

Effect of An Educational Program on Pregnant Women's Knowledge Regarding Possible Side Effects of Drugs Used During Pregnancy on Fetus and Mother

Hagar Kamal Masoud¹, Heba Ahmed Mohamed², Hanan Elzeblawy Hassan^{3,*}

¹Lecturer of Maternal & Newborn Health Nursing, Faculty of Nursing, Beni-Suef University, Egypt

²MNS Student in Maternal and Newborn Health Nursing, Faculty of Nursing, Beni-Suef University, Egypt

³Professor of Maternal and Newborn Health Nursing, Faculty of Nursing, Beni-Suef University, Egypt

*Corresponding author: nona_nano_1712@yahoo.com

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Abstract Background: Self-medication, as defined by the WHO, involves individuals treating their own health issues and has emerged as a significant public health concern worldwide, addressing billions of health issues each year. **Aim:** The current study was conducted to evaluate the effect of an educational program on pregnant women's knowledge regarding possible side effects of drugs used during pregnancy on the fetus and mother. **Subjects and Methods: Design:** A quasi-experimental design was used. **Sample and Settings:** A convenient sample of 358 pregnant women was used at outpatient clinics at Beba Hospital, affiliated with the Ministry of Health, Beni-Suef Governorate. **Tools:** Tool 1: Women's knowledge regarding possible side effects of teratogenic drugs used during pregnancy on the fetus questionnaire sheet. Tool 2: Women's knowledge regarding possible side effects of teratogenic drugs used during pregnancy on the mother questionnaire sheet. **Results:** It reveals that 72.8% & 51.8% of the studied sample delayed marriage or childbearing to complete their studies or work. After program implementation, knowledge improved from 8.62 ± 3.78 to 9.21 ± 2.24 . Females' attitude toward oocyte preservation after program implementation improved to 48.52 ± 4.66 compared to 36.83 ± 4.87 preprogram. Working females' intention regarding oocyte preservation after program implementation is 21.89 ± 2.15 as compared to 19.74 ± 2.98 preprogram. Using the chi-square test revealed highly significant statistical differences between females' overall knowledge, attitude, and intentions pre- and post-program implementation ($P=0.000$). **Conclusion:** Based on the findings of the present study, it can be concluded that after program implementation, the studied female workers at Beni-Suef University had marked improvement in knowledge, attitude, and intention regarding oocyte cryopreservation compared to before program implementation. **Recommendations:** Advocacy campaigns on safe pregnancy medication use should utilize interactive workshops, posters, and digital resources, emphasizing educational backgrounds and teratogenic medication safety for prenatal care and community health initiatives.

Keywords: An Educational Program, Women's Knowledge, Side Effects, Drugs, Fetus, Mother

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1. Introduction

Teratogenicity refers to the ability of a substance, agent, or factor to cause developmental abnormalities or birth defects in a developing embryo or fetus when a pregnant individual is exposed to it. Teratogens disrupt normal development, leading to structural or functional anomalies in the baby. Teratogenicity refers to the capacity of certain substances, infections, or environmental exposures to cause congenital abnormalities or birth defects in a developing fetus [1,2,3,4].

When a pregnant individual is exposed to teratogenic agents during pregnancy, especially during the critical

periods of embryonic development, these agents can interfere with normal growth and organ formation, leading to structural or functional defects [5]. Teratogenic drugs disrupt normal fetal development through mechanisms such as: Interference with cell division, differentiation, or migration. Disruption of DNA synthesis and repair. Alteration of blood flow to the placenta or fetus [6].

Antihypertensive drugs also present risks, such as angiotensin-converting enzyme inhibitors, which may cause oligohydramnios and renal failure, and angiotensin II receptor antagonists, which are associated with renal dysplasia [7]. In the case of anticonvulsants, both phenytoin and valproic acid can lead to facial dysmorphism, neural tube defects, and congenital heart defects in the fetus [8]. Psychiatric medications also carry

risks, such as lithium, which may cause cardiac anomalies, including Ebstein's anomaly [9].

Isotretinoin is associated with facial anomalies, congenital heart defects, and neural tube defects [10]. Additionally, warfarin has been linked to skeletal abnormalities, while thalidomide may cause amelia or meromelia and cardiac diseases [11]. Another medication, diethylstilbestrol, has been associated with clear cell adenocarcinoma of the vagina in female offspring exposed to it [12].

As some drugs have teratogenic effects. Women are encouraged to avoid smoking, alcohol, and recreational drugs, all of which are known to harm fetal development. Nutritional deficiencies, particularly folic acid, are addressed by recommending supplements to reduce the risk of neural tube defects like spina bifida [13,14,15,16,17].

Women planning a pregnancy should schedule a consultation with a healthcare provider to identify and mitigate potential risks. This includes reviewing medical history, chronic conditions, and current medications for teratogenic potential. Good medication control for maternal metabolic diseases is crucial to minimize risks for the fetus. This includes maintaining appropriate dosages of medications for conditions such as diabetes and hypertension, which can have adverse effects on fetal development if not properly controlled. Together, these preventive measures play a crucial role in promoting a healthy pregnancy and reducing congenital malformations [18].

Environmental and occupational hazard mitigation is vital for reducing exposure to teratogens. Therefore, pregnant women should be aware of the association between these environmental hazards during pregnancy, such as household air pollution, cigarette smoking, and pesticides, and pregnancy outcomes (birth weight, preterm birth, and birth defects). Women should limit contact with harmful chemicals such as pesticides, solvents, and heavy metals, which are commonly found in certain workplaces or environments. Promoting clean energy and improved and efficient stoves at the household level will help to reduce household air pollution [19].

Pregnant women should avoid exposure to harmful chemicals and toxins, such as pesticides, heavy metals, solvents, and radiation. These substances can interfere with fetal growth and lead to developmental abnormalities. Employers have a responsibility to provide a safe working environment for pregnant employees, including minimizing exposure to teratogens and offering protective equipment. At home, women should be cautious about household cleaning agents, lead-based paints, and other potentially harmful substances [20].

Nurses serve as essential advocates for patients and families affected by teratogenic exposures. One of their primary roles is to ensure that patients have access to accurate, evidence-based information regarding environmental causes of congenital malformation, including maternal infection, maternal age, maternal drug intake during the critical period of embryogenesis, and substances such as caffeine, nicotine, commonly used medicines, maternal nutritional and health status, maternal exposure to hazardous waste, and maternal alcohol intake during early pregnancy. Moreover, parental race, parental socioeconomic status, hyperthermia during early

pregnancy, and maternal diabetes [12,21,22].

Genetic counseling and testing are also part of preconception care. Couples may receive counseling and, if necessary, undergo genetic testing to assess the risk of inherited genetic disorders or explore family planning options. This allows them to make informed decisions about their reproductive choices and take appropriate steps to mitigate potential risks. Genetic counselors can help prospective parents understand their risk factors. These interventions can provide early information about the health of the fetus and help guide decision-making. Genetic counselors can evaluate the risk of inherited conditions and discuss options for carrier screening and prenatal testing. For couples identified as carriers of specific conditions, assisted reproductive technologies like preimplantation genetic diagnosis may be recommended to select embryos without the genetic anomaly [14].

2. Aim of the Study

The current study was conducted to evaluate the effect of an educational program on pregnant women's knowledge regarding possible side effects of drugs used during pregnancy on the fetus and mother.

3. Research Hypothesis

Pregnant women's knowledge regarding possible side effects of drugs used during pregnancy on the fetus and mother will be improved after implementation of the educational program.

4. Subject and Method

Research design:

Quasi-experimental research design (pre/post-test) was utilized to achieve the aim of the current study.

Subjects and Settings:

A convenient sample of 358 pregnant women was used by the outpatient clinics at Beba Hospital, which is affiliated with the Beni-Suef Governorate's Ministry of Health.

Tools of data collection:

Tool 1: Women's knowledge regarding possible side effects of teratogenic drugs used during pregnancy on the fetus questionnaire sheet:

This tool was developed by the researcher after reviewing the related literature to assess women's knowledge regarding teratogenic medications' side effect can affect fetus as fetal growth retardation, intrauterine death, chromosomal abnormalities, and visible malformations in subsequent ages.

Scoring system:

Total knowledge scores were calculated from 4 questions, each worth 4 points. Correct answers received 1 point, while incorrect or "don't know" responses received 0. Mean scores were derived by summing points and dividing by the number of questions, expressed as percentages. A score of 50% or more (≥ 2 points) indicated adequate knowledge, whereas a score below 50% (< 2

points) indicated inadequate knowledge.

Tool 2: Women's knowledge regarding possible side effects of teratogenic drugs used during pregnancy on the mother questionnaire sheet:

This tool was developed by the researcher after reviewing the related literature to assess women's knowledge regarding teratogenic medications' side effect can affect mother as abortion, uterine contraction, bleeding, postpartum depression, and loss of memory

Scoring system:

Total knowledge was assessed using five questions, each worth 5 points, with correct answers scoring 1 point and incorrect or uncertain answers scoring 0. Mean scores were calculated as percentages, where a score of 60% or higher (≥ 3 points) indicated adequate knowledge, and below 60% (< 3 points) indicated inadequate knowledge.

Supportive material:

The educational booklet, created in simple Arabic, aims to raise awareness among women regarding teratogenic medications during pregnancy. It offers guidance on proper medication use, identifies common teratogenic drugs like Imodium, and discusses congenital anomalies such as cleft lip and palate, providing crucial information on their impacts on the health of pregnant women.

Fieldwork:

The study involved assessment, planning, implementation, and evaluation, collecting data through interviews, questionnaires, and interviews with pregnant women. An educational booklet was created, and data analysis was performed.

5. Results

Table 1. Percentage distribution of the studied pregnant women's knowledge regarding to the possible side effects of drugs used during pregnancy on fetus (n=358)

The possible side effects of drugs on fetus	Pretest				Posttest				X ²	p value
	Correct		Incorrect		Correct		Incorrect			
	No.	%	No.	%	No.	%	No.	%		
Fetal growth retardation	155	43.3	203	56.7	305	85.2	53	14.8	5.879	0.015*
Intrauterine death	132	36.9	226	63.1	284	79.3	74	20.7	5.292	0.021*
Chromosomal abnormalities	145	40.5	213	59.5	283	79.1	75	20.9	7.537	0.006**
Visible malformations in subsequent ages	156	43.6	202	56.4	294	82.1	64	17.9	5.170	0.023*
Total (mean±SD)	1.642±1.200				3.257±0.929				4.395	0.036*

* Statistically significant at $p \leq 0.05$ ** High statistically significant at $p \leq 0.01$

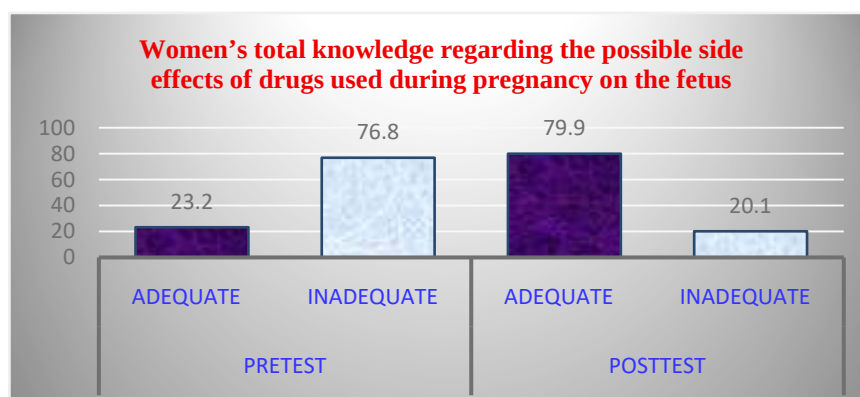


Figure 1. Women's total knowledge regarding the possible side effects of drugs used during pregnancy on the fetus

Table 1 reveals that there was a statistically significant improvement during the posttest among the studied pregnant women regarding the possible side effects of drugs used during pregnancy on the fetus compared with the pretest, and it was noticed that 43.3% & 43.6% of the studied pregnant women had correct knowledge regarding fetal growth retardation and visible malformations in subsequent ages during the pretest, which improved in the posttest to become 85.2% & 82.1% of women, respectively.

Figure 1 shows that it was noticed that 23.2% of the studied pregnant women had an adequate level of total knowledge regarding the possible side effects of drugs used during pregnancy on the fetus during the pretest, which improved in the posttest to become 79.9% during the pretest.

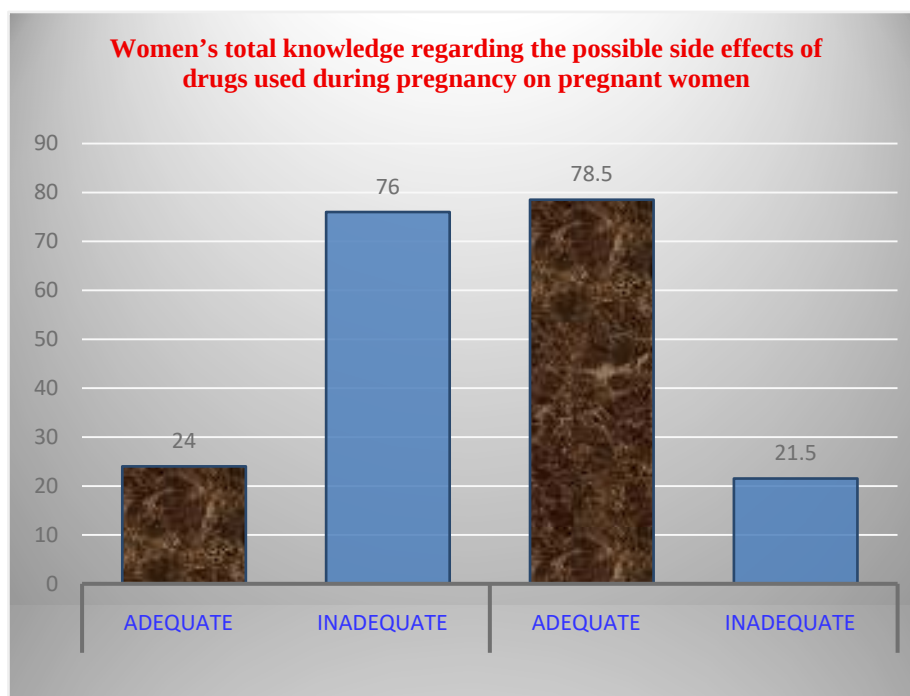
Table 2 shows that there was a statistically significant improvement during the posttest among the studied pregnant women regarding the possible side effects of drugs used during pregnancy on pregnant women compared with the pretest, and it was noticed that 30.4% of the studied pregnant women had correct knowledge regarding bleeding during the pretest, which improved in the posttest to become 74% of women. Also, 66.2% of women had incorrect knowledge regarding postpartum depression, which improved posttest to become 17.3% of women.

Figure 2 shows that there it was noticed that 24% of the studied pregnant women had an adequate level of knowledge regarding the possible side effects of drugs used during pregnancy on pregnant women during the pretest, which improved in the posttest to become 78.5% during the pretest.

Table 2. Percentage distribution of the studied pregnant women's knowledge regarding to the possible side effects of drugs used during pregnancy on pregnant women (n=358)

possible side effects of drugs on pregnant Women	Pretest				Posttest				X ²	p value
	Correct		Incorrect		Correct		Incorrect			
	No.	%	No.	%	No.	%	No.	%		
Abortion	144	40.2	214	59.8	300	83.8	58	16.2	7.092	0.008**
Uterine contraction	128	35.8	230	64.2	270	75.4	88	24.6	6.161	0.013*
Bleeding	109	30.4	249	69.6	265	74.0	93	36.0	11.951	0.002**
Postpartum depression	121	33.8	237	66.2	296	82.7	62	17.3	8.471	0.005**
Loss of memory	142	39.7	216	60.3	250	69.8	108	30.2	15.368	0.000**
Total (mean±SD)	1.798±1.105				3.857±1.296				4.793	0.029*

* Statistically significant at $p \leq 0.05$ ** High statistically significant at $p \leq 0.01$

**Figure 2.** Women's total knowledge regarding the possible side effects of drugs used during pregnancy on pregnant women

5. Discussion

According to the World Health Organization (WHO), self-medication is the process of medicating oneself to cure self-identified ailments or illnesses. Medication obtained without a prescription is an increasing public health problem or phenomenon throughout the world. Every year, self-medication is used to address billions of health concerns throughout the world [23]. This is the cause for conducting the present study, as it was conducted to evaluate the effect of an educational program on pregnant women's knowledge regarding possible side effects of drugs used during pregnancy on the fetus and mother.

Related to the knowledge regarding possible side effects of drugs used during pregnancy on the fetus, the current study revealed that there was a statistically significant improvement during the posttest among the studied pregnant women regarding the knowledge of possible side effects of drugs used during pregnancy on the fetus compared to the pretest.

The agreement with the current study findings of Li et al. (2020), who addressed the "Effectiveness of a Web-Based Medication Education Course on Pregnant

Women's Medication Information Literacy and Decision Self-Efficacy," revealed that participants that received the educational intervention exhibited significantly higher levels of medication information literacy and decision-making self-efficacy in comparison to the control group [24]. These outcomes highlight the pivotal role of targeted educational programs in enhancing pregnant women's awareness of medication safety, thereby promoting more informed and cautious health behaviors during pregnancy.

Concerning congenital anomalies, the present study illustrated that there was a statistically significant improvement during the posttest among the studied pregnant women regarding congenital anomalies compared to the pretest, with a highly statistically significant difference. This was congruent with Ahmed et al. (2021), who studied the "Impact of antenatal educational interventions on pregnant women's knowledge regarding congenital anomalies" and proved that structured antenatal educational sessions significantly improved women's awareness of fetal anomalies and the importance of early screening and prevention [25].

Conversely, Hussein and Salih (2019), who addressed "Barriers to effective health education on birth defects among pregnant women in primary healthcare settings," announced that minimal improvement in

participants' knowledge followed educational efforts [26]. This may be due to low baseline literacy levels and cultural misconceptions, which posed challenges to effective knowledge acquisition.

Regarding the women's knowledge of possible side effects of drugs used during pregnancy on pregnant women, the current study demonstrates that there was a statistically significant improvement during the posttest among the studied pregnant women, in agreement with Al-Ramahi et al. (2017), who investigated "Impact of counseling on knowledge, attitude and practice of medication use during pregnancy" and proved that structured counseling sessions significantly enhanced pregnant women's knowledge, attitudes, and practices related to medication use during pregnancy [27].

At last, after the program, working women showed improved pregnant women's knowledge regarding possible side effects of drugs used during pregnancy on fetus and mother. This enhancement was linked to the educational program, lectures, positive reinforcement, and various teaching methods [28-38]. The distribution of well-designed Arabic booklets significantly aided knowledge retention. These brief, visually appealing booklets complemented other strategies effectively. According to NTL's Pyramid of Learning, individuals retain 20% of audiovisual content and 10% of written material, while discussion enhances retention to 50% [39-49].

6. Conclusion

Based on the findings of the present study, it can be concluded that after program implementation, the studied female workers at Beni-Suef University had marked improvement in knowledge, attitude, and intention regarding oocyte cryopreservation compared to before program implementation.

Recommendation

Advocacy campaigns on safe pregnancy medication use should utilize interactive workshops, posters, and digital resources, emphasizing educational backgrounds and teratogenic medication safety for prenatal care and community health initiatives.

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