

Factors Associated with Pregnant Women's Dropout from Antenatal Care Visits in Primary Health Care Facilities

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Abstract

Background: Dropout of Antenatal Care (ANC) in El-Beheira Governorate remains a big health challenge. Pregnant women who dropout from ANC visits considered at risk of poor pregnancy outcomes. **Aim of this study:** Is to assess factors associated with pregnant women's dropout from antenatal care visits in primary health care facilities. **Research design:** A descriptive, retrospective research design. **Settings:** this study was carried out in 8 governmental primary health care facilities in 4 health directorates in El-Beheira Governorate. **Subjects:** A convenient sample of 354 women. **Data collection tools:** data were collected using two tools: **Tool (I):** Women's Factors Associated with Pregnant Women's Dropout from Antenatal Care Visits Structured Interview Schedule. **Tool (II):** Health Care Provider Factors Associated with Pregnant Women's Dropout from Antenatal Care Visits Structured Interview Schedule. **Results:** Most of the studied women 81.9% received less than four ANC visits. There was a significant relation between dropout from ANC visits and studied women who were working, who reported that Primary Health Care (PHC) facilities inaccessible, ANC follow-up unscheduled, respondents who were living in rural residence, who assumed that ultrasound not done, and had a low education. **Conclusion:** Both women's and health care provider factors are associated with pregnant women's dropout from ANC visits and most of these factors are preventable. **Recommendations:** Scale up health educational programs for pregnant women to increase their awareness about the importance of routine ANC visits follow up at least four visits and started as early as possible in the first trimester during their pregnancy.

Keywords: Antenatal care, Dropout, factors & Primary health care facilities.

Introduction

Dropout from ANC visits schedule and irregular attendance act as barriers against achieving the target of decreasing dropout rate. Pregnant woman who had less than four ANC visits during their most recent pregnancy is considered dropout from ANC visit schedule (Worku et al., 2021). Globally, 88% of pregnant women access ANC visits at least once between 2015 and 2021 (United Nations International Children's Emergency Fund [UNICEF], 2022). In Egypt, only 14 % received ANC visits in Primary Health Care (PHC) facilities (Ministry of Health and Population [MOHP], 2015) Pregnant women who dropout miss opportunities for early treatment as well as protecting the health of women and their unborn baby (Akinyemi et al., 2016; Mohammed, 2018).

Globally, Maternal Mortality Rate (MMR) declined by more than a third from 2000 to 2017. Yet, tragically, an estimated 810 women continue to die each day due to complications of pregnancy and childbirth mostly from preventable or treatable causes, such as infectious diseases and complications during or after pregnancy and childbirth (World Health Organization [WHO], 2019).

Improving maternal health is one of WHO's key priorities, ANC is one of the key strategies for decreasing maternal and neonatal morbidity and mortality, ANC it is a routine of care provided for pregnant women between conception and the onset of labor (World Health Organization [WHO], 2016).

There are several factors lead to pregnant women's dropout from ANC visits in El-Beheira governorate is still unknown (Ahmed et al., 2017; Farrag et al., 2019). Some studies reported that, the key factors of four or more antenatal care services utilization were receiving a high quality of ANC care, having high income, living with a short distance from the health facility, women involving in the household decision making, having good knowledge concerning ANC service, and positive attitude towards ANC services (Tadesse, 2020; Hamza et al., 2022)

"All women and babies need access to affordable and high quality care before, during and after pregnancy and childbirth". (World Health Organization [WHO], 2019). If the quality of ANC is poor and pregnant women's experience of it is negative, the evidence shows that pregnant women will dropout of the ANC schedule (Asifere et al., 2018).

Community health nurses during ANC visits play an important role she should prepare herself and pregnant woman by greeting her in a friendly manner, listening to her carefully, establish a trusting relationship and jointly develop a plan of care (Lowdermilk et al., 2016). Furthermore, educating pregnant women to follow up at least four visits and started in the first trimester as well as helping pregnant women deal positively with psychological and physical changes throughout the pregnancy to assist for a “big event” (Stanhope & Lancaster, 2017). Therefore, the intent of the present study is to assess the factors associated with pregnant women’s dropout from antenatal care visits in primary health care facilities.

Significance of the study

Dropout from ANC visits results in the potential complications during pregnancy, these complications can involve the mother's health, the fetus's health, or both (Nanda, 2022). Common complications of pregnancy include high blood pressure, gestational diabetes, anemia, preeclampsia, preterm labor, still birth and miscarriage (Janke & Baker, 2022). Getting early and regular ANC visits can help decrease the risk for problems by enabling health care providers to diagnose, treat, or manage conditions before they become serious (Tolefac et al., 2017). It's worth noting that decrease attendance rate from ANC visits in El-Beheira Governorate (Ismail & Essa, 2017). Thus, more effort is needed to identify factors that lead to pregnant women's dropout from ANC visits in primary health care facilities; this weakness point was the question of our study.

Aim of the study:

To assess factors associated with pregnant women’s dropout from antenatal care visits in primary health care facilities.

Research Question:

What are the factors associated with pregnant women’s dropout from antenatal care visits in primary health care facilities?

Operational Definitions

Dropout from ANC visits according to Egyptian MOHP means that, a pregnant woman who did not complete full recommended visit during their pregnancy (a minimum of four ANC visits).

Materials and Methods

Research design: A descriptive, retrospective research design was used to carry out this study.

Setting: This study was carried out in 8 governmental PHC facilities (4 urban and 4 rural health units) provide any of the following services: vaccination, Integrated Management of Childhood Illness (IMCI) and family planning clinic, in 4 health directorates in El Beheira Governorate namely: Kafer El-Dawar, Abo Homs, Damanhour and Kom Hamada.

Subjects: The target population of this study is comprised of 354 women attending the above-mentioned settings during their last pregnancy and who fulfilled the following **inclusion criteria**:

- Woman who had infant (6-12) months of age and visited a PHC facility to receive any of the following services:
- Vaccination
- Integrated Management of Childhood Illness (IMCI).
- Family planning clinic.

Note, the existence of COVID-19 has prevented in the existing time to attending PHC facilities as recommended ANC visits so, studied women who was included in the current study who delivered their fetuses before 6 months.

Sampling technique

- El-Beheira governorate was composed of 16 health directorates.
- Four out of the sixteen health directorates in El-Beheira (Kafer El-Dawar, Abo Homs, Damanhour and Kom Hamada) were selected by using the proportional allocation method, (constitute 25%) of the total health directorates based on the highest number of pregnant women’s dropout from antenatal care visits.
- From each health directorate, A total number of 4 urban and 4 rural health units were selected by using equal allocation technique based on the highest number of pregnant women’s dropout from antenatal care visits to be included in the study.
- A convenient sample of 354 women was selected from the selected settings who fulfilling the mentioned inclusion criteria.

Sample size: It was calculated by using the Epi-info 7 software program through applying the following information: using the following parameter:

1. Target population 4491 women who have less than 4 ANC visits during their last pregnancy from the above-mentioned settings.
2. Expected frequency $p = 50\%$.
3. Acceptable error = 5%.
4. Confidence coefficient = 95%.
5. Sample size = 354 women. By using the following equation to select the subjects from the previously mentioned settings.

$$n_i = \frac{n \times N_i}{N}$$

n = sample size

n_i = sample size allocation to i^{th} stratum

N = population size

N_i = i^{th} stratum size.

Tools for data collection

Two tools were used to collect the required data:

Tool I: Women's Factors Associated with Pregnant Women's Dropout from Antenatal Care Visits Structured Interview Schedule: This tool was developed by the researcher after reviewing the recent literature (Fahmy et al., 2015; Hijazi et al., 2018; Ministry of Health and Population [MOHP], 2015), in order to collect data about the studied women. It consisted of (24 items) divided into two sections, as follows:

Section 1: Socio-Demographic Characteristics: This part is composed of (13 items) regarding to women's age, marital status, residence, women's education, husband's education, women's occupation, husband's occupation, monthly family income, crowding index, accessibility to PHC facilities, affordability of ANC services cost, affordability of transportation cost and family support.

Scoring system:

Socio-economic level of studied women was measured based on updated social scale (Fahmy et al., 2015). Social class assessed by using Family Socio-Economic Status scale (SES). This scale was generated in 1983 by Fahmy and El-Sherbini then; it updated and validated by Fahmy and El-Sherbini in 2015 in English language. The total score calculated for 7 items as follow: (women's education score of 2-8, husband's education score of 1-8, women's occupation score of 0-3, husband's occupation score of 0-4, monthly family income score of 0-5, family size score of 0-5, crowding index score of 0-5), and the maximum score for previous indicators was 38 points.

The total score was transferred into percentage and classified into three social classes as follow:

Score	Interpretation
< 50% (<19)	Low class
50% - < 75% (19-27)	Medium class
≥ %75 (>28)	High class

Section 2: Obstetric History

This section consists of (11 questions) including: gravidity, parity, previous pregnancy complication, types of pregnancy complication, number of abortions, number of stillbirths, number of living children, mode of delivery, place of ANC visit, time of initial ANC visit, and dropout of ANC visits.

Tool II: Health Care Provider factors Associated with Pregnant Women's Dropout from Antenatal Care Visits Structured Interview Schedule: The tool was developed by the researcher after reviewing the recent literature (Ismail & Essa, 2017; Chei, 2017; Hijazi et al., 2018; Bekele et al., 2020) to assess women experience about performance of health care provider in primary health care facilities during their last pregnancy. This part is composed of (44 items)

grouped into six subscales namely: registration, history taking, physical examination, laboratory investigation, health education and follow-up. **Firstly**, registration (5 items) includes a convenient and easy registration, communication in a good manner, treatment in a respectful manner, receiving an ANC record book and appropriate waiting time. **Secondary**, history taking (9 items) includes menstrual history, knowing the expected date of delivery, family history, medical history, gynecological history, obstetric history, vaccination history, history of illness due to pregnancy and history of consuming medicine.

Thirdly, physical examination (11 items) includes a medical procedures explanation, measurement of weight, height and blood pressure, ultrasound examination, uterine fundus examination, fetal position examination, fetal heart sound examination, dental examination, getting tetanus toxoid vaccination, and appropriate consultation time. **Fourthly**, laboratory investigation (4 items) includes measurement of the following: hemoglobin level, albuminuria, glucosuria, and Rhesus factor.

Fifthly, health education (11 items) includes the importance of ANC, package of ANC services, ANC visit schedule, time of initial ANC visit, the importance of ANC follow-up visits, danger signs, balanced diet, sleeping pattern, physical activity, taking prescribed medicine, and clear information.

Finally, follow-up (4 items) includes the follow-up appointments that were scheduled, regular ANC follow-up visits, getting ANC follow-up results and performing home visits.

Scoring system:

Each studied woman was asked by the researcher to respond about each item. A score of 1 was given for yes and a score of 0 was given for no. The total score calculated and ranged from (0:44) and converted into percentage score (Ismail & Essa, 2017 & Chei, 2017). The levels of health care provider performance were classified into:

Score	Interpretation
< 50% (0-22)	Low performance
50% - < 75% (23- 33)	Moderate performance
≥ 75% (34- 44)	High performance

Methods

Administrative process:

- An official letter explaining the aim of the study was issued from the Dean Faculty of Nursing, Damanhour University and directed to the Directorate of Health and Population in El- Beheira Governorate to obtain their permission to conduct the study in the selected settings affiliated to this directorate.
- An official letter from the Directorate of Health and Population in El- Beheira Governorate was

directed to health directorates of selected settings to facilitate the implementation of the study via the researcher.

- Meetings were held with the directors of the selected settings to explain the aim of the study, set the date and time of data collection; assure them that collected data were used only for the study purpose; and gain their approval and cooperation during data collection.

Development of study tools:

Tool I & II was developed by the researcher after reviewing the relevant literature (Fahmy et al., 2015; MOHP, 2015; Ismail & Essa, 2017; Hijazi et al., 2018; Bekele et al., 2020) and translated into Arabic language.

- **Validity** of (Tool I and II) was tested by a jury consisting of a group of (5) experts in the field of Community Health Nursing (CHN) & Obstetric and Gynecological Nursing. Their opinions and suggestions were taken into consideration and the recommended modifications were done accordingly.
- **Reliability** of (Tool II) was tested by was tested for reliability using the cronbach's alpha coefficient test which indicated an accepted reliability of the tool ($\alpha = 0.821$).
- Each woman was interviewed individually after explaining the aim of the study to gain her cooperation.

Pilot study:

The pilot study included (10%) of the subjects chosen at random, total sample 35 + 354 women, then 35 women in pilot study excluded, so main study sample 354 women to test the feasibility and applicability of the tools and to identify obstacles that might interfere with the process of data collection. The necessary modifications were done accordingly.

Collection of data:

- The data were collected individually by interviewing every woman who attended the study setting at working time of PHC facilities (8 am-2pm) using (Tool I & II) after a brief explanation of the purpose and the nature of the research.
- At the beginning of the interview establishment of relationship with each woman the first step was done before data collection, the researcher introduced herself, clarified the purpose of the interview, and ensured the anonymity and confidentiality of the collected data.
- The structured interview (Tool I & II) took approximately 30-40 minutes for each woman.

- Interview and collect the necessary data from Women's who had infant (6-12) months of age and visiting a PHC facility it provides any of services (Vaccination, Integrated Management of Childhood Illness (IMCI) and family planning clinic).
- Data were collected by the researcher over a period of 5 months (from the beginning of January 2021 to the end of May 2021).

Statistical analysis:

- **After data collection**, the collected data were coded and transferred into an especially designed format to be suitable for computer feeding.
- **Data** were entered into a computer and analyzed using the statistical package for social science (SPSS) version 20.
- **After data entry**, data were checked and revised through frequency analysis, cross tabulation, and manual revision to discover any error during data entry.
- Variables were analyzed using **descriptive statistics** which included: percentages and frequencies.
- The significance of association (**P**) was accepted as statistically significant at an alpha level of ≤ 0.05 .
- Chi square test (χ^2) was used to test the relationship between categorical variables. Graphs were done for data visualization by using the Microsoft Excel program.
- Fisher's Exact (^{FE}p) or Monte Carlo (^{MC}p) Correction for chi-square when more than 20% of the cells have expected count less than 5 (invalid Chi square test).
- Multivariate Logistic Regression **Model** was used to indicate the predictors of dropout from antenatal care visits.

Ethical consideration:

- Permission was obtained to collect the data from the previous settings.
- Each director of selected setting was informed about the date and the time of data collection.
- Written informed consent was obtained from studied women included in the study after explanation of the aim of the study and assure them that collected data will be used only for the study purpose and informs them about their voluntary participation.
- Confidentiality and anonymity of individual response was guaranteed by using a code number as an alternative of names.

Results

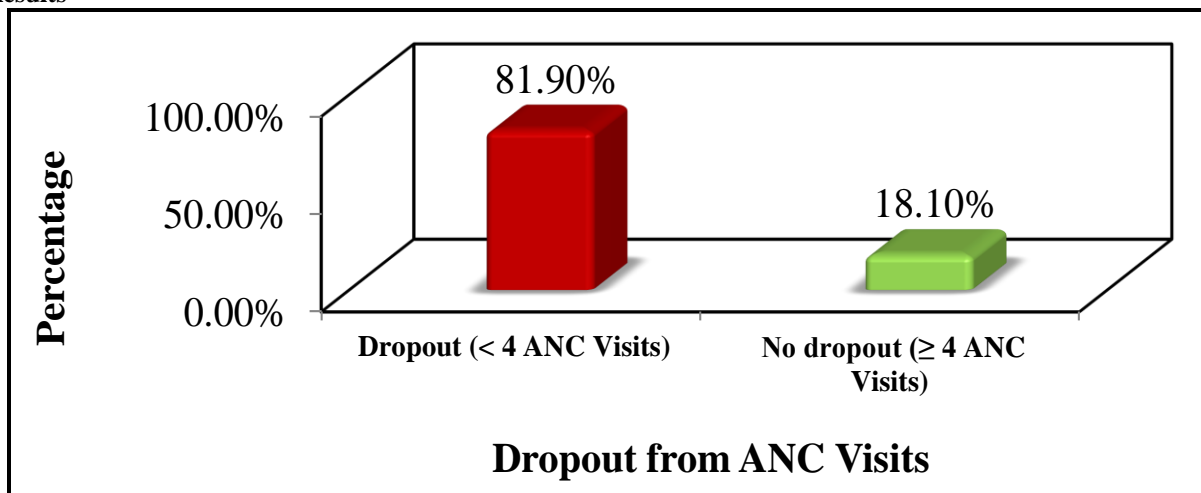


Figure (1): Distribution of the Studied Women According to their Dropout from Antenatal Care Visits in Primary Health Care Facilities During their Last Pregnancy (n = 354)

Table (1): Relationship between Studied Women's Socio-Demographic Factors and Dropout from Antenatal Care Visits During their Last Pregnancy

Socio-Demographic Factors	Dropout from ANC Visits				Total (n = 354)	χ^2	p
	Dropout < 4 (n = 290)		No dropout ≥ 4 (n = 64)				
	No.	%	No.	%			
Age (in years)							
<20	48	67.6	23	32.4	71	18.637	<0.001*
20 –	109	79.6	28	20.4	137		
30 or more	133	91.1	13	8.9	146		
Residence							
Rural	175	92.6	14	7.4	189	31.180	<0.001*
Urban	115	69.7	50	30.3	165		
Women's Education							
Illiterate / Read & Write	65	87.8	9	12.2	74	109.665	<0.001*
Basic Education #	146	93.0	11	7.0	157		
Secondary Education	72	82.8	15	17.2	87		
University Education or more	7	19.4	29	80.6	36		
Husband's Education							
Illiterate / Read & write	43	84.3	8	15.7	51	15.336	0.002*
Basic Education #	110	85.9	18	14.1	128		
Secondary Education	116	83.5	23	16.5	139		
University Education or more	21	58.3	15	41.7	36		
Women's Occupation							
Housewife	259	80.4	63	19.6	322	5.312	0.021*
Working	31	96.9	1	3.1	32		
Husband's Occupation							
Working	279	82.5	59	17.5	338	7.882	MC p=0.011*
Not Working	4	44.4	5	55.6	9		
Not Applicable °	7	100.0	0	0.0	7		
Accessibility to PHC Facilities							
No	175	96.7	6	3.3	181	54.511	<0.001*
Yes	115	66.5	58	33.5	173		

Socio-Demographic Factors	Dropout from ANC Visits				Total (n = 354)	χ^2	p
	Dropout < 4 (n = 290)		No dropout \geq 4 (n = 64)				
	No.	%	No.	%			
Affordability of Transportation Cost							
No	122	91.7	11	8.3	133	13.839	<0.001*
Yes	168	76.0	53	24.0	221		
Husband and Family Support							
No	184	84.0	21	10.2	205	20.188	<0.001*
Yes	106	71.1	43	28.9	149		
Socio-Economic Level							
Low class	103	90.4	11	9.6	114	12.348	0.002*
Medium class	172	79.6	44	20.4	216		
High class	15	62.5	9	37.5	24		

*: Statistically significant at $p \leq 0.05$

MC: Monte Carlo

Primary & Preparatory education

Table (2): Relationship between Studied Women's Obstetric History Factors and Dropout from Antenatal Care Visits During their Last Pregnancy

Obstetric History Factors	Dropout from Antenatal Care				Total (n = 354)	χ^2	p
	Dropout < 4 (n = 290)		No dropout \geq 4 (n = 64)				
	No.	%	No.	%			
Gravidity							
Once	37	68.5	17	31.5	54	11.528	0.003*
Twice	94	79.0	25	21.0	119		
\geq Three	159	87.8	22	12.2	181		
Parity							
Once	41	68.3	19	31.7	60	9.341	0.009*
Twice	137	83.5	27	16.5	164		
\geq Three	112	86.2	18	13.8	130		
No of Living Child							
<3	170	78.0	48	22.0	218	5.954	0.015*
\geq 3	120	88.2	16	11.8	136		
Mode of Delivery							
Vaginal delivery	69	74.2	24	25.8	93	5.086	0.024*
Caesarean section	221	84.7	40	15.3	261		

*: Statistically significant at $p \leq 0.05$

Table (3): Relationship between the Studied Women Experience about Health Care Provider Factors and Dropout from ANC Visits During their Last Pregnancy

Health Care Provider Factors	Dropout from ANC Visits				Total (n = 354)	χ^2	p
	Dropout < 4 (n = 290)		No dropout \geq 4 (n = 64)				
	No.	%	No.	%			
Registration							
Communication in a good manner							
No	196	90.3	21	9.7	217	26.724	<0.001*
Yes	94	68.6	43	31.4	137		
Treat in a respectable manner							
No	199	96.1	8	3.9	207	68.055	<0.001*
Yes	91	61.9	56	38.1	147		

Health Care Provider Factors	Dropout from ANC Visits				Total (n = 354)	χ^2	P
	Dropout < 4 (n = 290)		No dropout ≥ 4 (n = 64)				
	No.	%	No.	%			
Appropriate waiting time							
No	211	85.1	37	14.9	248	5.583	0.018*
Yes	79	74.5	27	25.5	106		
Physical examination							
Ultrasound examination							
No	229	89.5	27	10.5	256	35.424	<0.001*
Yes	61	62.2	37	37.8	98		
Uterine fundus examination							
No	226	85.3	39	14.7	265	8.045	0.005*
Yes	64	71.9	25	28.1	89		
Dental examination							
No	215	84.6	39	15.4	254	4.507	0.034*
Yes	75	75.0	25	25.0	100		
Appropriate consultation time							
No	176	85.4	30	14.6	206	4.113	0.043*
Yes	114	77.0	34	23.0	148		
Health Education							
Important of antenatal care							
No	238	86.2	38	13.8	276	15.718	<0.001*
Yes	52	66.7	26	33.3	78		
Danger signs							
No	209	87.1	31	12.9	240	13.411	<0.001*
Yes	81	71.1	33	28.9	114		
Balanced diet							
No	274	83.3	55	16.7	329	5.833	^{FE} p=0.027*
Yes	16	64.0	9	36.0	25		
Follow-up							
ANC Follow-up scheduled							
No	280	86.4	44	13.6	324	52.247	<0.001*
Yes	10	33.3	20	66.7	30		
Regular ANC follow-up							
No	272	83.4	54	16.6	326	6.385	0.012*
Yes	18	64.3	10	35.7	28		
Home visits							
No	212	86.2	34	13.8	246	9.871	0.002*
Yes	78	72.7	30	27.3	108		

χ^2 : Chi square test ^{FE}p: Fisher's Exact *: Statistically significant at $p \leq 0.05$

Table (4): Relationship between the Health Care Provider Performance and Studied Women's Dropout from ANC Visits During their Last Pregnancy

Health Care Provider Performance	Dropout from ANC Visits				Total (n = 354)	χ^2	P
	Dropout < 4 (n = 290)		No dropout ≥ 4 (n = 64)				
	No.	%	No.	%			
Low performance	87	91.6	8	8.4	95	122.955	<0.001*
Moderate performance	190	90.9	19	9.1	209		
High performance	13	26.0	37	74.0	50		

χ^2 : Chi square test *: Statistically significant at $p \leq 0.05$

Table (5): Multivariate Logistic Regression Analysis of Different Risk Factors Associated with Pregnant Women's Dropout from ANC Visits in Primary Health Care Facilities

Risk Factors	B	SE	OR	95% CI		P
				LL	UL	
Working women	3.049	1.172	21.101	2.120	210.002	0.009*
PHC facilities inaccessible	2.774	0.643	16.023	4.543	56.519	<0.001*
ANC follow-up unscheduled	2.442	0.800	11.491	2.396	55.118	0.002*
Unsupported from husband and family	2.094	0.590	8.117	2.552	25.813	<0.001*
Rural residence	2.089	0.672	8.078	2.163	30.170	0.002*
low class	1.877	0.687	6.535	1.702	25.101	0.006*
Ultrasound not done	1.861	0.573	6.427	2.089	19.778	0.001*
Low level of women's education #	1.689	0.524	5.411	1.938	15.109	0.001*
Didn't know importance of ANC follow-up	1.463	1.059	4.321	0.542	34.463	0.167
Waiting time inappropriate	0.821	0.666	2.272	0.616	8.386	0.218
Consultation time inappropriate	0.687	0.511	1.987	0.730	5.409	0.179
Age \geq 30 years	0.421	0.577	1.524	0.492	4.719	0.465
Parity \geq 3	-0.166	0.545	0.847	0.291	2.466	0.760
Irregular ANC follow-up	-0.480	0.928	0.619	0.100	3.818	0.605

OR: Odds Ratio CI: Confidence Interval LL: Lower Limit UL: Upper Limit B: Beta weight SE: Standard Error *: Statistically significant at $p \leq 0.05$ #: illiterate, read & write, primary & preparatory education

Figure (1): Demonstrates the distribution of the studied women according to dropout from ANC visits during their last pregnancy. It was evident from the figure that, the highest percent (81.9%) of the studied women had dropout from ANC (less than 4) visits in their previous pregnancy. While approximately less than one fifth (18.1%) of them had no dropout from ANC (4 or more) visits.

Table (1): Illustrates the relationship between studied women's socio-demographic characteristics factors and dropout from ANC visits during their last pregnancy. Regarding to **women's age** it was evident that the majority (91.1%) of the studied women aged 30 years or more had less than four ANC visits. A statistically significant relation was observed between women's age and dropout from ANC visits ($\chi^2 = 18.637$, $p < 0.001$).

With respect to **place of residence**, the table illustrates that the majority (92.6%) of the studied women who were living in rural areas got less than four ANC visits. There was a significant relation between the place of residence and dropout from ANC visits ($\chi^2 = 31.180$, $p < 0.001$).

In relation to **women's education**, the table demonstrates that the majority (93.0%, 87.8%, and 82.8%) of the studied women who had basic education, illiterate /read and write and secondary education had dropout from ANC visits respectively. There was a significant relation between the women's education and dropout from ANC visits ($\chi^2 = 109.665$, $p < 0.001$).

Concerning to **husband's education**, the table shows that most of the studied women

(85.9%, 84.3%, 83.5%) whose husbands had a basic education, illiterate /read and write, and a secondary education had dropout from ANC visits respectively. There was a significant relation between the husband's education and dropout from ANC visits ($\chi^2 = 15.336$, $p = 0.002$).

Regarding to **women's occupation**, the table shows that the majority (96.9%) of the studied women who were working had dropout from ANC visits. There was a significant relation between the women's occupation and dropout from ANC visits ($\chi^2 = 5.312$, $p = 0.021$).

Concerning to **husband's occupation**, the table reveals that more than three quarters (82.5%) of the working husbands' wives had less than four ANC visits, there was a significant relation between the husband's occupation and dropout from ANC visits ($\chi^2 = 7.882$, $p = 0.011$).

Regarding to **accessibility to Primary Health Care (PHC) facilities**, it was clear that the majority (96.7%) of the participants who alleged that they had a problem with the accessibility to primary health care facilities got less than four ANC visits. There was a statistically significant relation between accessibility to primary health care facilities and dropout from ANC visits ($\chi^2 = 54.511$, $p < 0.001$).

Concerning to **affordability of transportation cost** it was obvious that the majority (91.7%) of the studied women who complained that transportation cost wasn't affordable had less than four ANC visits. A statistically significant relation was observed between affordability of transportation cost and dropout from ANC visits ($\chi^2 = 13.839$, $p < 0.001$).

Regarding to **husband and family support**, the table also highlights that most of the studied women (84.0%) who mention that they received no support from their husbands and family got less than four ANC visits. There was a statistically significant relation between husbands and family support and dropout from ANC visits ($\chi^2 = 20.188$, $p < 0.001^*$).

Concerning to **socio-economic level**, the table reveals that the majority (90.4%) of the studied women who had a low socio-economic class had less than four ANC visits. There was a significant relation between socio-economic level and dropout from ANC visits ($\chi^2 = 12.348$, $p = 0.002^*$).

Table (2): Illustrates the relationship between studied women's obstetric history factors and dropout from antenatal care visits during their last pregnancy. Regarding to **gravidity**, the majority (87.8%) of the studied women who had gravidity three or more had less than four ANC visits. A statistically significant relation was observed between gravidity and dropout from ANC visits ($\chi^2 = 11.528$, $p = 0.003^*$).

Concerning to **parity**, 86.2% of the studied women who had parity three or more had less than four ANC visits. There was a statistically significant relation observed between parity and dropout from ANC visits ($\chi^2 = 9.341$, $p = 0.006^*$).

In relation to **living child**, the majority (88.2%) of the studied women who had three or more live children had less than four ANC visits. A statistically significant relation was observed between number of living child and dropout from ANC visits ($\chi^2 = 5.954$, $p = 0.015^*$).

Regarding to **mode of delivery**, more than three quarters (84.7%) of the studied women who delivered caesarean section had less than four ANC visits. There was a statistically significant relation observed between mode of delivery and dropout from ANC visits ($\chi^2 = 5.086$, $p = 0.024^*$).

Table (3): Displays the relationship between the studied women experience about health care provider factors and dropout from ANC visits during their last pregnancy. Concerning to **registration**, the table reveals that the majority (90.3%) of the studied women who mentioned that the **communication of health care provider** was inappropriate had less than four ANC visits. There was a statistically significant relation between the communication of health care provider and dropout from ANC visits ($\chi^2 = 26.724$, $p < 0.001^*$).

In addition to that, the majority (96.1%) of the studied women who reported that the health care provider didn't **treat them respectably** had less than four ANC visits. There was a statistically significant relation between the respectable manner of health care provider and dropout from ANC visits ($\chi^2 = 68.055$, $p < 0.001^*$).

Moreover, it was obvious that 85.1% of the studied women reporting **waiting time** wasn't appropriate had less than four ANC visits. A statistically significant relation was observed between waiting time and dropout from ANC visits ($\chi^2 = 68.055$, $p < 0.001^*$).

Pertaining to **physical examination**, the table also revealed that the majority (89.5%) of the studied women who had less than four ANC visits assumed that the **ultrasound examination** wasn't entirely done. There was a statistically significant relation between ultrasound examination and dropout from ANC visits ($\chi^2 = 35.424$, $p < 0.001^*$).

Additionally, 85.3% of the studied women who complained that the **uterine fundus examination** wasn't entirely performed had less than four ANC visits. A statistically significant relation was observed between uterine fundus examination and dropout from ANC visits ($\chi^2 = 8.045$, $p = 0.005^*$).

Moreover, most of the studied women (84.6%) who alleged that **dental examination** wasn't entirely conducted had less than four ANC visits. There was a statistically significant relation between dental examination and dropout from ANC visits ($\chi^2 = 8.045$, $p = 0.005^*$).

In addition to that, this table also shows that 85.4% of the studied women who reported that the **consultation time** was inappropriate had less than four ANC visit. A statistically significant relation was observed between consultation time and dropout from ANC visits ($\chi^2 = 4.113$, $p = 0.043^*$).

Concerning to **health education**, the table depicts that 86.2% of the studied women who alleged that didn't get any information about the **importance of ANC** wasn't given had less than four ANC visits. A statistically significant relation was observed between health education about the importance of ANC and dropout from ANC visits ($\chi^2 = 15.718$, $p < 0.001^*$).

Moreover, the table also portrays that the majority (87.1%) of the studied women who alleged the health care provider didn't give any instructions about **danger signs** had less than four ANC visits. A statistically significant relation was observed between health education about danger signs and dropout from ANC visits ($\chi^2 = 13.411$, $p < 0.001^*$).

Furthermore, it was clear that more than three quarters (83.3%) of the studied women who assumed that the health care provider didn't give them any information about **balanced diet** had less than four ANC visits. There was a statistically significant relation between health education about balanced diet and dropout from ANC visits ($\chi^2 = 5.833$, $p = 0.027^*$).

Regarding to **ANC follow-up**, it was clear that most of the studied women (86.4%) who reported **ANC follow-up appointments** weren't scheduled had less than four

ANC visits. A statistically significant relation was observed between follow-up appointments and dropout from ANC visits ($\chi^2 = 52.247$, $p < 0.001^*$).

In addition to that, it was obvious that more than three quarters (83.4%) of the studied women got less than four ANC visits reported that their **ANC follow-up visits** were irregular. There was a statistically significant relation between regular ANC follow-up and dropout from ANC visits ($\chi^2 = 6.385$, $p = 0.012^*$).

Lastly, most of the studied women (86.2%) who got less than four ANC visits reported that the health care provider didn't conduct any **home visits** during their previous pregnancy. There was a statistically significant relation between home visits and dropout from ANC visits ($\chi^2 = 9.871$, $p = 0.002^*$).

Table (4): Displays the relationship the health care provider performance and studied women's dropout from ANC visits during their last pregnancy. The table shows that the majority (91.6%) of the studied women who reported that health care provider performance was low had dropout from ANC visits. There was a significant relation between health care provider performance and dropout from ANC visits ($\chi^2 = 122.955$, $p < 0.001^*$).

Table (5): Illustrates the multivariate logistic regression analysis of different risk factors associated with pregnant women's dropout from ANC visits in primary health care facilities. Based on the findings, the most independent high-risk factors associated with pregnant women's dropout from ANC visits in primary health care facilities, working women (OR = 21.101, $p = 0.009^*$), studied women who reported that PHC facilities inaccessible (OR = 16.023, $p < 0.001^*$), ANC follow-up unscheduled (OR = 11.491, $p = 0.002^*$), those who were unsupported from husband and family (OR = 8.117, $p < 0.001^*$), respondents who were living in rural residence (OR = 8.078, $p = 0.002^*$). Moreover, studied women who had a low class (OR = 6.535, $p = 0.006^*$), who assumed that ultrasound examination not done (OR = 6.427, $p = 0.001^*$), and who had a Low level of education (OR = 5.411, $p = 0.001^*$).

Discussion

Antenatal care is essential for protecting the women's health and their unborn children (**United Nations International Children's Emergency Fund [UNICEF], 2019**). Despite the investment in the health sector, there is still a notable dropout of women from ANC visits during their last pregnancy caused by a range of factors.

Firstly, in the current study, it was clear that most of the studied women (81.9%) had a **dropout from ANC visits** during their last pregnancy, compared to approximately one fifth of them having ANC visits four or more. These findings were in unison with a study conducted by **Stanikzai et al., (2021)** in Afghanistan, who revealed that only 21.7% of mothers claimed the recommended four ANC visits.

The current finding is relatively similar to the study by **Ismail & Essa, (2017)** in El-Beheira Governorate Egypt, who stated that 62.0% of the study subjects received less than four ANC visits.

On the other hand, these findings are contraindicated by **Hijazi et al., (2018)** in Jordan, who reported that 36.6% of women received inadequate number of ANC visits. This discrepancy can be attributed to regional differences which reflect that some regions in Egypt are in more need of focusing and devoting efforts to primary health care facilities improvement.

Secondly, in the current study **several factors** were found to be associated with above mentioned **dropout from ANC visits** and affected utilization for ANC services. Regarding to **socio-demographic characteristics** of these women, this study revealed that **women's age** was an important determinant of dropout among the participants. The highest percentage of older women aged 30 or more were more likely to have less than four ANC visits than younger women. This is in line with the study conducted by **Suleman et al., (2021)** in Ethiopia, who reported that older women were less likely to have adequately utilized ANC services than the younger. By contrast, a study done by **Worku et al., (2021)** in Ethiopia, who illustrated that women age range from 30 to 39 years were less likely to dropout of ANC services. This could be explained by the fact that young women may be more careful about their pregnancy and therefore require institutional care than older women.

The **women's residence** may give an idea of the circumstances in which the pregnant woman lives. The present study showed that the residence had a significant association with dropout from ANC visits. Similarly, utilizing ANC services has been wider among urban than rural women in Egypt over the past years, and this was evident in the following survey done throughout MOHP (2022) (**Ministry of Health and Population [MOHP], 2022**). By contrast, a study done by **Farrag et al., (2019)** in Damietta Governorate, Egypt, which stated that ANC services utilization was higher in urban than rural population. This might be explained by the fact that studied women living in rural areas spend more time on their multiple responsibilities.

Education might have a direct impact on pregnant women's and their unborn health. As regard to **women's education**, the current findings showed that the majority of the studied women with a basic education, illiterate /read and write and secondary education had less than four ANC visits. This result is consistent with **Bhowmik et al., (2020)** in Bangladesh, who reported that women who have a poor education are less likely to use ANC services

The present study also revealed that there was a significant relation between the **husband's education** and dropout from ANC visits. It was noticed that most of the studied women's whose husbands had a basic education, illiterate /read and write, and a secondary education had less than four ANC visits, compared by those who had a university education or more. The same finding was mentioned by **Shibre et al., (2021)** in Guinea, who illustrated that level of education, both maternal and partner, was identified as a determinant for the utilization of ANC services.

Regarding the association between the **women's occupation** and dropout from ANC visits, the present study revealed that the majority of the studied women who were working had dropout from ANC visits compared with housewives. These results were in agreement with **Wolde et al., (2019)** in Ethiopia, who reported that there was an association between women's employment and utilization ANC services. On the other hand, these results didn't match the results by **Badolo et al., (2022)** in Burkina Faso, who showed that higher rates of regular utilization of ANC services among working mothers. This discrepancy might be lack of time and busy making money for the basic needs of their families.

In the current study, it was obvious that the majority of women's husbands were working. The **husband's occupation** was significantly associated with the dropout from ANC visits. More than three quarters of the working husbands' wives had dropout from ANC visits in PHC facilities compared with those who were not working. In conflicting to these results, the study done by **Belay et al., (2022)** in Ethiopia, who illustrated that the husband's occupation influenced maternal health care services utilization. This variation could be explained by the fact that most Egyptian women are socioeconomically dependent on male partners who are decision-makers in households. Additionally, **accessibility to PHC facilities** was a barrier for seeking ANC services in this study the majority of participants alleged that they had a problem with the accessibility to PHC facilities got less than four ANC visits. There was a statistically significant relationship between accessibility to PHC facilities and dropout from ANC visits. This is in line with findings by **Bekele et al., (2020)** in Ethiopia, who reported that a very strong association between distance to PHC facilities and the attendance of ANC services.

Regarding to **transportation cost**, in this study the majority of the studied women who complained that to transportation cost wasn't affordable had less than four ANC visits. There was a statistically significant relationship between transportation costs and dropout from ANC visits. This was parallel with study by **Tsegaye et al., (2021)** in Addis Ababa, who stated

that the shortage of transportation to-and-from facilities was one of the potential barriers for attending ANC services.

Pregnant women who get **support from their husbands and family** can serve as a preventive strategy to reduce stress. In the current study, most of the studied women indicated that they didn't get any support from their husbands and family had less than four visits, with a significant relationship with dropout from ANC visits. These results are in line with findings by **Liem et al., (2022)** in Indonesia, which showed that 53.3% of respondents don't have husband's support.

With respect to **socio-economic level**, the findings of this study showed that the majority of the studied women were of low socio-economic class had less than four visits, with a significant relationship between socio-economic level and dropout from ANC visits. The same result was postulated by **Muchie, (2017)** in Ethiopia, who stated that women of poor household less likely to complete four or more ANC visits as compared to those in the rich household.

Regarding to obstetric characteristics, in the current study it was noticed that pregnant women who had less than four visits were high among women whose **parity** was three or more, with a statistically significant relation observed between parity and dropout from ANC visits. These results support the study done by **Adedokun and Yaya, (2020)** in Sub-Saharan Africa, who showed that women with parity once are more likely to adequately utilize antenatal care compared to women with parity five or more. On the other hand, these findings are contraindicated with **Tekelab et al., (2019)** in Ethiopia, who reported that parity has no association with utilization of antenatal care services.

Regarding to **mode of delivery**, the current study portrayed that A statistically significant relation observed between mode of delivery and dropout from ANC visits. **Similar pictures** were found by **Abdel-Tawab, (2018)** in Egypt, who showed that pregnant women who received ANC visits in private facilities more likely to deliver via caesarean section.

Thirdly, the studied women highlighted **several factors** associated with **dropout from ANC** visits related to previous pregnancy experience about health care provider performance. In relation to **communication of health care provider**, the table reveals that the majority (90.3%) of the studied women who mentioned that the inappropriate communication had less than four ANC visits. These findings agreed with the finding of **Ernawaty et al., (2019)** in Indonesia, who illustrated that health care provider's communication had a significant influence on the ANC visits of pregnant women.

Concerning to disrespect in the present study, the majority of studied women who reported that the health care provider didn't **treat them respectably** had less than four ANC visits. The findings of these studies were in accordance with study done by **Tsegaye et al., (2021)** in Addis Ababa, who illustrated that barriers for loss to follow up from ANC services to PHC facilities were disrespectful care. In contrast, the study conducted by **Hijazi et al., (2018)** in Jordan, who reported that 82.7% of adequate ANC attendance were among women who were often treated in a respectful manner. The variance may be due to; health care providers didn't understand respectful care during focused ANC is believed to be the most cost-effective intervention.

In the current study, most of the studied women who reported that **waiting time** wasn't appropriate had less than four ANC visits, with a statistically significant relation was observed between waiting time and dropout from ANC visits. These results are in harmony with those observed by **Steenland et al., (2019)** in Mozambique, who shown that waiting time for ANC services is perceived as a significant barrier to pregnant women seeking ANC visits. On the other hand, these findings are contraindicated with **Rahman et al., (2016)** in Malaysia, who reported that the majority of pregnant women were satisfied with the waiting time for ANC services. The difference can be attributed to shortage of staff, overloading of studied women in the ANC clinic during morning time this causes long queues and aging equipment.

Regarding to **Physical examination**, in the current study, the majority of studied women assumed that the **ultrasound examination** wasn't entirely done, with a significant relationship between ultrasound examination and dropout from ANC visits. These findings are in consistent with result of study, which was conducted by **Afulani et al., (2019)** in Kenya, who observed that only 16.0 % of pregnant women received an ultrasound examination during ANC visits. In contrast, the study conducted by **Luntsi et al., (2022)** in Nigeria, who demonstrated that there was a significant increase in the number of ANC visits after introduction of ultrasound services. These findings are not surprising which can be explained by the fact according to the present finding that limited availability of ultrasounds may be out of service.

Additionally, in the current study most of the studied women observed by health care providers weren't entirely performed **uterine fundus examination** had less than four ANC visits. There was a statistically significant relation between uterine fundus examination and dropout from ANC visits. This is in line with result of study which was conducted by **Mahmoud et al., (2020)** in Alexandria, who observed that all the study

subjects didn't perform inspection & palpation to the uterine height.

Furthermore, in the current study it is especially worrisome that most of the studied women reported that health care providers hadn't entirely performed **dental examination** had less than four ANC visits. There was a statistically significant relation between dental examination and dropout from ANC visits. This result coincides with a study done by **Albasry et al., (2019)** in Saudi Arabia, who showed that dental services utilization among pregnant women only 13.7% performed routine dental visit.

Concerning **consultation time**, in the current study, more than half of the studied women reported that the consultation time was inappropriate. There was a significant relationship between consultation time and dropout from ANC visits. This result is consistent with **Rurangirwa et al., (2018)** in Rwanda, who demonstrated that more than half of the pregnant women reported that the consultation time provided for them was inappropriate. On the other hand, the findings contraindicated with the findings of **Lire et al., (2021)** in Ethiopia, who found that 32.6% of pregnant women were dissatisfied with the time of consultation. This variation may be due to a shortage of staff, long queues and crowding while receiving the ANC services in PHC facilities.

Regarding to **health education**, it is worth noting from the findings of the current study that, more than three quarters of studied women didn't have any information about the **importance of ANC**, with a statistically significant relation was observed between health education about the importance of ANC and dropout from ANC visits. This finding was supported by **Grum and Brhane, (2018)** in Ethiopia, who revealed that Women who had poor knowledge about importance of ANC were also significantly associated with low utilization of ANC services. On the other hand, the findings disagreement with the study by **Nangolo et al., (2020)** in Rundu, who revealed that most of pregnant women are knowledgeable and have good attitude towards benefits of ANC visits. This variation may be due to mothers who had poor knowledge about the existing ANC services, they haven't benefited optimally from ANC services.

Every pregnant woman needs to be aware about the **danger signs** during pregnancy. In the current study, the majority of studied women who alleged they didn't have any information about danger signs were significantly associated with dropout from ANC visits. This result was in convergence with studies conducted by **Teshoma et al., (2020)** in Ethiopia, who found that the number of ANC visits was variables significantly associated with awareness of the danger signs of pregnancy. On the contrary, the study done by **Tamang et al., (2021)** in Thimphu,

who illustrate that 77.0% of pregnant women cited 'Nurse/midwife' as their source of information on danger signs. The difference can be attributed to inappropriate health education for pregnant women during ANC at each visit.

Unfortunately, in the current study, more than three quarters of the studied women didn't get any information about a **balanced diet** had less than four ANC visits, with a significant relationship with dropout from ANC visits. Similarly, the finding by **Phommachanh et al., (2019)** in Vientiane, which stated that only 16.9% of pregnant women received information about eating variety of food and none of them provided counseling on nutrition. On the contrary, the study done by **Mekonnen et al., (2017)** in Ethiopia, who illustrate that 98.6 % of pregnant women had advised on nutrition from health care providers. This variation may be due to understaffing has been attributed to little time to give quality care, especially in terms of health education.

Interestingly, our study illustrated that scheduling **ANC follow-up appointments** is likely to have an impact on women's decisions about future visits. In the current study, most of the studied women reporting ANC follow-up appointments weren't scheduled had a significant relationship with dropout from ANC visits. These results are in harmony with that observed by **Alanazy & Brown, (2020)** in Saudi Arabia, who found that around half of Saudi mothers had already missed one or more antenatal care appointments.

Additionally, in the current study most of the studied women mentioned that they were irregular **ANC follow-up visits** and there was a significant relationship with dropout from ANC visits. These results were in agreement with **Shinde et al., (2020)** in India, who reported that underutilization of ANC services among pregnant women. Contrary to the findings of **Akowuah & Danquah, (2019)** in Ghana, who reported that with 19.0% irregular ANC visits. This variation might be due to poor availability of some components of ANC provided in PHC facilities. **Home visits**, in the current study, most of the studied women reported that health care providers didn't conduct any home visits during their previous pregnancy. There was a statistically significant relationship between home visits and dropout from ANC visits. These findings are in agreement with the findings of **Stansert et al., (2020)** in South Africa, who reported that 38.0 % of mothers who received a home visit.

Finally, there was a statistically significant regression analysis of different risk factors associated with pregnant women's dropout from ANC visits in PHC facilities. The main significant predictor of receiving less than four ANC visits were studied women who

were working, who reported that PHC facilities inaccessible, ANC follow-up unscheduled, unsupported from husband and family, respondents who were living in rural residence, who had a low class, who assumed that ultrasound examination not done, and had a low level of education. These findings are in agreement with the findings by **Muchie, (2017)** in Ethiopia, who reported that the inadequacy of utilization of ANC visits was associated with low educational status, low economic level, late age groups, and rural residence.

Therefore, efforts should be made for the continuous training of the health care providers at PHC facilities as they may improve their performance, and health promotion, health education, special attention must be given to increasing resources to improve the quality of ANC services in the El-Beheira Governorate to help mobilize many pregnant women to utilize the ANC services to ensure safe motherhood.

Conclusion

Based upon the results of the present study, it can be concluded that, more than three quarters of the studied women have dropout from ANC visits during their last pregnancy. Both women's and health care provider factors are associated with pregnant women's dropout from ANC visits and most of these factors are preventable. There was a significant relation between dropout from ANC visits and studied women who were working, who reported that PHC facilities inaccessible, ANC follow-up unscheduled, unsupported from husband and family, respondents who were living in rural residence, who had a low socio-economic class, who assumed that ultrasound examination not done, and had a Low level of education.

Based on the current study findings the following recommendations are suggested:

For pregnant women

Encourage pregnant women who especially with their increasing age to conduct their ANC visits on time.

Encourage pregnant women who first time ANC visitors to increase the chance for a return ANC visit and recommended for other.

Increase mothers' awareness about importance of antenatal care visits, antenatal visits schedule and the importance of healthy practices among pregnant women.

For health care providers

Provide training programs to health care providers to enhance their knowledge and performance regarding antenatal care.

Further studies:

Further study is proposed to investigate of nurse's performance in antenatal care unit.

Further study is needed to explore factors affecting the provision of antenatal care services at the time-of-service delivery.

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