Assiut Scientific Nursing Journal
http://asnj.journals.ekb.eg http://www.arabimpactfactor.com
DOI: 10.21608/asnj.2025.354158.1996 http://olddrji.lbp.world/indexedJournals.aspx
https://vlibrary.emro.who.int/journals/assiut-scientific-nursing-journal

Factors Associated with Birth Preparedness and Complications Readiness among Pregnant Women

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Abstract

Background: The birth preparedness and complications readiness (BPCR) concept are a global safe motherhood strategy and an important aspect of the antenatal care (ANC) package in reducing maternal mortality. **Aim:** assess the factors associated with birth preparedness and complications readiness among pregnant women. **Design:** A descriptive cross-sectional design. **Subjects:** A convenient sample of 316 pregnant women who attended the Antenatal Clinics of New Obstetric and Gynecological Hospital, Mansoura University Hospitals, Mansoura City, Egypt. **Data collection tools**: A structured interview questionnaire of five parts; demographic characteristics, reproductive health factors of the pregnant women, level of birth preparedness and complications readiness, knowledge of key obstetric danger signs, and attitude and perception about BPCR. **Results:** 50.6% of women mentioned the health facility, while only 32.3% were well prepared. Most (84.5%) women were less knowledgeable, and 68.7% had a positive attitude and perceptions toward BPCR. Demographic factors including age, education level, employment status, income perception, and place of residence were associated with women's knowledge levels. Similarly, these demographic factors (age, education, employment, and income perception) and reproductive historical elements (gravidity, parity, timing of first antenatal care visit, and receipt of birth preparedness counseling) were linked to women's attitudes. **Conclusion:** less knowledgeability, low preparedness, and positive attitude levels among pregnant women regarding BPCR were observed. Maternal age, education, marital condition, employment, parity, and gestational age were associated with BPCR. **Recommendations:** Effective health information and promotion programs should be implemented with greater attention to the importance of birth preparedness and complications readiness for all pregnant women.

Keywords: Antenatal care, Birth preparedness, Complications readiness & Skilled birth attendant.

Introduction

Transition to parenthood is an important life event involving women and husbands. Lack of accurate and adequate information about pregnancy and childbirth among pregnant women makes them less able to make choices that promote their well-being **(Tola et al., 2022)**. Achieving the recently accepted Sustainable Development Goal (SDG) of reaching a global Maternal Mortality Ratio (MMR) of 70 requires attaining an annual rate of reduction in MMR of 7.5% between 2016 and 2030 **(Moinuddin et al., 2017)**. The World Health Organization (WHO) has integrated BPCR into a focused ANC package **(Wudu & Tsegaye, 2021)**.

Antenatal care should emphasize BPCR to promote skilled and critical care to reduce maternal morbidity and mortality **(Lincetto et al., 2018)**. Providing health education on obstetric danger signs, preparing a birth plan, and encouraging delivery with a skilled attendant are some of the key roles of ANC **(Solnes et al., 2017)**.

The BPCR concept is a global strategy for safe motherhood and an important aspect of the ANC package in reducing maternal mortality **(Silwal et al., 2020)**. It depends on the supposition that preparation for birth and complications decrease the three phases of delays in obtaining services from a skilled birth attendant. BPCR is a grid of responsibilities that are shared by the pregnant woman/family, community, and health facility/provider **(Anikwe et al., 2020)**. Whereas normal pregnancy, labor, and puerperium are retrospective events, the BPCR concept helps each group in preparation for the conclusive goals of safe delivery **(Ijang et al., 2019)**.

The concept of BPCR comprises setting plans before birth to make sure that the pregnant woman is well prepared for normal birth and complications. Important decisions on issues such as the desired birthplace, the preferred skilled birth attendant, birth companion, birth supplies, a compatible blood donor, and transportation are made and identified **(Olowokere et al., 2020)**. The other components

include knowledge of the expected delivery date, labor signs, mobilizing financial resources, determining the person who looks after the family, postnatal care, and family planning **(Aziz et al., 2020)**.

Based on the WHO framework, the BPCR intervention package effectively builds the mother's capacities and the husband's involvement in maternal and neonatal health **(Rahman et al., 2019)**. An effective plan for birth preparedness can positively affect the mother's and newborn health and health services utilization **(Silwal et al., 2020)**. This arose from the fact that the woman during pregnancy is at risk for unpredicted serious complications which might occur suddenly and end in death or disease. This is because complications are highly fatal if effective treatment is not provided such as in case of hemorrhage. The birth plan should be addressed on the first visit, readdressed in subsequent visits, and executed at the end of pregnancy **(Begashaw et al., 2017)**.

The BPCR package is fundamental in countries with low-quality obstetric services **(Ijang et al., 2019)**. There is also evidence from Nepal, Burkina Faso, and India that promoting BPCR improves preventive behaviors, mothers' knowledge of danger signs, and care-seeking during emergencies, reducing childbirth-related deaths and disabilities **(Acharya et al., 2015)**.

Birth preparedness and complications readiness, a strategy to combat maternal and neonatal mortality, is so far from achieving its roots as an aspect of focused ANC **(Wudu & Tsegaye, 2021)**. Although it is a feasible means of reducing maternal and neonatal mortality, it is not widely performed by women and families as evidenced by continuous maternal deaths due to delays **(Olowokere et al., 2020)**.

Significance of the study

Life-threatening unpredictable complications that increase the need for emergency obstetric care occur in around 15% of pregnant women. Rapidly, these complications may get worse to mortal outcomes **(Sageer et al., 2019)**. Adequate birth preparation can be lifesaving for mothers and newborns, as it reduces delays associated with care-seeking for emergencies that contribute to lots of maternal deaths in low-income societies **(Moinuddin et al., 2017)**.

Early birth preparation throughout pregnancy, delivery, and postpartum is important to prevent maternal and neonatal mortalities. Knowledge deficit and cultural beliefs prevent earlier delivery preparation. Many families don't take any action before the delivery and only start to move during the labor process **(Gebre et al., 2015)**. Most pregnant women and their families do not know how to perceive the danger signs of complications. When complications occur, the unprepared family wastes a long time in realizing the problem, getting money, finding transport, and accessing an accurate referral facility **(Kiataphiwasu & Kaewkiattikun, 2018)**.

In Africa, 250,000 of the 30 million pregnant women die annually of pregnancy-related conditions. According to global standards, MMR in Egypt is quite elevated, around 1400 women and half of their babies die yearly due to perinatal complications **(Reinke & Haier, 2017)**. Despite the progressive MMR decrease from 68 to 52 per 100, 000 live births in 2003 and 2015 respectively, this decrease is lower than the SDG for the issue of MMR reduction from the 2010 baseline by about 66.6%, especially with the increased rates found in Qena, Assiut, Sohag, and Beni Suef governorates; the MMR is 60–65 per 100.000 live births **(UNFPA, 2018; UNDP & the Ministry of Planning, Monitoring and Administrative Reform, 2015; Aziz et al., 2020)**.

Studies from different countries have shown that promoting BPCR increases the mother's knowledge about obstetric danger signs and improves preventive behaviors, leading to improvement in seeking emergent health care **(Begashaw et al., 2017)**. Even though BPCR is essential for additional improvement of maternal and child health, the current magnitude and influencing factors are little known in Egypt. Hence, this study assessed the factors associated with pregnant women's birth preparedness and complications readiness.

Aim of the study

This study assessed the factors associated with birth preparedness and complications readiness among pregnant women.

Study questions

- What is the pregnant woman's birth preparedness and complications readiness level?
- What are the factors associated with birth preparedness and complications readiness among pregnant women?
- What is the attitude of pregnant women regarding birth preparedness and complications readiness?

Operational definitions

Birth preparedness and complications readiness: A woman will be prepared for birth and its complications if she identifies at least 4 components of the birth preparedness and complications readiness items.

Knowledge of key danger signs of pregnancy, labor, and post-partum: A woman will be knowledgeable if she spontaneously mentions the 5 signs in the 3 stages (as a minimum 1 in each stage).

Method

Study Design:

A descriptive cross-sectional design was used in which the condition and potentially associated factors

are assessed at a specific time for a certain population to assess the prevalence of conditions. Also, exposure and outcome are measured simultaneously in this study.

Study Setting: The study was carried out at the Antenatal Clinics of New Obstetric and Gynecological Hospital, Mansoura University Hospitals, Mansoura City, Egypt. The New Obstetric and Gynecological Hospital consists of one floor of 6 rooms: admission, ultrasound, antenatal examination, vesicular mole, gynecological examination, and nursing staff. The antenatal clinic is open every day (except Thursday and Friday) from 9 am to 12 pm. The daily follow-up cases are 75- 100.

Study Subjects:

Sampling: a convenient sample of 316 pregnant women at 32 weeks gestation or more who had attended the antenatal clinic at least twice was included.

Sample Size: Based on data from Begashaw et al., (2017), a precision/absolute error of 5% and type 1 error of 5%, the sample size is calculated according to the following formula:

$$n=\frac{(Z1-\alpha/2)^2.P(1-P)}{d^2}$$

where $Z_{1-\alpha/2}$ at 5% type 1 error ($p<0.05$) is 1.96, P is the expected proportion in population based on previous studies and d is the absolute error or precision. Therefore, sample size.

$$n=\frac{(1.96)^2.(0.776)(1-0.776)}{(0.046)^2}=315.6.$$

Based on the formula, the total sample size required for the study is 316.

Tools of data collection

A structured interview questionnaire was used to collect data. It was developed by researchers after reviewing related literature (Anikwe et al., 2020; Aziz et al., 2020; Begashaw et al., 2017; Ijang et al., 2019). It included five parts:

Demographic characteristics of the studied women: include age, education, marital status, employment**,** residence, and income perception.

Reproductive health factors of the studied women: including gravidity, parity, gestational age at 1st ANC, number of ANC visits, received counseling on birth preparedness, and complications readiness were coded as "Yes" and "No".

Level of birth preparedness and complications readiness is assessed by asking women about completing the four components during pregnancy: i) mentioning a health facility for the delivery, ii) identifying a skilled birth attendant, iii) saving money for emergencies, and iv) arranging emergency transport.

Scoring system

Women answering, 'yes' to at least three of four questions were considered "well prepared". The remaining women were considered "less prepared".

Knowledge of key obstetric danger signs: it included danger signs in pregnancy, childbirth, and postpartum. Pregnancy: severe hemorrhage, blurring of vision, and hands/face edema. Childbirth: severe vaginal bleeding, slow progress in labor, retained placentas, and seizure. Postpartum: hemorrhage, hyperthermia, and offensive leukorrhea.

Scoring system

Knowledge was coded as "Yes" or "No." It consisted of 3 danger signs in pregnancy, 4 danger signs in childbirth, and 3 danger signs in postpartum. A woman was considered knowledgeable if she mentioned at least 5 signs across the 3 stages, with at least one sign from each stage. If she mentioned fewer than 5 signs, she was considered less knowledgeable.

Attitude and perception about BPCR: Adopted from Letose et al., 2020. It included eight questions. Responses to all questions were added for each woman to form a composite variable. Negatively worded questions were coded before analysis.

Scoring system

Every question was answered with a 3-point Likert scale. The responses were coded as 3 = agree, 2 = neutral, and 1 = disagree. A mean score was computed to measure the attitude of women towards BPCR. Accordingly, a score equal to or above the mean (60%) was a positive attitude whereas a score below the mean (60%) was negative.

Validity

The study tool was tested for validity by a panel of five experts in the maternity nursing field. Their suggestions were made, such as the rephrasing of some sentences.

Reliability

The tool was assessed for internal consistency by Cronbach's alpha, which was 0.902 for the BPCR Scale, 0.899 for the knowledge of key obstetric danger signs, and 0.901 for the attitude and perception of BPCR.

Pilot study

The pilot study was conducted on 32 (10%) pregnant women, who were excluded from the entire sample in the previously mentioned setting to evaluate the clarity and applicability of the tool.

Ethical Considerations:

Ethical approval was obtained from the Research Ethics Committee at the Faculty of Nursing, Mansoura University (P.0494 on 25-06-2023) to perform the study. The aim of the study was explained to women by the researcher. Formal consent was signed by women before the study.

Women were told that they had the right to retire from the study at any time. Privacy and confidentiality were ensured.

Research Process: Two phases were conducted to achieve the aim of the study: the preparatory and assessment phases.

Preparatory phase

In this phase, the researchers collected related literature, designed and validated the tool, and conducted the pilot study.

Interviewing and assessment phase

Data was collected for four months from August 2023 to November 2023 from the Antenatal Clinics of New Obstetric and Gynecological Hospital after obtaining official permission from the responsible director to conduct the study. In the morning, the researchers attended the Antenatal Clinics and checked the registration book to detect eligible women. Then the researchers met each woman individually and invited them to participate in the study. The researchers informed the pregnant women about the aim of the study and the time required for participation. The researchers obtained written consent and distributed the questionnaires, which included questions about the demographic characteristics and reproductive health factors, birth preparedness, and complications readiness, knowledge of obstetric danger signs, and attitude and perception of BPCR among women. Each woman was interviewed separately to encourage free talking about her previous experience and background. Completing the questionnaire took about 20 minutes.

Statistical Analysis

Statistical analyses were performed using SPSS for Windows version 20.0 (SPSS, Chicago, IL). Categorical data were expressed in numbers and percentages. The chi-square and Fisher's exact tests were used for comparison of variables with categorical data. The reliability (internal consistency) test for the study questionnaire was calculated. Statistical significance was set at $p<0.05$.

Results:

Table (1): Socio-demographic characteristics of pregnant women (n=316)

Items	No.	%
Age (Years)		
18 – 23	14	4.4
24 – 29	223	70.6
30 – 35	79	25.0
Educational level		
Basic	47	14.9
Middle	180	57.0
High	89	28.2
Marital status		
Married	288	91.1
Separated/divorced	23	7.3
Widowed	5	1.6
Employment		
No	208	65.8
Yes	108	34.2
Residence		
Rural	145	45.9
Urban	171	54.1
Income perception		
Low	99	31.3
Moderate	212	67.1
High	5	1.6

Table (2): Reproductive health factors of pregnant women (n=316)

Items	No.	%
Gravida		
Primi (1)	20	6.3
Multi (2–4)	278	88.0
Grand multigravida (>5)	18	5.7
Parity		
Nulli (0)	28	8.9
Primi (1)	194	61.4
Multi (2–4)	94	29.7
Gestational age at 1st ANC (Weeks)		
< 6	8	2.5
6 – 8	273	86.4
> 8	35	11.1
Antenatal Care Attendance		
Less than 4 times (<4)	111	35.1
Four or more times (≥4)	205	64.9
Receive counseling on BPCR		
Yes	127	40.2
No	189	59.8

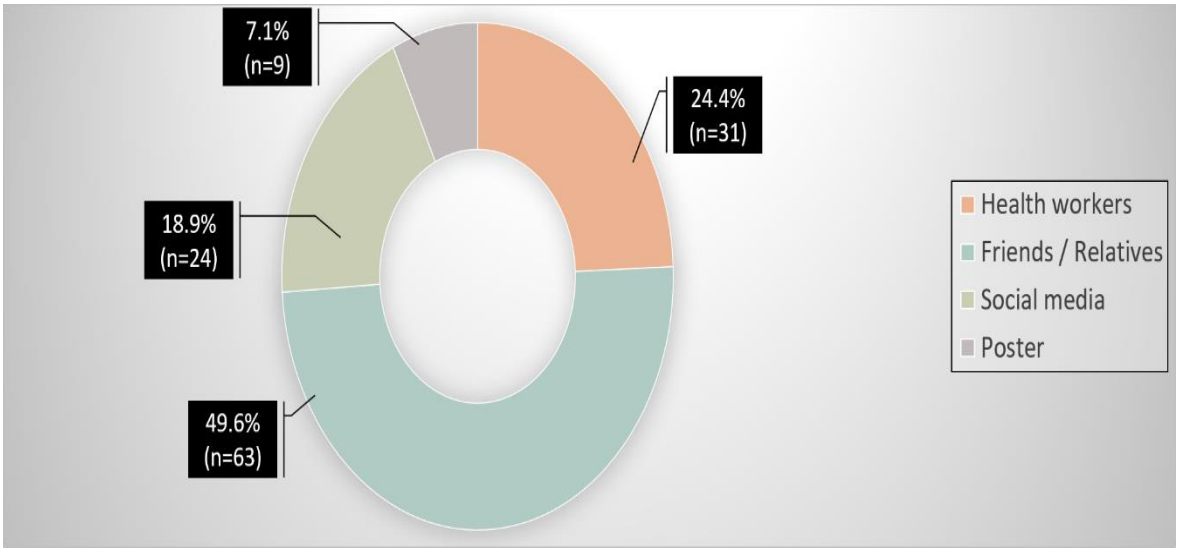

Figure (1): Distribution of source of information on BPCR among pregnant women (n=127)

Table (3): Level of birth preparedness and complications readiness of pregnant women (n=316)

Items	No.	%
Complications readiness		
Mentioned the health facility	160	50.6
Arranged emergency transport	143	45.3
Saved money for emergencies	156	49.4
Identified skilled birth attendant	135	42.7
Total preparedness level	**No.**	**%**
Less prepared	214	67.7
Well prepared	102	32.3

Table (4): Knowledge of key obstetric danger signs of pregnant women (n=316)

	No.	%
Knowledge of key danger signs during pregnancy		
Severe hemorrhage	273	86.4
Hands/face edema	113	35.8
Blurring of vision	6	1.9
Knowledge of key danger signs of childbirth		
Severe vaginal bleeding	256	81.0
Slow progress in labor	39	12.3
Knowledge of key danger signs of the postpartum		
Offensive leukorrhea	74	23.4
Hyperthermia during the first 7 days after childbirth	8	2.5
Total Knowledge level	No.	%
Less knowledgeable	267	84.5
Knowledgeable	49	15.5

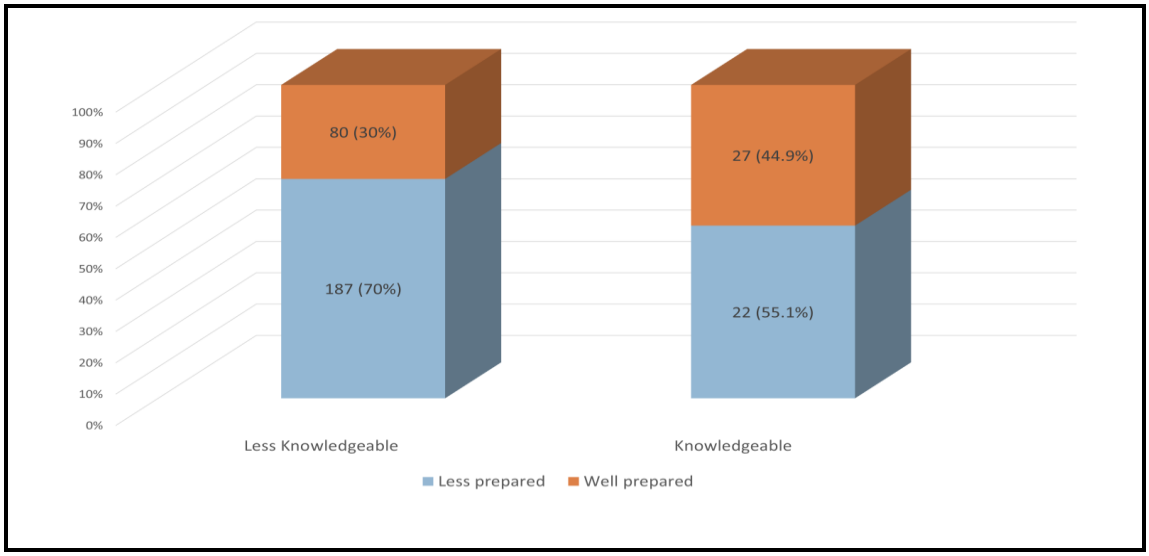

Figure (2): Knowledge of women on birth preparedness and complications readiness (n=316)

Table (5): Attitude and perception about BPCR of pregnant women (n=316)

	No.	%	No.	%	No.	%
A pregnant woman should plan the time of delivery	2	0.6	14	4.4	300	94.9
A pregnant woman should plan access to the facility for labor.	0	0.0	30	9.5	286	90.5
A husband must go with his wife during ANC checkups.	0	0.0	18	5.7	298	94.3
A husband must go with his wife during labor	0	0.0	16	5.1	300	94.9
Labor is a woman's responsibility. Husbands don't have to do anything.	301	95.3	12	3.8	3	0.9
Women do not have access to a health facility because it is too expensive.	12	3.8	4	1.3	300	94.9
Women do not have access to a health facility because of the non-respectful treatment from the staff.	244	77.2	4	1.3	68	21.5
Women do not have access to a health facility because of many difficulties in reaching there.	312	98.7	4	1.3	0	0.0
Total level	No.		%			
Negative	99		31.3			
Positive	217		68.7			

Table (6): Association between socio-demographic characteristics of pregnant women and knowledge, preparedness, and attitude levels (n=316)

	Preparedness						Knowledge						Attitude					
	Less prepared (n=214)		Well prepared (n=102)		Chi-Square / Fisher's		Less knowledgeable (n=267)		Knowledgeable (n=49)		Chi-Square / Fisher's		Negative (n=99)		Positive (n=217)		Chi-Square / Fisher's	
	No.	%	No.	%	X^2	P	No.	%	No.	%	X^2	P	No.	%	No.	%	X^2	P
Age (Years)																		
18 – 23	4	1.9	10	9.8			10	3.7	4	8.2			6	6.1	8	3.7		
24 – 29	157	73.4	66	64.7			180	67.4	43	87.8			53	53.5	170	78.3		
30 – 35	53	24.8	26	25.5	10.565	0.005*	77	28.8	2	4.1	14.402	<0.001**	40	40.4	39	18.0	20.476	<0.001**
Educational level																		
Basic	35	16.4	12	11.8			47	17.6	0	0.0			28	28.3	19	8.8		
Middle	108	50.5	72	70.6			159	59.6	21	42.9			69	69.7	111	51.2		
High	71	33.2	18	17.6	11.804	0.003*	61	22.8	28	57.1	27.942	<0.001**	2	2.0	87	40.1	56.521	<0.001**
Marital status																		
Married	202	94.4	86	84.3			243	91.0	45	91.8			95	96.0	193	88.9		
Separated/divorced	9	4.2	14	13.7			21	7.9	2	4.1			4	4.0	19	8.8		
Widowed	3	1.4	2	2.0	9.507	0.009*	3	1.1	2	4.1	3.107	0.212	0	0.0	5	2.3	4.725	0.094
Employment																		
No	117	54.7	91	89.2			193	72.3	15	30.6			94	94.9	114	52.5		
Yes	97	45.3	11	10.8	36.638	<0.001**	74	27.7	34	69.4	31.960	<0.001**	5	5.1	103	47.5	54.367	<0.001**
Residence																		
Rural	105	49.1	40	39.2			134	50.2	11	22.4			48	48.5	97	44.7		
Urban	109	50.9	62	60.8	2.699	0.100	133	49.8	38	77.6	12.829	<0.001**	51	51.5	120	55.3	0.392	0.531
Income perception																		
Low	63	29.4	36	35.3			99	37.1	0	0.0			54	54.5	45	20.7		
Moderate	148	69.2	64	62.7			165	61.8	47	95.9			43	43.4	169	77.9		
High	3	1.4	2	2.0	1.316	0.518	3	1.1	2	4.1	27.643	<0.001**	2	2.0	3	1.4	37.001	<0.001**
Gravida																		
Primigravida	14	6.5	6	5.9			10	3.7	10	20.4			6	6.1	14	6.5		
Multigravida	188	87.9	90	88.2			239	89.5	39	79.6			79	79.8	199	91.7		
Grand- multigravida	12	5.6	6	5.9	0.058	0.972	18	6.7	0	0.0	21.929	<0.001**	14	14.1	4	1.8	19.163	<0.001**
Parity																		
Nulliparous	18	8.4	10	9.8			18	6.7	10	20.4			10	10.1	18	8.3		
Primiparous	149	69.6	45	44.1			171	64.0	23	46.9			45	45.5	149	68.7		
Multiparous	47	22.0	47	46.1	20.977	<0.001**	78	29.2	16	32.7	10.865	0.004*	44	44.4	50	23.0	16.684	<0.001**
Gestational age at 1st ANC (Weeks)																		
< 6	2	0.9	6	5.9			6	2.2	2	4.1			8	8.1	0	0.0		
6 – 8	187	87.4	86	84.3			234	87.6	39	79.6			83	83.8	190	87.6		
> 8	25	11.7	10	9.8	6.975	0.031*	27	10.1	8	16.3	2.304	0.316	8	8.1	27	12.4	18.812	<0.001**
Antenatal Care Attendance																		
Less than 4 times	72	33.6	39	38.2			89	33.3	22	44.9			33	33.3	78	35.9		
Four or more times	142	66.4	63	61.8	0.639	0.424	178	66.7	27	55.1	2.430	0.119	66	66.7	139	64.1	0.203	0.652
Receive counseling on BPCR																		
Yes	39	18.2	88	86.3			109	40.8	18	36.7			68	68.7	59	27.2		
No	175	81.8	14	13.7	133.074	<0.001**	158	59.2	31	63.3	0.288	0.591	31	31.3	158	72.8	48.705	<0.001**

Table (1): Demonstrates that 70.6% of women were aged 24 to 29, 57% of them had middle education, 91.1% were married, 65.8% were housewives, 54.1% were from urban areas, and 67.1% had moderate income

Table (2): Shows that 88% of women were multigravida, 61.4% were primiparous, 86.4% had gestational age; 6-8 weeks at 1st ANC, 64.9% attended antenatal care four or more times, and 59.8% didn't receive counseling on birth preparedness and complications readiness.

Figure (1): Illustrates that about half of women (49.6%) reported that they get their information about birth preparedness and complications readiness from friends and relatives, followed by healthcare workers (24.4%).

Table (3): Reveals that 50.6% of women mentioned the health facility, while only 32.3% were well prepared.

Table (4): Shows that most (84.5%) women were less knowledgeable.

Figure (2): Illustrates that less knowledgeable women were less prepared.

Table (5): Reveals that 68.7% of women had a positive attitude and perception toward birth preparedness and complications readiness.

Table (6): shows that the women's age, educational level, employment, parity, and counseling on birth preparedness are statistically associated with their levels of preparedness (<0.005*, 0.003*, 0.001*,0.001*, and 0.001*) respectively. It also shows that the women's age, employment, education, residence, income perception, gravidity, and parity are statistically associated with their levels of knowledge (0.001*, 0.001*, 0.001*,0.001, *0.001*, 0.001*, and 0.004*) respectively. Finally, it shows that the women's age, employment, education, income perception, gravidity, parity, gestational age at 1st ANC, and receiving counseling on birth preparedness are statistically associated with their attitude (0.001*) for all.

Discussion

This study assessed the factors associated with birth preparedness and complications readiness among pregnant women. It found that most (84.5%) women were less knowledgeable regarding key obstetric danger signs. This is reflected in the low practice of birth preparation found. This may be explained by more than half (59.8%) of women didn't receive counseling on birth preparedness and complications readiness. Pregnant women need accurate information about the danger signs of pregnancy, childbirth, and postpartum, which may occur suddenly and cause high rates of maternal mortality and morbidity. This ultimately helps them to make effective decisions and take accurate action to reach emergency care.

This is consistent with a study carried out in Egypt revealed that 81.67% of women were less knowledgeable about the key danger signs of pregnancy, labor, and postpartum **(Aziz et al., 2020)**. Also, a cross-sectional study reported a suboptimal level of women's knowledge of danger signs **(Smeele et al., 2018) & Letose et al., (2020)** supported the same result.

It is worrying that 49.6% of women were informed about BPCR by friends and relatives, and only 24.4% were informed by healthcare workers. It is supposed for women to get information from reliable sources, including healthcare workers, rather than friends and relatives, which may be inaccurate. This highlights the importance of antenatal health education offered by healthcare professionals. In addition, birth preparedness requires that health facilities be equipped to meet the increased demand for care. This is inconsistent with a study done in Southwest Ethiopia, which concluded that 71.7% of mothers were told about BPCR by health professionals **(Wudu & Tsegaye 2021).** This variation may be due to the good ANC quality confirmed by the Ethiopian study.

In concordance with previous results by other studies **(Yosef & Tesfaye 2021; Anikwe, et al., 2020),** the present study revealed that severe vaginal bleeding during pregnancy, childbirth, and postpartum was the most reported key danger sign. This may be clarified by the women perceiving the bleeding as a dangerous sign that needs immediate action. Contrarily, vaginal bleeding, which is a dangerous sign of antepartum hemorrhage, wasn't mentioned by 35.8% of the respondents.

The present study finding indicated that only 32.3% of women were well-prepared for birth. This could reflect the influence of knowledge on birth preparedness. It implies the need for antenatal care interventions to increase birth preparedness practice and improve maternal survival.

This finding is in line with a community-based comparative study from Southwest Ethiopia **(Letose et al., 2020)** which showed a low prevalence of birth preparedness and complications readiness. Other studies also concluded that most pregnant women weren't prepared for birth and its complications **(Wudu & Tsegaye 2021 & Orwa, et al., 2020).** On the contrary, a cross-sectional study conducted in Ethiopia concluded a relatively higher practice of birth preparation **(Azeze, et al 2019).**

It is worth noting and expected that primiparous women were less prepared than multiparous women. This may be due to the birth preparedness background after the first childbirth among multiparous women. The multiparous women could predict serious complications from their previous experiences. This

indicates the importance of targeting primiparous women in birth preparedness education regardless of education level and/or monthly income.

The commonest birth preparations observed in this study were mentioned, such as the health facility, saving money for emergencies, and arranging emergency transport. This could be explained by the women nowadays choosing their preferred birthplace and preparing for immediate transportation if an emergency occurs. Furthermore, the belief that childbirth is a natural event that happens at home has become non-existent in many places.

For money or alternative funds for costs, women and their families know that it is needed to purchase childbirth equipment and facilitate referrals in case of complications. This is consistent with studies done in Nigeria, which concluded that identification of transport and saving money were the most common birth plans **(Anikwe et al., 2020).**

One important element of birth preparedness is a skilled birth attendant which is essential in reducing maternal mortalities related to birth complications. This item was mentioned by 42.7% of women in this study, which is important for safe childbirth and urgent emergency care. This may be due to their family's encouragement and recommendations. The encouragement may include financial and social support.

Another reason may be that women fear they may face obstetric problems at birth, and to overcome their fear they prefer childbirth by a skilled birth attendant. This finding is not in line with a study conducted in Nigeria, which revealed that none of the women who delivered outside the healthcare facilities received skilled birth attendant care **(Olowokere et al., 2020) & Letose et al., (2020)** found that 22.9% of participants identified skilled health attendants during childbirth and emergencies.

Regarding attitude and perception toward BPCR in the present study, it was found that 68.7% of women had a positive attitude and perception. This is in concordance with the findings of **Aziz et al., (2020)** who reported a positive attitude toward preparing for childbirth in most cases. Another study on birth preparedness has reported a similar finding; a higher proportion of pregnant women (61.8%) had a favorable attitude **(Letose et al., 2020).**

Counseling on danger signs during ANC is an effective strategy to promote birth preparedness and complications readiness. However, maternal age, education, marital condition, employment, parity, and gestational age were associated factors. This was found in this study; middle maternal age, middle education, married non-employed women, multiparous, and gestational age were related to increased birth preparedness.

A similar finding was observed by **Azeze et al., (2019)** in another study. A study conducted by **Letose et al., (2020)** stated other factors such as having an urban residence, early visiting the antenatal clinic (within 12 weeks gestation), attending at least four times, being a government employee, and being a high-income individual.

This study correlated women's age, educational level, employment, residence, income perception, gravidity, and parity with their knowledge levels. This result is reinforced by the study of **Anikwe et al., (2020)** which mentioned the association between education, residence, age, and social state with knowledge of birth preparedness and complications readiness.

As revealed in the present study, the women's age, educational level, employment, income perception, gravidity, parity, gestational age at 1st ANC, and receiving counseling on birth preparedness were associated with their attitude. This finding is similar to the finding of a community-based cross-sectional study conducted in rural Cambodia **(Takahashi & Chuemchit 2016).**

The concept of birth preparedness and complications readiness is an essential tool for safe motherhood. It encourages pregnant women to seek health behaviors and then prevent adverse obstetric outcomes.

Conclusion

This study concluded less knowledgeability, low preparedness, and positive attitude levels among pregnant women regarding BPCR. Maternal age, education, marital condition, employment, parity, and gestational age were correlated with birth preparedness and complications readiness. Women's age, educational level, employment, residence, income perception, gravidity, and parity were associated with women's knowledge levels. Women's age, educational level, employment, income perception, gravidity, parity, gestational age at 1st ANC, and receiving counseling on birth preparedness were associated with women's attitudes.

Recommendations

The study findings recommend the following:

1. Effective health information and promotion programs should be implemented with greater attention to the importance of birth preparedness and complications readiness for all pregnant women.
2. Strategies that improve women's attendance of ANC visits should be supported to empower them with knowledge of obstetric danger signs, which are indications for urgent emergency care.

Acknowledgments
The authors convey their appreciation to all the women who took part in the research and were enrolled in the Antenatal Clinics of New Obstetric and Gynecological Hospital, Mansoura University Hospitals. They appreciate their kind and efficient cooperation, which made this study possible.

Conflict of interest
The authors declare that they have no conflict of interest.

Funding
There was no fund received from any organization or agency.

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