: **Tool (I),** the Structured Interview Questionnaire Sheet **Tool (II)** the Self-reported practice checklist; **Tool (III)** Self-reported Attitude on cardiac disease; and **Tool (IV)** pregnancy outcomes**. Results:** This study' main findings revealed that 100% of the studied women had an unsatisfactory knowledge regarding cardiac disease, 100 % of them had an unsatisfactory level of practice and26.7% of study group had positive attitude, in the pretest, While after application of the teaching program, it was observed that there was a highly significant improvement in their knowledge, practice and Attitude regarding cardiac disease, compared to pretest ($p < 0.001$). In addition statistically significant improvements in pregnancy outcomes among the study group after applying teaching program compared to the control group ($p < 0.001$). **Conclusion:** Implementation of teaching program were effective and significantly improved pregnant women' awareness and pregnancy outcomes regarding cardiac disease **Recommendation:** Continue the educational program and Special Standardized Booklet provided for pregnant women about cardiac disease and it's management to reduce maternal and neonatal mortality and morbidity.

Keywords: Cardiac disease, Pregnancy outcomes, teaching program.

Introduction

Cardiovascular disease is the primary cause of non-obstetric maternal morbidity and mortality globally, and its incidence is on the rise **(World Health Organization, 2020).** Timely detection and suitable treatment can avert complications and enhance pregnancy results (**Shub & Lappas, 2020).** Although there have been improvements in the treatment of maternal cardiovascular conditions, cardiac disease during pregnancy is responsible for up to 33% of maternal deaths **(Keepanasseril et al., 2021).**

Throughout a typical pregnancy, the mother's cardiovascular system experiences numerous alterations that put physiological stress on the heart. These changes involve an augmentation in the amount of blood circulating in the body, an increase in plasma volume, a rise in heart rate, and an elevation in cardiac output. Generally, mothers in good health usually handle this situation without any problems. However, women who already have heart disease or have insufficient cardiovascular capacity may struggle with it. **(Koziol et al. 2023).**

Nurses have a crucial role in overseeing the care of women with cardiac conditions during pregnancy and childbirth. This involves closely monitoring labor's progress and promptly identifying potential complications to achieve

optimal outcomes for both the mother and baby. The primary objective of the healthcare team is to ensure the successful and uncomplicated delivery of a newborn. In order to accomplish this, ensure that the delivery of the infant requires minimal cardiac exertion. Efforts should be made to minimize the duration of the second stage of labor, employing interventions that promote the mother's relaxation and reduce her stress levels**(Meng et al., 2023).**Specialized nurse in delivery room responsible for monitoring Hemoglobin and arterial oxygen saturation , maternal blood pressure ,cardiac function and fetal heart rate (FHM) is typically advised as the standard of care for pregnant women in labor who have cardiac issues **(Meng et al., 2023).**

Pregnant mothers are motivated to adopt healthy practices in their daily lives through education that employs effective teaching strategies. Emphasizing the educational role of the nurse should be highlighted. Teaching mothers about cardiac disease care and improving the nurse's role can lead to better knowledge, practice, attitude and outcomes for both the mother and fetus during the pregnancy period*. (***Zakaria et al. 2020).**

Significance of the study

The World Health Organization (WHO) approximates that cardiovascular disease affects approximately 1-4% of pregnant women globally. The incidence of maternal mortality in South Africa is increasing, with heart conditions currently responsible for 41 percent of indirect fatalities. **(Mehta et al., 2020).**

Obstetricians face a challenging task when it comes to managing pregnant women with cardiac disease in Egypt. The factors that contribute to the delay in taking action to reduce the risks and complications of the disease include a lack of awareness among the general public about the importance of antenatal follow-up, limited involvement of nurses in antenatal clinics, a lack of effective communication between different specialties, and a lack of easily accessible facilities for communication in government hospitals. Thus far, the studies conducted in Egypt have primarily focused on the medical aspects of cardiac disease during pregnancy **(Gooda et al., 2020).**

In Egypt, the prevalence of pregnant women with cardiac disease was 9.3%, according to a study conducted by **Gooda et al. in 2020).** In Egypt, 16% of maternal fatalities result from cardiovascular conditions occurring during pregnancy. Cardiac disease during pregnancy ranks as the fourth most prevalent cause of maternal mortality, as indicated by the given percentage **(Ghaleb et al., 2021).**

From 2020 to 2021, cardiac disease was the primary cause of death during pregnancy in the USA, accounting for 15.5% of all pregnancy-related deaths. **(Merkt et al., 2021)** Between 2008 and 2019, the United Kingdom experienced a significant increase in the rate of maternal deaths related to cardiac disease, with the number rising from 1.0 to 2.3 per 1,000 pregnancies **(Huang, 2022).** Cardiac disease in pregnancy has been the primary cause of indirect maternal deaths in Australia for nearly half a century **(Parsonage et al., 2021),** and it is frequently responsible for maternal deaths occurring later in pregnancy.

Aims of the study:

This study aims to evaluate the Impact of the Teaching Program on Cardiac disease women's Awareness and their pregnancy outcomes.

Research hypotheses:

- **H1**-Pregnant women who received the teaching program will improve their Awareness of cardiac disease care.
- **H2-** There will be significant association between women's knowledge with their practices regarding care of cardiac disease.
- **H3**- There will be significant association between pre-test knowledge, practice, and attitude scores of women's with their selected socio-demographic characteristics regarding care of cardiac disease.
- **H4-**Pregnant women who received teaching program will show improvement of their pregnancy outcomes.

Subject and Methods:

Research Design: (Quasi experimental research design (two groups pre-test, post-test) was utilized to fulfill the aim of this study.

Research Setting: This study was carried out at ante natal inpatient department and ante natal outpatient clinic of Maternity and Child Minia University Hospital **(**MCMUH). This facility is regarded as one of the major medical and specialized hospitals in North Upper Egypt and it provides free health care for women and children during stages of the lifespan.

Sample: A Purposive sample was utilized in this study. The total sample was 60 pregnant

women (30 women case group , 30 women control group) suitable for inclusion criteria.

Inclusion criteria

Cardiac disease Pregnant women with grade I and II, Cardiac disease Pregnant women at 2nd and 3rd trimester, Women who willing to participate.

Data Collection Tools:

The data was collected through utilization of four tools:

Tool I: Structured Interview Questionnaire Sheet:

It was developed by the researcher based on review of pertinent literature. It aimed to assess the women‟ knowledge regarding cardiac disease. It consisted of three parts:

- **Part 1: Socio demographic characteristics** of the study subjects such as: (age, educational level, residence, previous knowledge).
- **Part 2: Pregnancy history which include (**past history, .Current history and medical history).
- **Part 3: knowledge assessment tool it was constructed by British Heart Foundation. (2020).** and adjusted by the researcher based on extensive literature review to assess women's knowledge regarding cardiac disease pre- and post teaching program .the questionnaire had **24** questions the first **4** questions asked about cardiac disease definition, signs and symptoms of cardiac disease, grades of cardiac disease , types of cardiac disease , the second **5** questions asked about risk factors that increase risk of developing cardiac disease and what the effect of family history ,being over weight,stress,hypertension and smoking on the risk of developing cardiac disease. The third 5 questions asked about complications and danger time on cardiac disease pregnant woman, the last 10 questions asked about Diagnosis and treatment of cardiac disease.

Scoring System:

The women's answers related to knowledge was scored and calculated. All correct and complete answers were counted **one** score, and all incorrect answers were counted **zero** the total knowledge score were further divided into: from 60% and above considered satisfactory knowledge score and less than 60% considered unsatisfactory knowledge score **(Rizvi et al 2023).**

Tool II: Self-reported practice checklist:

It was adopted from **WHO (2014), (J Am Heart Assoc. 2017**)and modified by the researcher. it contains**: three parts**: **First part** Women's practice regarding informatics aspect of care, which includes many items about; 1) nutrition, 2) exercice, 3) Sexual Activity, 4) Danger signs during pregnancy, 5) Protection from infection and breast feeding**, Second part** contain checklist to Teach women how to give herself Subcutaneous Injection such as (clexane and Heparin), **Third part** contain checklist to Teach women how to assess pitting edema.

Scoring System:

For first part Regarding of women's' "reported practice were scored **(one)** for the "satisfactory reported practices and (**Zero)** for "unsatisfactory" reported practices Summed the items of practices and total score level were divided into the following;. **≥ 50%** if satisfactory practices and **< 50% %** if unsatisfactory practices.for second and third part each done correctly was coded **(one)** score, done incorrectly and not done was coded (**Zero)** score ,Summed the items of practices for second and third part separately and total score level were divided into the following;. **≥ 50%** if satisfactory practices and **< 50% %** if unsatisfactory practices,Summed the items of practices of 1st ,2nd ,3rd part and total score level were divided into the following; **≥ 50%** if satisfactory practices and **< 50% %** if unsatisfactory practices. **(Sabah et al 2018).**

Tool III: Self-reported Attitude on cardiac disease:

It was adopted from **(Rosediani M,2018).**to Assess women's' attitude regarding cardiac disease during pregnancy which includes**(**Willing to exercise, Change eating habit easily, Maintain normal weight, Try to reduce sugar intake, Willingness to take HRT, Increase knowledge about cardiac disease through mass media or electronics**).**

Scoring system:

According to **(likert score)** regarding of women's' "reported attitude was coded (three) for the "agree" and (two) for "Neutral "and (one) for disagree. Summed the items of attitude and total score level divided into the following; >70% was referred as positive reported attitude and < 70% was referred as negative reported attitude

IV: Pregnancy outcomes assessment tool :

It was created from **(Adhikari L, 2018)** was included (9 items). Which was designed to assess maternal outcomes (4 items) and assessment of neonatal outcomes (5 items). assessment for maternal outcomes were included (Gestational age at delivery ,mode of delivery, maternal complications during labour ,post partum complications and maternal death) and assessment for fetal outcomes were included (birth weight, still birth ,Apgar score,congenital anomalies, fetal complication such respiratory distress syndrome and fetal death**(Amanda Owens, 2018).**

Supportive material (Health education guideline Booklet :)

The researcher updated a comprehensive literature review, and then the final result was made into a handout (booklet). That was provided to the woman during the teaching session and was kept it for later use, this booklet was include all necessary information about cardiac disease such as (definition, signs &symptoms, classifications, risk factors, types, complication of cardiac disease, ante-natal follow up, lifestyle such as a healthy diet ,exercise ,rest, stress management, practice and precautions during labour, post-partum period, breast feeding and contraceptive method, checklist to teach woman subcutaneous injection and how to assess pitting edema. It was written in straightforward Arabic and accompanied by various descriptive photographs to improve Cardiac disease women's Awareness and their pregnancy outcomes.

Validity and Reliability:

Five specialists in obstetrics and gynecology and community, as well as nursing professors, piloted the questionnaire to assess its clarity, relevance, comprehensiveness, understanding, applicability, and ease of use. The necessary modifications were done to the tools. To establish reliability, the tools were tested for internal consistency by using using *Cronbach's* alpha test of 0.841, 0.791 and 0.894 for knowledge, practice and attitude tool respectively to check the stability of the internal consistency of the tools.

Administrative design

Before conducting the pilot study and the actual study, official permission and consent were obtained from the dean of the Faculty of Nursing and the Director of Minia university hospital for maternity and child. The research proposal was approved by the ethical committee in the faculty of nursing.

Pilot Study:

The current study tools were evaluated in terms of their clarity, validity, and the amount of time required to be used in a pilot study that was carried out on 10% of pregnant women (six women) in the environment that was just described. The necessary adjustment was carried out after the pilot project findings were analyzed. The pilot sample was incorporated into the primary sample for the investigation.

Data collection Procedure:

The current study was achieved through four phases: preparatory, assessment, implementation, and evaluation.

Preparatory phase

- This phase pertains to the construction of the study tools and production of the teaching program by the researcher based on an extensive review of current related literature. It was written in the Arabic language. The teaching program included the necessary information related to cardiac disease and it is care.
- The general objective of the teaching program is to improve women's Awareness and their pregnancy outcomes. Regarding cardiac disease. Teaching aids that were used include visual materials such as photos and a personal laptop, dolls were used. Booklet was prepared and written in simple Arabic language supported by illustrative pictures used to facilitate the process of teaching after return at home.

Assessment phase: (pre- test):

- After official permission was obtained from the ethical research committee of the faculty of Nursing, participants' patients were recruited from ante natal inpatient department and ante natal outpatient clinic at Minia University for maternity and children.
- During the assessment phase, the researcher begin the first meeting with women at ante natal inpatient department and ante natal outpatient clinic to introduce herself, greeted each women, explained the aims, natural, duration, and activities of the study ,They were informed that participation in this study was voluntary, and they had the right to withdraw at any time and

taken oral approval of patients to share in the study.

- After gaining women's acceptance to engage in the study, the researcher gave them an overview and clarified the assessment tool question.
- Structured interviewing questionnaire was filled by the researcher to assess demographic characteristics of the patients and past, medical history and assessed women's knowledge regarding cardiac disease (Tool I) the time taken to fill the tool I ranged from 20-25 minutes. After that, the researcher assess Women's practice regarding informatics aspect of care and subcutaneous injection, assessing pitting edema, (Tool II) after that, the reaeacher assess the women attitude regarding cardiac disease(Tool III) (Pre-test).the time taken to fill the tool (Tool II) and (Tool III) ranged from 20-25 minutes.

Implementation phase (conducting education program)

- The researcher collected the sample through three days per week in two shifts (morning and evening) from the beginning of the study. The study was carried out in the period from January 2023 through October 2023. The researcher attended to ante natal inpatient department and ante natal outpatient clinic. at 9:00 a.m., to 1:00 p.m.
- In this phase, after assessing the women's knowledge practice, and Attitude (pre-test), The teaching program of this study was implemented through **five** sessions for each group (1 to 2 pregnant women) **two** sessions for knowledge and **three** sessions for practice and attitude. The teaching program was applied individually for each patient on **five** sessions.
- **The first session** ranged between 30-40 minute, the researcher explain the Arabic booklet. Regarding explanation the concept , causes and risk factors; different types, complications of cardiac disease during pregnancy.
- **The second session** ranged between 30-40 minute, the researcher explain follow up and antenatal schedule visits ,diagnosis and management of cardiac disease during pregnancy.
- **The third session** the researcher used power point videos ,dolls , and pictures to teach women how to inject her self anticoagulation drugs such as calexane or heparin ampules
- **The fourth session** the researcher used power point videos and doll and pictures to teach women how to measure or assess pitting edema .
- **The fifth session** for attitude, the last three session for practice and attitude, length of each session different according to women response lasted for around 60-90 minutes.
- The face-to-face approach accomplishes the purposeful aim and gives the women the chance to pose questions, have discussions, and achieve a high degree of understanding.
- Different teaching methods were used as small group discussion, demonstration & re-demonstration on simulation mode (leg doll, Abdominal doll), and using videos. Also, an Arabic booklet with pictures was given to each participant. Motivation and reinforcement during a session were used to enhance women's learning At the end of the sessions, (10 minutes) were assigned for the pregnant women to make sure the women received the most benefits possible by asking any questions and getting feedback..

An evaluation phase (post- test):

Four time of evaluation were done for each woman:

- The first time of evaluation (pre-test) was done before the implementation of the teaching program by using tools I,II and tool III to assess Awareness of the women regarding cardiac disease. For study and control group.
- Second-time of evaluation (post-test) done immediately after implementation of the educational program for study group using tool I (part three),tools II (part two and three) and tool III) to evaluate impact teaching program on the women's awareness regarding cardiac disease.
- Third-time of evaluation (post-test) for study group done after two months by using tool I (part three),tools II and tool III) to evaluate impact teaching program on the women's awareness regarding cardiac disease.
- Fourth time of evaluation was done after delivery for study and control group by using IV tool to evaluate impact teaching program on the women's pregnancy outcomes.
- The impact of the health education program was done by comparing the pre-test and post-test conducted immediately and after two months and outcomes after delivery to assess Awareness of the women regarding cardiac

disease and their pregnancy outcomes.

Ethical consideration:

After explaining the study's significance, nature, and purpose to the pregnant women willing to participate, the study is given the go-ahead officially. All participants have the right to decline to participate and/or withdraw from it at any time without giving a reason, privacy was considered during data collection, and no health risks were present. Participants were assured that all their information was kept in the strictest confidence

Statistical analysis

Organization, tabulation, presentation and analysis of data were performed using SPSS, version 26 statistical package software (IBM; Armonk, New York, USA). Normality of the data was tested using the Shapiro-Wilk tests.

Numerical data were presented as mean and standard deviation (SD). Student t-test was used for statistical analysis of parametric data. Mann-whitney test was used for non-parametric data analysis Categorical data were presented as numbers and percentages, chi-squared test or fisher exact test were used for statistical analysis. Correlations were made to the study for comparing numerical variables. The level of significance adopted for this study is $P < 0.05$.

Results

Table (1): Distribution of study samples related to their socio-demographic characteristics.

Socio-demographic characteristics (part I)		Study group (N= 30)		Control (N=30)		P value
		N	%	N	%	
Age	Less than 25	6	(20%)	4	(13.3%)	0.815
	25-35	19	(63.3%)	22	(73.3%)	
	More than 35	5	(16.7%)	4	(13.3%)	
Residence	Urban	6	(20%)	11	(36.7%)	0.152
	Rural	24	(80%)	19	(63.3%)	
Educational level	Illiterate	7	(23.3%)	13	(43.3%)	**0.027****
	Read and write	1	(3.3%)	5	(16.7%)	
	Diploma	16	(53.3%)	10	(33.3%)	
	University education	6	(20%)	1	(3.3%)	
	Others	0	0%	1	(3.3%)	
Mother occupation	House wife	29	(96.7%)	29	(96.7%)	>0.999
	Employed	1	(3.3%)	0	0%	
	Unemployed	0	0%	1	(3.3%)	

Analyzed by chi square test **fisher test ¡ mann whitney test
*p value is considered statistically significant at <0.05

Table (1): shows that 63.3% of study group and 73.3% of controls were aged from 25-35 years. 80% of study group & 63.3% of controls lived in rural areas. 96.7% of study group &96.7% of controls were house wives. There is statistically significant difference between study group and controls as regarding educational level ($p<0.005$). The majority of study group (53.3%) have diploma while the majority (43.3%) of controls were illiterate.

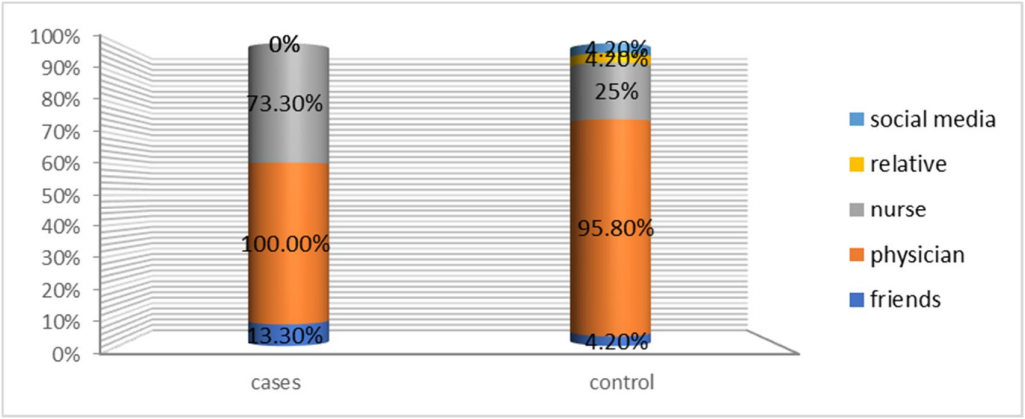

Fig (1): Source of information among study group and controls about cardiac disease.

Fig (1): shows that friends were the source of knowledge in 13.3% of study group &4.2% of controls, from physicians in 100% of study group & 95.8% of controls, from nurses in 73.3% of study group & 25% of controls, from relatives; only in 4.2% of controls. None of the study group compared to 4.2% of controls knew from social media.

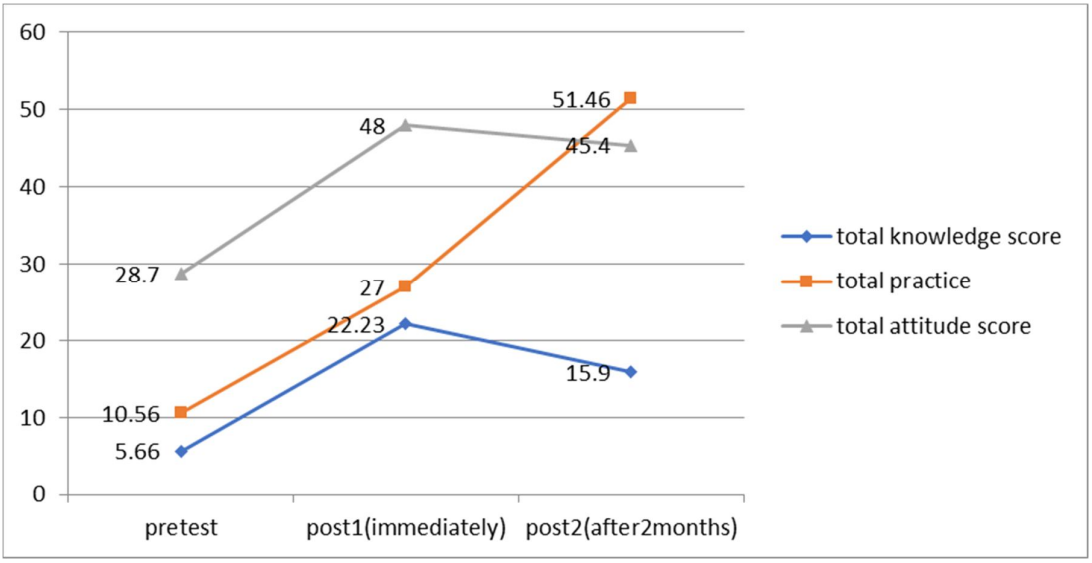

Fig (2): The effect of the teaching program on total knowledge, practice & attitude score among the studied women

Fig (2): shows that the teaching program was effective in increasing the scores of knowledge, attitude and practice among the studied women although the knowledge and attitude scores declines after 2 month, they remained satisfactory compared to the pretest scores.

Table (2): The relation between the socio-demographic characteristics of the studied women (study group) and the total knowledge, practice &attitude score pre-program

socio-demographic characteristics	Total knowledge score		Total attitude score		Total practice Score	
	Mean ±SD	P value	Mean ±SD	P value	Mean ±SD	P value
Age						
<25	6.16±2.48	0.787	27.67±4.36	0.487	4.5±3.01	0.513
25-35	5.63±2.52		28.26±6.42		2.89±2.94	
>35	5.2±2.58		31.6±6.91		2.6±2.79	
Residence						
Urban	7.83±3.76	0.093	29.33±4.03	0.705	4.16±3.12	**0.029***
Rural	5.12±1.72		28.54±6.58		2.91±2.87	
Educational level						
Illiterate	4.57±2.07		29 ±6.13		1.71±2.42	
Read and write	5±0	0.192	35±0		9±0	
Diploma	5.37±1.96		27.62±6.43	0.572	2.62±2.33	**0.042***
University	7.83±3.25		30.16±5.7		5.33±3.07	
Others	0±0		0±0		0±0	
Mother occupation						
House wife	5.58±2.45		28.37±5.95		3.06±2.91	
Employed	8±0	0.243	38±0	0.118	6±0	0.258
unemployed	0±0		0±0		0	

* Analyzed by independent t- test and anova test

*p value is considered statistically significant at <0.05

Table (2): Reveals that there is a relation between the educational level of the mother and the total practice score in the pretest stage (p<0.042), the higher the educational level of the mother, the higher become the practice score. Also, there is a relation between the residence and the total practice score (p<0.029), urban residence is associated with high practice score.

Table (3): Distribution of the women regarding their pregnancy (maternal) outcomes among study and control groups

Pregnancy outcomes		Study group N%	Control N%	P value
Maternal outcome				
Gestational age at delivery	(>37 weeks)	21(70%)	4(13.3%)	**<0.001***
	(<37 weeks)	9(30%)	26(86.7%)	
Mode of delivery	Normal	20(66.7%)	30(100%)	**0.001***
	Instrumental	0	0	
	Cesarean section	10(33.3%)	0	
	Emergency C section	0	0	
Maternal complications during Labor	No complication	27(90%)	2(6.7%)	**<0.001****
	Heart failure	1(3.3%)	8(26.7%)	
	arrhythmia episode	1(3.3%)	11(36.7%)	
	Pulmonary embolism	1(3.3%)	0	
	Hypertensive crisis	0	9(30%)	
	Mitral stenosis	0	0	
	Other	0	0	
Post-partum Maternal complications	No complication	25(83.3%)	2(6.7%)	**<0.001***
	Post-partum hemorrhage	5(16.7%)	28(93.3%)	
	Maternal death	0	0	
	Others	0	0	

* Analyzed by chi square test **fisher test

*p value is considered statistically significant at <0.05

Table (3): illustrates that at the nursing teaching program was effective in improving the maternal outcomes and reducing the incidence of preterm labor, 70% of the gestational age of the study group was >37 week while 86.7% of the controls were <37 week. 66.7 % of the study group had normal vaginal delivery compared to 100% of the controls. The program was effective in reducing the maternal complications during the labor, 3.3% only had heart events, 3.3% had arrhythmia and only 3.3% had pulmonary embolism while in the control group 36.7% of the patients had life threatening arrhythmia.16.7% of study group had post-partum hemorrhage compared to 93.3% of the controls and there were highly statistically significant differences between the study and control groups as P – value**<0.001***.

Table (4): Distribution of the women regarding their pregnancy (Fetal) outcomes among study and control groups

Pregnancy outcomes		Study group N%	Control N%	P value
Fetal outcome				
Birth weight (g) at delivery	<1000	2(6.7%)	6(20%)	**<0.001****
	1000–1500	1(3.3%)	22(73.3%)	
	1500–2500	10(33.3%)	2(6.7%)	
	>2500	17(56.7%)	0	
Low Apgar score	Low	12(40%)	25(83.3%)	**0.001***
	Normal	18(60%)	5(16.7%)	
Fetal morbidity	No morbidity	19(63.3%)	1(3.3%)	**<0.001****
	RDS	11(36.7%)	28(93.3%)	
	anomalies	0	1(3.3%)	
stillbirth	No	30(100%)	28(93.3%)	0.492
	yes	0	2(6.7%)	
Neonatal death	No	30(100%)	27(90%)	0.237
	yes	0	3(10%)	

* Analyzed by chi square test **fisher test *p value is considered statistically significant at <0.05

Table (4) :illustrates that the nursing program was effective in improving the fetal outcome and reducing the fetal mortality, 56.7% of the birth weight of the delivered babies of the study group were >2.5kg while 73.3% of the controls were 1- 1.5kg there were highly statistically significant differences between the study and control groups as P – value<0.001*.40% of the babies of the study group compared to 83.3% of

control were considered with low Apgar score. 36.7% of the babies of the study group had RDS compared to 93.3% of the controls.

Table (5): Correlation between knowledge, total practice and attitude scores in pre-test stage

Factor	Practice score	
	r	p
Knowledge score	0.533	0.002*
Attitude score	0.197	0.296

*p value is considered statistically significant at <0.05

Table (5): Represents that there is moderate positive correlation between knowledge score and practice score in pre-test stage(r=0533, p=0.002).

Table (6): Correlation between knowledge, total practice and attitude scores in post-test2 stage

Factor	practice	
	r	p
Attitude score	0.555	0.001*
Knowledge score	0.119	0.531

*p value is considered statistically significant at <0.05

Table (6): **shows** that there is moderate positive correlation between attitude score and practice score in post-test2 stage (r=0.555,p=0.001)

Table (7): Correlation between total knowledge, total practice and total attitude scores of the study group after delivery.

Factor	practice	
	r	p
Attitude	0.540	0.002*
Knowledge	0.124	0.514

*p value is considered statistically significant at <0.05

Table (7): shows that after applying labor and post-partum practices there is a statistically significant moderate positive correlation between total practice score and total attitude score for the study group (r=0.540, p=0.002*)

Discussion

The current study aimed to evaluate the Impact of the teaching Program on Cardiac disease women's Awareness and their pregnancy outcomes. The impact of cardiovascular diseases on pregnant women is a growing concern, as these conditions pose significant risks to both maternal and fetal. Health Education and awareness programs have the potential to play a critical role in improving the knowledge, practice, attitude and health outcomes for these women.

Regarding the socio-demographic characteristics of the women in this study, it was found that less than two-thirds of the study group and less than three-quarters of the control group were aged 25-35 years. This finding aligns with **Allen-Davis et al. (2023)**, who investigated pregnancy outcomes among women with cardiac disease and reported a higher incidence of pregnancy-related cardiac complications in this age range. They attributed this to both increased reproductive activity and elevated cardiovascular risk. Furthermore, **Metwally, et al. (2018)** who agree with the current result and revealed that over half of pregnant mothers within this age group .However, **Gahlot, Singh, and Pandey (2016),** in their study of pregnancy outcomes in women with heart disease at a tertiary referral center in Northern India, observed a greater prevalence of cardiac conditions in older pregnant women. These contrasting findings suggest that regional healthcare availability and lifestyle factors may contribute to age-related differences in pregnancy-related cardiac risk.

Additionally, a significant proportion of participants in both the study and control groups were housewives, a result consistent with the findings of **Mehrnoush et al. (2023),** who explored urban-rural differences in the cardiac disease pregnancy-related adverse outcomes. Their research indicated that housewives, particularly those in rural settings, face heightened risks of adverse pregnancy outcomes. This suggests that socio-economic factors, particularly in rural areas, play a

pivotal role in health-seeking behaviors and access to prenatal care. The rural residence of many participants in this study further underscores the limited access to specialized healthcare, particularly for managing pregnancy complicated by cardiac conditions.

Educational levels also revealed significant differences between the study and control groups. A larger proportion of participants in the study group held a diploma, while a higher percentage of the control group was illiterate. This finding is consistent with the research by **Mellon, Schiller, Nelson, and Stohl (2020),** who reported that higher education levels are associated with increased awareness of pregnancy-related cardiac risks and better health-seeking behaviors. Education thus plays a critical role in shaping health outcomes during pregnancy, particularly in the context of managing pre-existing conditions such as heart disease.

Concerning the sources of information about cardiac disease among pregnant women in this study, it was found that physicians were the primary source of knowledge for both the study group and the control group. The entire study group, along with the majority of the control group, relied on physicians for information regarding cardiac conditions. This finding reflects the well-established role of physicians as the most trusted source of medical advice, particularly in high-risk pregnancies. It underscores the critical importance of physician-patient communication in the management of cardiac health during pregnancy. This result is consistent with findings from **Mehta et al. (2020),** who reported that over 90% of pregnant women preferred consulting physicians for information related to cardiac conditions during pregnancy.

In addition, this finding is supported by **Park et al. (2021),** who emphasized that while physicians are the primary source of cardiac health information, nurses also play a vital role in raising awareness about maternal cardiac conditions, particularly in clinical settings. However, this trend contrasts with findings by **Gleeson, Craswell, and Jones (2019),** who noted the growing role of social media as a source of pregnancy-related information. Although social media is emerging as a resource, it remains secondary to professional healthcare advice, especially for complex conditions like cardiac disease.

Concerning the overall impact of the teaching program on the total knowledge, practice, and attitude scores of the studied pregnant women, the current study demonstrated a highly statistically significant improvement in all three areas post-intervention ($p < 0.001$). This finding echoes the results of **Zhang et al. (2023),** who reported significant improvements in knowledge, attitude, and self-care management among pregnant women with cardiac conditions following an educational program. Their research reinforced the idea that increased knowledge and skills contribute directly to more positive attitudes and better health practices.

The present study's findings are also supported by the work of **El-Bana and Ali (2020),** who examined the effect of an educational intervention on pregnant women's knowledge and self-care practices. Their study similarly demonstrated significant improvements in knowledge and practice scores post-intervention, affirming the effectiveness of targeted health education in empowering pregnant women to manage chronic conditions.

In contrast, **Easter et al. (2020),** found minimal changes in knowledge levels despite educational efforts, suggesting that external factors such as cultural beliefs and personal experiences may play a significant role in shaping health behaviors. This discrepancy indicates the complexity of educational interventions and the importance of considering contextual factors that may influence their success in different populations.

The current study explored the relationship between the socio-demographic characteristics of the pregnant women in the study group and their total knowledge, practice, and attitude scores regarding cardiac disease before the educational intervention. A significant relationship was found between the educational level of the mothers and their total practice scores in the pretest stage ($p = 0.042$), with higher educational levels correlating with better practice scores. Additionally, there was a significant association between the participants' residence and their practice scores ($p = 0.029$), with urban dwellers showing higher practice scores compared to rural participants. These findings suggest that socio-demographic factors, particularly education and residence, play a crucial role in shaping health practices related to managing cardiac conditions during pregnancy.

This result aligns with the study by **Bratcher-Rasmus et al. (2024),** who examined the influence of heart disease risk factor knowledge and social support in African American women. Their findings highlighted the significant impact of demographic variables such as education and

residence on health practices, similar to the correlation observed in the current study. Similarly, **Van Hagen et al. (2018)**, found a strong correlation between educational level and health practices in pregnant women with heart disease, emphasizing that women with higher educational attainment were more likely to engage in effective health practices.

However, contrasting findings were reported by **Mehta et al. (2020),** who did not find a significant association between educational level and health practices among pregnant women with cardiac conditions. Their research suggested that while education may be an important factor, other variables such as health literacy, access to healthcare, and individual motivation might also influence health behaviors, highlighting the multifaceted nature of health practices.

In terms of pregnancy outcomes between the study and control groups, the present study demonstrated the effectiveness of the nursing teaching program in improving maternal outcomes and reducing the incidence of preterm labor. Less than three-quarters of the study group reached a gestational age of over 37 weeks, while most of the control group had preterm births at less than 37 weeks. Additionally, two-thirds of the study group had normal vaginal deliveries compared to 100% of the control group having preterm deliveries, with statistically significant differences between the groups ($p < 0.001$). These findings suggest that the nursing education program significantly enhanced maternal outcomes, likely due to increased awareness, self-management skills, and better pregnancy navigation in women managing their cardiac conditions.

These results are consistent with the findings of **Ye and Zhu (2024),** who examined the effect of nursing educational interventions on maternal outcomes in women with high-risk pregnancies, including cardiac disease. Their study similarly demonstrated that women who received structured nursing education experienced significantly better maternal outcomes, including reduced rates of preterm labor and fewer complications such as arrhythmia and postpartum hemorrhage. The authors emphasized the critical role of education in helping women manage their cardiac conditions during pregnancy.

Moreover, the results agree with **Gahlot et al. (2016),** who found that nursing teaching programs significantly improved maternal outcomes for women with cardiac disease. Their study reported a ssubstantial reduction in adverse outcomes, such as preterm labor and life-threatening maternal complications, in the intervention group. These consistent findings across studies underscore the importance of structured educational interventions in promoting positive maternal outcomes and improving the management of cardiac conditions during pregnancy.

The current study demonstrated that the nursing educational program was effective in improving fetal outcomes and reducing fetal mortality. More than half of the babies delivered in the study group had a birth weight greater than 2.5 kg, compared to less than three-quarters of the control group, whose infants weighed between 1 and 1.5 kg. The difference between the study and control groups was statistically significant ($p < 0.001$). Additionally, two-fifths of the babies in the study group had low Apgar scores, in contrast to the majority of the control group. Moreover, more than one-third of the study group's babies experienced respiratory distress syndrome (RDS) compared to the majority of the controls.

These findings are consistent with the study by **Khushboo et al. (2018),** which showed that women who participated in structured nursing programs had babies with higher birth weights and significantly lower rates of neonatal complications, including low Apgar scores and RDS. Similarly, **Cantarutti, Franchi, Monzio Compagnoni, Merlino, and Corrao (2017)**, found that maternal education positively influenced neonatal outcomes, leading to higher birth weights and fewer complications such as RDS.

In examining the correlation between knowledge, total practice, and attitude scores regarding cardiac disease among pregnant women in the pre-test stage, this study found a moderate positive correlation between knowledge and practice scores ($r=0.533$, $p=0.002$). This finding is consistent with the results of **Gooda, Ahmed, Mohamed, and Mohammed (2020),** who studied the "Effect of Nursing Care Guideline on Nurses' Knowledge and Practice about Pregnant Women Suffering from Heart Disease" and reported a similar moderate-to-strong positive correlation between knowledge and practice scores. This underscores the importance of knowledge acquisition as a critical factor in improving health practices among pregnant women with cardiac conditions.

The correlation between knowledge, practice, and attitude scores was also examined in the post-test 2 stage. The study showed a moderate positive correlation between attitude and practice

scores (r=0.555, p=0.001), suggesting that an increase in positive attitudes towards cardiac health is associated with improved practice during the postpartum period. This finding aligns with research by **Koohi and Khalili (2020),** which highlighted a similar relationship, reinforcing that enhanced knowledge and positive attitudes are linked to healthier behaviors during pregnancy. Moreover, de **Oliveira Rodrigues et al. (2022)**, found that women who developed positive attitudes toward their health condition were more motivated to adhere to recommended practices, particularly in the later stages of pregnancy and postpartum. This demonstrates the far-reaching impact of educational interventions in fostering both knowledge and positive attitudes, leading to improved maternal and infant health outcomes.

Further analysis of the correlation between total knowledge, total practice, and total attitude scores regarding cardiac disease after delivery revealed a statistically significant moderate positive correlation between total practice and total attitude scores (r=0.540, p=0.002*). This result is in agreement with **Hazavehie, Lotfinik, Moeini, and Roshanaei (2018),** who studied the effect of education based on the health belief model on postpartum care for cardiac disease and found a similar positive correlation. Their study highlighted that improved attitudes facilitated the implementation of effective health practices, particularly during the postpartum period. This suggests that fostering positive attitudes through educational programs can have a lasting effect on promoting healthier behaviors and practice in new mothers.

Reseach Gap

The current body of research on awareness level among pregnant women with cardiac disease remains markedly limited, with insufficient data correlating this awareness level to pregnancy outcomes. Existing studies often fail to adress demographic-specific awareness, and there is notable lack of longtudinal research tracking awareness throughout the stages of pregnancy

Conclusion

Based on the present study findings, the study concluded that:

Implementation of teaching program for pregnant women with cardiac disease was effective and showed significant improvements in the overall pregnant women's Awareness about cardiac disease, As well as there was a statistically significant difference in pregnant women knowledge ,practice and attitude pre, and post implementation of teaching program. Also, there was statistically significant improvements in pregnancy outcomes among the study group after applying teaching program compared to the control group.

Recommendations

The present study's findings suggest the following recommendations:

- Giving a health teaching handout about cardiac disease and its related care on discharge plans, particularly for those who are illiterate. to raise the awareness of cardiac disease women regarding these issues.
- Providing a training oriented program about cardiac disease and it's related care for women before decision of pregnancy and give them help and assistance to take caring for herself and her newborn
- Special Standardized Booklet regarding cardiac disease and its management should be available in the antenatal department.
- Continue the educational program for pregnant women about cardiac disease and its management to reduce maternal and neonatal mortality and morbidity.
- Continue the educational program for nurses about cardiac disease and it's related care.
- Educate the mothers on the importance of prenatal care visits and follow- up. Therefore, any problems can be identified early and treated.

For further research

- More researches should be applied in other settings to generalize the findings.

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