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Women's knowledge and attitude regarding teratogenic medications and practices toward minor discomfort: impact of an educational program

Abstract

Background: Nurses play a crucial role in antenatal care by promoting healthy lifestyles, advocating for patients, and offering health education. They are often the first healthcare professional's pregnant women meet, responsible for identifying patients at risk for congenital anomalies, ensuring appropriate treatments, and educating them on lifestyle and self-care modifications.

Aim: The current study was conducted to evaluate the effect of an educational program on women's knowledge and attitude regarding teratogenic medications and practices toward minor discomfort.

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*:** Four data collection tools were used to carry out the current study: (I): Tool 1: A structured interview questionnaire, Tool 2: Women's knowledge regarding the teratogenic medications questionnaire sheet; Tool 3: Women's attitude regarding the teratogenic medications questionnaire sheet; Tool 4: Self-reported practices regarding the minor discomforts questionnaire sheet.

Results: illustrated that 5.3% of the studied pregnant women had a satisfactory knowledge level during the pretest, which improved in the posttest to become 88.8% of women; 10.9% had a positive attitude regarding teratogenic medications during the pretest, which improved in the posttest to become 64.2%; and 3.4% had good practices regarding minor discomforts in the pretest, which improved in the posttest to become 76.5%. Additionally, 55.9% of women used to obtain drug information from themselves and 20.7% from any physician (not a specialist).

Conclusion: The program was effective in improving women's knowledge, attitudes, and practices. There was a positive correlation between total knowledge, attitude, and behavior of the studied pregnant women posttest.

Recommendations: Implement continuous educational programs targeting pregnant women to improve their knowledge regarding the risks of teratogenic medications and how they affect fetal development.

Keywords: knowledge, attitude, teratogenic medications, practices, minor discomfort, educational program

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Introduction

Teratogenicity is defined as "any morphological, behavioral or biochemical effect induced during embryonic life or fetal life detected at birth or later. Teratogen is originated from a Greek word 'teras' meaning a monster. Majority (94%) of these defects occur in middle and low income countries additionally the account for 7% of all neonatal mortality and 3.3 million under five deaths. Common birth defects include congenital heart disease, congenital deafness and neural tube defect. Teratogenicity is an important cause of fetal birth defect leading to neonatal morbidity and mortality.[1]

The teratogenicity of drugs can produce a range of effects depending on how long the fetus was exposed and the dosage of exposure. The most sensitive and likely developmental period to develop deformities due to teratogens is around 14 to 60 days post-conception. This is because it would be after the fertilized egg has implanted and when the most important processes are beginning to take place in the fetus's development, including the division and multiplication of cells to create the beginning components for the future development of a fetus.[2]

Medications should be avoided if possible during the first trimester and should only be prescribed if the expected maternal benefit is greater than the risk to the fetus. Although it is desirable to avoid medicines during pregnancy, it is often impossible and can be harmful because there are some pregnant women who suffer from chronic illnesses and new modern health problems that appear during pregnancy. Failure to comply with these conditions and diseases may have an impact on the mother and on the health of her child.[3]

Self-medication is widely practiced globally, including in both developed and developing countries. It is reported that 44.55% of pregnant women worldwide practice self-medication. Self-medication among pregnant women poses potential risks to both maternal and fetal health. Self-medication among pregnant women may be exacerbated by limited access to health facilities, low socioeconomic status,

relatively high illiteracy rates, and a lack of knowledge regarding the negative consequences of self-medication.[4]

The use of medications during pregnancy requires careful consideration due to significant changes in drug metabolism that occur. These changes include an increase in interstitial fluid volume, alterations in the pattern of serum proteins, and increased activity of maternal hepatic enzymes due to elevated levels of sex steroids. These changes can affect the distribution, protein binding, and metabolism of medications administered during pregnancy.[5]

Self-medication can have a negative impact on both the fetus and the mother, resulting in malformation/teratogenicity, fetal toxicity, low birth weight, early birth, respiratory difficulties, and death. According to reports, drug exposure during pregnancy causes at least 10% of birth malformations.[6] In Egypt, there are few studies that assess the potential use of self-medications. It has been reported that mothers of infants with congenital anomalies were using aspirin, antacids, dextroamphetamine, phenobarbitone, sodium amytal, other barbiturates, cough medicines, iron, sulphonamides, and nicotinamide.[7–11]

Aim of the study

The current study was conducted to evaluate the effect of an educational program on women's knowledge and attitude regarding teratogenic medications and practices toward minor discomfort.

Research hypothesis

Women's knowledge, attitude, and practices will improve after implementation of the educational program.

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:

Setting:

This study was conducted at an outpatient clinic at Beba Hospital, affiliated with the Ministry of Health, Beni-Suef Governorate.

Sample type and size:

A convenient sample was used. The sample was calculated by the following equation using the Steven and Thompson equation to calculate the sample size from the next formula.[12]

$$n = \frac{\mathrm{NxP}(1-\mathrm{P})}{\left\{\mathrm{N}-1\mathrm{x}\left(\mathrm{d}^2 \div \mathrm{Z}^2\right)+\mathrm{P}(1-\mathrm{P})\right\}}$$

N = Population size, Z^2 = confidence level of 95%, P = probability, d^2 = margin of error, n = sample size

The total number of pregnant women in one year, beginning in January 2023 and ending in December 2023, was 5249 pregnant women in Beba Hospital, so the target population of this study was 358 pregnant women. The sample size calculation was done using the following equation:

Technique:

Pregnant women that attended the outpatient clinic at Beba Hospital from June 2024 till the end of December 2024 were selected as participants in the study using a simple random sampling through a random sequence generator from the sampling frame. At each visit, the researcher gathered the assigned subgroup of 7-8 pregnant women in the waiting room, where the pretest structured questionnaire was completed.

Sample criteria:

The inclusion criteria:

I. Pregnant women aged from 15 to 39 years.

II. Pregnant women agreed to participate in the study.

III. Pregnant women in their first, second, and third trimesters to receive a health promotional program.

The exclusion criteria:

I. Women who refused to participate in the study.

II. High-risk pregnant women

Tools of data collection:

Four data collection tools were used to carry out the current study.

Tool 1: A structured interview questionnaire:

A self-administered questionnaire, adapted from Devkota et al.,[13] was utilized for data collection.[13] The researcher developed an Arabic-structured interview questionnaire based on a review of relevant literature, aligning with the study's objectives and data requirements from participants.

Tool 2: Women's knowledge regarding teratogenic medications questionnaire sheet:

This tool was developed by the researcher after reviewing the related literature to assess women's knowledge (definition, types, risks, complications, …) regarding teratogenic medications.

Scoring system:

Total global score consisted of 58 questions, each worth 1 point for a correct answer and 0 for "don't know" or incorrect responses. Total scores per knowledge section were summed and averaged, providing mean scores converted to percentages. Scores indicate adequate knowledge if ≥ 60% (≥35 points) and inadequate knowledge if < 60% (<35 points).

Tool 3: Women's attitude regarding teratogenic medications questionnaire sheet:

It is a self-reported questionnaire developed to assess women's attitudes towards teratogenic medications using a Likert scale with 12 statements and five response options, yielding total scores from 1 to 60.

Scoring system:

Responses were scored on a five-point Likert scale: strongly agree (5), agree (4), neutral (3), disagree (2), and strongly disagree (1). Attitudes were categorized as positive (≥75%, ≥45 points), neutral (50%-74%, 30-45 points), and negative (<50%, <30 points).

Tool (4): Self-reported practices regarding minor discomforts questionnaire sheet:

It is a self-reported practices questionnaire developed to assess behaviors for alleviating minor discomfort. It uses a three-point Likert scale with responses: Always (3), Sometimes (2), and Never (1), resulting in scores ranging from 1 to 126. Respondents are categorized

into good (≥75%; ≥95 points), average (50%-74%; 63-94 points), and poor (<50%; <63 points) practices based on their total scores.

Supportive material:

It was designed to enhance women's awareness, attitude, and practices regarding teratogenic medications and minor discomforts. It was designed by the researcher in the form handout (booklet) using simple Arabic language and different illustrative pictures in order to facilitate understanding its content. The educational booklet contained knowledge about instructions about drug intake during pregnancy and common drugs that can cause congenital anomalies. Effects on fetus and pregnant women's health, for example, common teratogenic drugs cause cleft lip and cleft palate when taken during pregnancy (e.g., Imodium). Also, the educational booklet contained basic knowledge about the definition of congenital anomalies and types of congenital anomalies regarding body systems, effects of teratogenic medications on pregnant women's health, minor discomfort, etc.

Fieldwork

Assessment phase

The data were collected by the researcher through interviewing participant women in a proper place. The researcher greeted the women, introduced herself, explained the purpose of the study, provided participant women with all information about the study (purpose, duration, and activities), and took informed oral consent for participation in the study. Data were collected by a self-administered questionnaire for women's general characteristics, obstetric history, women's knowledge regarding teratogenic medications, women's attitudes related to drug intake, and self-reported practices regarding minor discomfort during pregnancy.

Planning phase

It was based on the assessment data that was obtained through the interviewing questionnaires, literature review, and giving instruction about drug intake during pregnancy. The booklet was written in the Arabic language and printed out equal to the sample size.

Implementation phase

I. Pregnant women that attended the outpatient clinic at Beba Hospital from June 2024 till the end of December 2024 were selected as participants in the study using a simple random sampling through a random sequence generator from the sampling frame. At each visit, the researcher gathered the assigned subgroup of 7-8 pregnant women in the waiting room, where the pretest structured questionnaire was completed.

II. The researcher attended the previously mentioned setting till all the pre mentioned sample size was collected. The researcher introduced herself to the women and explained the aim of the study prior to data collection.

III. The sample was collected 2 days per week from 9am to 2pm. Approval of women was obtained orally before data collection.

IV. The researcher starts to fill out the interviewing questionnaire to assess women's socio-demographic characteristics, obstetric history, and their knowledge about common drugs that can cause effects on fetus and pregnant women's health.

V. This phase (intervention phase) protocol of nursing intervention was distributed among the studied pregnant women. The instructions were given to a group (7-8) of pregnant women in groups.

VI. The researcher used simple Arabic language, and also each session ended with a summary of its content and feedback from the women to ensure that the women got the maximum benefits.

VII. The program implementation was through 6 sessions, and all sessions were theoretical. The first theoretical session was about program structure, its objectives, and instructions about drug intake during pregnancy, and common drugs that can affect the fetus and pregnant women's health. The second theoretical session involved the definition of the congenital anomalies according to body system, including congenital syndrome, CNS, & CVS.

The third theoretical session was about types of congenital anomalies in the musculoskeletal system, congenital anomalies in the digestive system, and congenital anomalies in the genitourinary system. The fourth theoretical session was about types of congenital anomalies in the respiratory system and congenital anomalies in the eye, ear, & trunk. The fifth theoretical sessions were about the definition of preterm labor, complications of preterm labor, common drugs that can cause preterm labor, the definition of eclampsia, complications of eclampsia, common drugs that can cause eclampsia during pregnancy, the definition of placental separations during pregnancy, complications of placental separations during pregnancy, and common drugs that can cause placental separations during pregnancy. The sixth theoretical sessions were about minor discomfort during the first trimester, second trimester, and third trimester and relief measures for each session. Implemented in (30) min through using learning material (lecture–group discussion).

Evaluation phase

The effect of the educational program was done through comparing pretest and posttest scores of knowledge, attitude, and behavior.

Ethical considerations

A written initial approval to conduct the study was obtained from the research ethical committee of the faculty of medicine, Beni-Suef University. Informed consent was obtained from pregnant women after explaining the purpose of the study. No harmful methodology was used with the women. Each woman had the right to withdraw from the study at any time.

Administrative design

An official written approval from the ethical committee of the faculty of medicine, Beni-Suef University. Official permission was obtained by submission of official letters issued from the dean of the faculty of nursing, Beni-Suef University, to the manager of Beba Hospital as approval for data collection after explanation of the nature and purpose of the study.

Statistical design

Data were summarized, tabulated, and presented using descriptive statistics in the form of means and standard deviations as a measure of dispersion. The Statistical Package for the Social Sciences (SPSS), version 26, was used for statistical analysis of the data, as it contains the test of significance given in standard statistical books.

Qualitative data were expressed as a percentage. For quantitative data, a comparison between two variables was done using a pregnant women's t-test.

Probability (P-value) is the degree of significance; less than 0.05 was considered significant. The smaller the P-value obtained, the more significant the result; less than 0.001 was considered highly

significant (*), and the correlation coefficient was done by using the Pearson correlation test. T-test was used when the cell sizes are expected to be large. If the sample size was small (or you have expected cell sizes <5). The chi-square (X^2) test of significance was used in order to compare proportions between qualitative parameters.

Results

Figure 1 illustrates that 5.3% of the studied pregnant women had a satisfactory knowledge level during the pretest, which improved posttest to become 88.8%.

Figure 1 Percentage distribution of the studied pregnant women's total knowledge about teratogenic medications.

Figure 2 shows that 10.9% of the studied pregnant women had a positive attitude regarding teratogenic medications during the pretest, which improved in the posttest to become 64.2%.

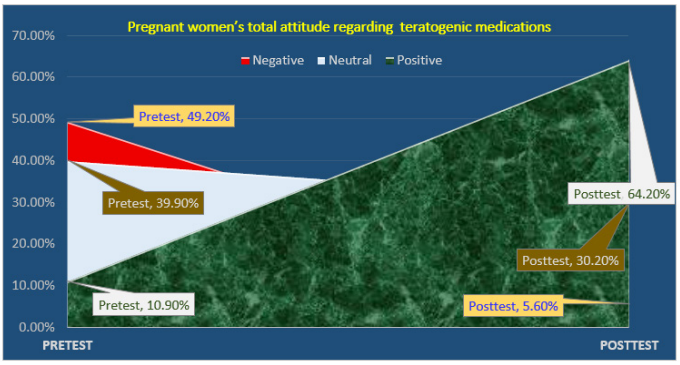

Figure 2 Percentage distribution of the studied pregnant women's total attitude regarding to teratogenic medications.

Figure 3 illustrates that 3.4% of the studied pregnant women had good behavior levels regarding teratogenic medications during the pretest, which improved posttest to become 76.5%.

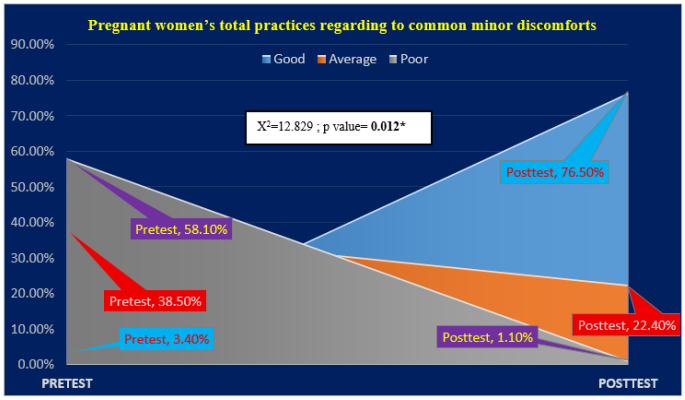

Figure 3 Percentage distribution of the studied pregnant women's total practices regarding to common minor discomforts.

Figure 4 presents studied pregnant women's sources of information. It reveals that 55.9% of women used to obtain drug information from themselves and 20.7% from any physician (not a specialist).Table 1 shows that there was a negative correlation between the total knowledge, attitude, and behavior of the studied pregnant women pretest. While there was a positive correlation between total knowledge, attitude, and behavior of the studied pregnant women posttest.

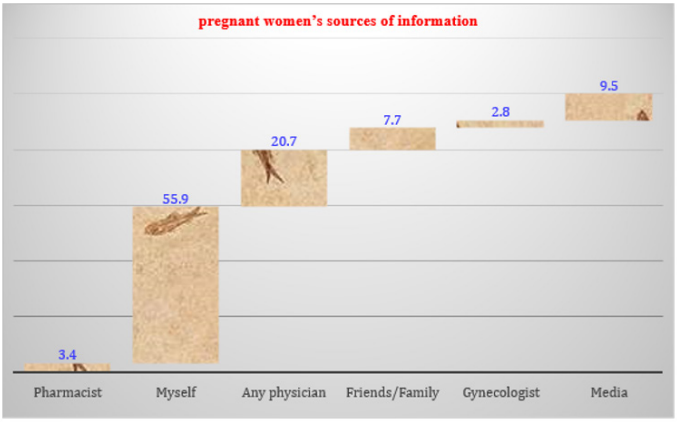

Figure 4 Pregnant women's sources of information.

Table 1 Correlation between total score of knowledge, attitude and total behaviors of pregnant women during pretest and posttest

Pretest		Knowledge	Attitude	Posttest		Knowledge	Attitude
Knowledge	r			Knowledge	r		
	p				p		
Attitude	r	0.062		Attitude	r	0.564	
	p	0.242			p	0.049*	
Behavior	r	0.085	0.002	Behavior	r	0.883	0.759
	p	0.108	0.977		p	0.021*	0.036*

** positive correlation at p≤0.05 ** strong positive correlation at p≤0.01*

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Discussion

Nurses promote healthy lifestyles in addition to giving direct care to a large number of pregnant women, act as patient advocates, and provide health education. Nurses are the first healthcare staff members who meet pregnant women when they arrive for prenatal care and follow-up appointments.[14–23] Therefore, identifying pregnant patients who may be at risk of congenital anomalies, ensuring that these pregnant women receive effective treatments, and educating patients on behavior, lifestyle, and self-care modifications are all critical roles performed by nurses in antenatal care.[24–30] Hence, the current study was conducted to evaluate the effect of an educational program on women's knowledge and attitude regarding teratogenic medications and practices toward minor discomfort.

Regarding the relationship between total knowledge levels of the studied pregnant women pre- & post-test, the current study revealed that there was no statistically significant relationship between total knowledge levels of the studied pregnant women during pre- and post-test. From the researcher's point of view, the absence of a post-intervention assessment in the study limits its capacity to evaluate change or impact. Rather than opposing the current study's results, their findings highlight the critical need for structured and targeted health education during pregnancy. The persistently low knowledge levels they reported reinforce the importance of implementing educational strategies.

This finding was supported by Calis et al.[31] and found that there was no statistically significant relationship between total knowledge levels of the studied pregnant women during pre- and post-tests.[31] Concerning the total attitude regarding teratogenic medications, the present study revealed that a minority of the studied pregnant women had a positive attitude regarding dangerous usage of teratogenic medications during the pretest, which improved posttest to become two-thirds of them. This finding is similar to Gurtoo et al.,[32] who showed that structured education significantly improved positive attitudes regarding medication safety.[32] Conversely, this finding is different from Heitmann et al.[33] and observed that despite educational efforts, a substantial proportion of participants maintained negative or fearful attitudes toward necessary teratogenic-risk medications.[33]

Regarding the relation between total attitude levels of the studied pregnant women pre- and post-test, the present study revealed that there was a highly statistically significant relation between total attitude levels of the studied pregnant women during pre- and post-test. The study found a significant improvement in self-care and medication behaviors among pregnant women after health education. While a minority showed good practices in the pretest, over three-quarters displayed appropriate behaviors in the posttest, indicating effective modification of risky behaviors during pregnancy. In contrast to the current study's findings, El-Gamal et al.[34] in Egypt reported that despite some exposure to health information, a large proportion of pregnant women continued to use medications without medical advice.[34] Only a minority were aware of the potential teratogenic risks. From the researcher's point of view, this suggests that education alone may not be sufficient if not reinforced regularly or supported by continuous healthcare engagement.

Regarding the source of information about drugs, the current study illustrated that more than half of women were used to obtaining drug information from themselves, less than half of women hadn't checked the accompanied leaflet content, and more than half of them hadn't read the leaflet when medication was prescribed for them during pregnancy. This finding is in accordance with Nordeng et al.,[35] who revealed that more than half of women were used to obtaining drug information from themselves.[35] This finding disagrees with Werler et al.,[36] who reported that less than half of women didn't read the leaflet when medication was prescribed for them during pregnancy.[36] The variation in findings may be due to variations in health education and awareness among pregnant women in different populations, especially since the current study sample had a generally low educational level.

The study also reported that more than half of the pregnant women reported that their doctor gave them complete information about the prescribed drug(s) and more than one-third of pregnant women reported that the pharmacist gave them complete information about the prescribed drug(s). The finding was in the same line with Al-Zidan[37] who reported that doctors and pharmacists gave patients complete information about the prescribed drug(s).[37] Regarding the correlation between total scores of knowledges, attitude, and behavior of pregnant women during the pretest and posttest phases, the present study revealed a negative correlation between total knowledge, attitude, and behavior scores in the pretest, indicating that higher knowledge did not necessarily translate into more positive attitudes or safer behaviors before the intervention. However, in the posttest, a positive correlation was observed between knowledge, attitude, and behavior, suggesting that improved knowledge following the educational intervention was associated with enhanced attitudes and healthier behaviors concerning teratogenic medication use during pregnancy.

This finding is supported by a study conducted by Khalil et al.,[38] which evaluated the impact of health education on pregnant women's knowledge, attitudes, and practices regarding medication safety. The authors reported that after an educational intervention, not only did knowledge levels increase significantly, but they also became positively correlated with attitudes and practices.[38] This suggests that structured educational efforts can align cognitive (knowledge) and affective/behavioral (attitude and practice) domains. In contrast, a study by Othman et al.[39] found no significant correlation between knowledge, attitude, and behavior scores among pregnant women even after exposure to antenatal counseling. The researchers argued that although knowledge improved slightly, deeply rooted beliefs, cultural factors, and limited access to resources may have prevented this knowledge from translating into positive attitudes or behavior changes.[39]

The inconsistency in these findings can be explained by variations in the quality, depth, and delivery mode of educational interventions. Moreover, the degree to which health education addresses misconceptions and engages women in active learning may critically influence the alignment of knowledge with both attitude and behavior`

The results of the current study declare that, after the program sessions were implemented, the pregnant women's knowledge, attitude, and practices toward common minor discomforts improved, according to the current study's findings, which showed a significant increase in these areas. Thus, following the implementation of program sessions, the females' grading increased for overall good knowledge, positive attitudes, and healthy practices, while their grading decreased for overall poor knowledge, negative attitudes, and unhealthy practices.

This improvement could be attributed to the attending of the implemented educational program and the lecture and positive reinforcement, as well as a wide variety of educational methods used.[40–43] Additionally, the distributed Arabic booklets also played a crucial role in attaining and retaining knowledge. Booklets are best used when they are brief, written in plain language, and full

of good pictures and when they are used to back up other forms of education. This is in accordance with Edgar Dale's or the NTL's Pyramid of Learning as cited by Masters, as the pyramid illustrated that individuals can retain 10.0% of what they read and 20.0% of what they see and hear (audiovisual). The same author added that one can retain 50.0% of what he learned by a discussion.[44–51]

Conclusion

Based on the findings of the present study, it can be concluded that, the program was effective in improving women's knowledge, attitudes, and practices. There was a positive correlation between total knowledge, attitude, and behavior of the studied pregnant women posttest.

Recommendation

I. Implement continuous educational programs targeting pregnant women to improve their knowledge regarding the risks of teratogenic medications and how they affect fetal development.

II. Conduct periodic awareness campaigns about the safe use of medications during pregnancy, including interactive workshops, posters, and digital resources, customized to the educational level of the pregnant women.

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