

## Original Article

# Patterns and Determinants of Utilization of Antenatal Care Services by Pregnant Women in Sohag, Upper Egypt

Rasha A. Ali, Seham A. Abo-Kresha <sup>Y</sup>

Department of Public Health & Community Medicine, Faculty of Medicine, Sohag University, Egypt

## Abstract

**Background:** The objective of antenatal care (ANC) services is to achieve a healthy pregnancy and clean and safe delivery and birth of a full-term healthy baby with further reduction of maternal and fetal mortality by providing comprehensive health care for women before and during pregnancy.

**Objective:** The aim of this study is to determine the utilization pattern of ANC services and its determinants among pregnant women in Sohag Governorate.

**Methods:** This cross-sectional study included 955 pregnant women in their third trimesters who attended eight randomly selected maternal and child health (MCH) and primary healthcare centers of Sohag Governorate for antenatal care services in a duration of 6 months. Socio-demographic data, ANC knowledge, and data on the adequacy of utilization of ANC services were collected using structured questionnaires.

**Results:** The mean knowledge score of the surveyed pregnant women was  $3.1 \pm 1.1$ , indicating fair knowledge. Overall, 76.5% of the surveyed women adequately utilized antenatal care services, and the predictors of proper utilization were urban residence, higher education and good knowledge regarding the importance of prenatal care services, and the utilization of the available services.

**Conclusion:** Most of the study participants exhibited fair knowledge and adequate utilization of antenatal care services. Moreover, urban residence, higher education, good knowledge regarding the importance of prenatal care services, and utilization of available services are among the important factors that influence the utilization of antenatal services.

**Keywords:** Antenatal care utilization, knowledge

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✉Correspondence:

Email: [sehamghalib@yahoo.com](mailto:sehamghalib@yahoo.com)

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## INTRODUCTION

Maternal health means the health of women during the childbearing years, including pre-pregnancy period, pregnancy, and caring of young children.<sup>(1)</sup> The objective of maternal health care is to reduce maternal morbidity and mortality rates, which may be achieved through comprehensive health care for women before and during pregnancy, during and after labor, and in the inter-pregnancy periods.<sup>(2)</sup> The Millennium Development Goal that is relevant to maternal health care is Goal 5, which aimed to scale back maternal mortality by three-quarters between 1990 and 2015. This is often the goal toward which the smallest amount of progress has been made thus far.<sup>(3)</sup> Estimated maternal deaths had been reduced by 35% (from 451,000 in 2000 to 295,000 in 2017). Moreover, the worldwide maternal mortality ratio (MMR) in 2017 was estimated to be 211

deaths per 100,000 live births, indicating a 38% reduction since 2000, when it had been estimated to be 342. The typical annual rate of reduction within the global MMR was 2.9%.<sup>(4)</sup> Regional differences are present, with MMR being the lowest in urban governorates and the highest in frontier governorates.<sup>(5)</sup> Maternal healthcare services include utilization of antenatal, intranatal, and postnatal care services. The goal of antenatal care (ANC) is to achieve a healthy pregnancy and safe delivery and birth of a full-term healthy baby. Its components include registration and recordkeeping, periodic examination including laboratory tests, risk management, immunization, referral as required, psychological support, health education, supplementation with the needed vitamins and minerals, home visits, and social care.<sup>(6, 7)</sup> Women should visit health facilities for ANC at least four times during their pregnancy period to increase the chance of good skills attendant at birth time.<sup>(6-8)</sup> Accordingly,

utilization of maternal health services depends on their availability and the feasibility of the provided services and socio-economic, demographic, and cultural factors of pregnant women, including women's age and education, education of their husbands, employment, residence, autonomy, and economic status.<sup>(9, 10)</sup> Furthermore, the aim of this study is to determine patterns and determinants of the utilization of antenatal care services among a sample of Egyptian women in Sohag Governorate.

## METHODS

### Research design and time

This is a cross-sectional study conducted on pregnant women at the MCH centers and primary healthcare units of Sohag Governorate for antenatal care services in a duration of 6 months (from July to December 2019) to assess their ANC knowledge and patterns and determinants of adequate utilization of ANC services among pregnant women in Sohag.

### Study setting, study population, and sampling technique

Sohag Governorate is located in the southern part of Egypt and consists of 12 districts with an estimated 5.5 million inhabitants. A multi-stage sampling technique was used to collect the required sample. Based on the districts of the Governorate, four districts were selected using simple random sampling technique, representing four geographical regions (north, east, south, and west). From each district, two regions were chosen randomly, representing both the urban and rural zones in the selected districts. The pregnant women who attended the MCH centers in the urban regions and primary healthcare units in the rural regions for antenatal care services were asked to participate in the study on the condition that they were in the third trimester of pregnancy. From the selected health facilities, sample units were selected and collected proportionally using a systematic random sampling technique (every third pregnant woman).

### Sample size

The sample size was calculated by the OpenEpi program (Version 3.01, Open Source Epidemiologic Statistics for Public Health, USA) according to the following conditions: ANC utilization rate was 50%; power was 80%, and the confidence interval was set at 95%. Based on these assumptions, the sample size was calculated to be 384 participants. The sample size was then tripled to enhance the proper representation of all regions of the Governorate, and the final sample was 955 as the response rate was 82.5%.

### Data collection and study instrument

The data were collected through personal interviews with pregnant women attending the aforementioned health facilities during the third trimester of pregnancy using a structured questionnaire that was designed to have three sections. The first section inquires about the socio-demographic profile of pregnant women (age, residence,

education, and work status of the surveyed pregnant women and their husbands, family size, and income). We defined prenatal visits as meetings with a physician or a midwife for the medical supervision of pregnancy. The second section assessed the knowledge of the surveyed woman as regards the timing of the first antenatal care visit during the first trimester of pregnancy, the importance of regular antenatal care visits and having at least four visits during pregnancy, healthy nutrition in pregnancy, tetanus vaccination, hazards of having medication without the advice of a doctor. The participants were asked to choose one of three options: "correct," "incorrect," or "don't know." A score of 1 point was given when the answer was "correct," and 0 points were given when the answer was "incorrect" or "don't know."

The third section assessed the utilization of ANC services by the surveyed pregnant women using four questions: <sup>(1)</sup> whether the first antenatal care visit was in the first trimester, <sup>(2)</sup> whether a participant had four antenatal care visits during the whole pregnancy, <sup>(3)</sup> whether she had tetanus vaccine, and <sup>(4)</sup> whether she had a full course of iron and folic acid. The surveyed women were allowed to answer "yes" or "no." A score of 1 point was given to the answer of "yes," and 0 points were given for the answer of "no." A score of 3 or more was considered to be adequate utilization of ANC services, and a score below 3 was considered to indicate inadequate utilization of ANC services.

### Statistical analysis

The Statistical Package for the Social Science program (version 20) was used for the grouping, tabulation, and statistical analysis of the data. The sample characteristics were summarized as the means and standard deviations (SD) for continuous variables and percentage for categorical variables. We assessed the relative importance of socio-demographic variables in explaining the adequacy of utilization of ANC using a chi-squared test and an independent t-test. A *p* value below 0.05 was considered statistically significant. Furthermore, a forward stepwise logistic regression analysis was used.

### Ethical considerations

The study conformed to the international ethics guidelines and that of Declaration of Helsinki (2013). The research proposal was approved by the Scientific Research Ethical Committee of the Faculty of Medicine, Sohag University, before data collection started. During the data collection stage, the surveyed pregnant women provided signed informed consent and were briefed on the purpose of the study, ensuring strict confidentiality and anonymity of all the collected data.

## RESULTS

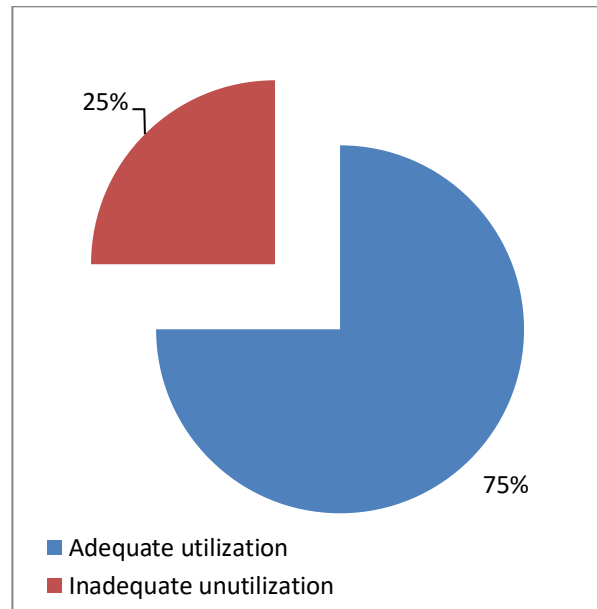
Regarding the socio-demographic characteristics, more than half (54.9%) of the study participants were in the 18–29 age range, and more than half (53%) of them resided in

rural areas. The largest percentage of the studied pregnant mothers (42.3%) had less than high school education; 44.7% of them had been married to highly educated men. Moreover, a large proportion (65.1%) of the studied pregnant mothers was housewives. Table 1 presents detailed data on the socio-demographic profile of the study participants.

Figure 1 displays the utilization rate of ANC services by the studied pregnant women; most of the study participants (77%) adequately utilized the provided ANC services.

**Table (1): Socio-demographic profile of the study participants in Sohag, Egypt**

Variable	Summary statistics
	(n = 955) No. (%)
<b>Age (mean ± SD)</b>	30.4 ± 3.8
18–29	525 (54.9)
30–40	478 (50)
40–45	25 (4.9)
<b>Residence</b>	
Urban	448 (47)
Rural	507 (53)
<b>Education of the woman</b>	
Illiterate	224 (23.4)
Less than high school	404 (42.3)
High school education	159 (16.6)
University education	168 (17.7)
<b>Education of the husband</b>	
Illiterate	40 (0.4)
Less than high school	300 (31.4)
High school education	445 (44.7)
University education	170 (17.8)
<b>Occupation of the woman</b>	
Housewife	637 (65.1)
Working woman	348 (34.9)
<b>Number of members in the family</b>	
3–4	231 (23.2)
5–6	558 (56)
7–9	156 (15.8)
<b>Family income</b>	
Unsatisfactory	290 (30.3)
Satisfactory	417 (43.7)
More than enough	248 (26)



**Figure (1): Pattern of utilization of ANC services among pregnant women in Sohag, Upper Egypt**

With regard to the knowledge of the pregnant women on antenatal care, their mean score of knowledge was 3.1. Most of them (41.9%) knew that the first ANC check-up should be performed in the first 3 months (44.9% of them were aware that a pregnant woman needs at least four ANC follow-ups throughout her pregnancy). More than half of the study participants (52.2%) knew the importance of eating healthy food during pregnancy, and the majority of them (60.8%) knew that a pregnant woman needs vaccination during the pregnancy period (Table 2).

Table 3 presents the association between the socio-demographic factors of the study participants and adequacy of utilization of ANC services. Women aged between 18 and 29 years, those who had university education, those whose husbands had a university education, and those who resided in urban areas significantly utilized the provided ANC services more adequately (*p* value < 0.05).

**Table (2): Distribution of the surveyed pregnant women regarding their knowledge about ANC in Sohag, Egypt**

Knowledge about antenatal care	Correct answer (n = 955)
	No. (%)
Should the first ANC check-up be performed in the first 3 months?	400 (41.9)
Does a pregnant woman need to visit health facilities for ANC at least four times throughout her pregnancy?	429 (44.9)
Do pregnant women need regular ANC follow-up?	367 (38.4)
Is a full course of folic acid and iron supplementation essential for pregnant women?	442 (35.8)
Is eating healthy food essential for pregnant women?	502 (52.6)
Is a tetanus vaccine extremely needed?	581 (60.8)
Is the intake of medication without physician prescription hazardous for the fetus?	433 (53.3)
<b>Mean score ± SD</b>	3.2 ± 1.1
<b>Min–max</b>	2–7

**Table (3): Relation between socio-demographic characteristics of the surveyed pregnant women and their antenatal service utilization pattern**

Variable	Inadequate utilization (n = 239) No. (%)	Adequate utilization (n = 756) No. (%)	p value
<b>Age (mean ± SD)</b>			
18–29	95 (21)	357 (79)	0.025
30–39	137 (28.7)	341 (71.3)	
40–45	7 (28)	18 (72)	
<b>Residence</b>			
Urban	91 (20.3)	357 (79.7)	0.004
Rural	148 (29.2)	359 (70.8)	
<b>Education of the woman</b>			
Illiterate	73 (32.6)	151 (67.4)	0.006
Less than high school	98 (34.3)	306 (75.7)	
High school education	39 (24.5)	120 (75.5)	
University education	29 (17.3)	139 (82.7)	
<b>Education of the husband</b>			
Illiterate	15 (37.5)	25 (62.5)	0.005
Less than high school	93 (31)	207 (69)	
High school education	100 (22.5)	345 (77.5)	
University education	34 (20)	163 (80)	
<b>Occupation of the woman</b>			
Housewife	165 (25.2)	491 (74.8)	0.07
Working woman	60 (17.3)	288 (82.7)	
<b>Number of members in the family</b>			
3–4	45 (19.2)	168 (80.5)	0.07
5–6	150 (26.5)	416 (73.5)	
7–9	44 (27.8)	114 (72.2)	
<b>Family income</b>			
Unsatisfactory	70 (24.1)	220 (75.9)	0.7
Satisfactory	103 (24.7)	314 (75.3)	
More than enough	66 (26.6)	182 (73.4)	
<b>Mean knowledge score</b>	3.1 (1.1)	3.3 (1.1)	0.03**

\* Chi-squared test

\*\* Independent samples t-test

The forward stepwise regression analysis of the studied socio-demographic factors indicated that urban residence, higher education, and good ANC knowledge were

predictors of the adequate utilization of ANC services among the study participants (Table 4).

**Table (4): Final regression models of the predictors of utilization of ANC services among the surveyed pregnant women in Sohag, Egypt**

Characteristics	OR	CI <sub>95%</sub>	p value
Urban residence	8.023	6.085–9.105	0.000
University education	2.08	1.027–3.042	0.003
High knowledge	1.234	0.945–2.902	0.03

## DISCUSSION

Provision of comprehensive antenatal care services (ANC) ensures good maternal and fetal outcomes of pregnancy.<sup>(11)</sup> Women who are in danger of pregnancy-related complications are in need of both early recognition and continuing attention throughout the pregnancy period. The present study, which was conducted on 955 randomly selected pregnant women in Sohag Governorate, demonstrated a high rate of adequate utilization of ANC services (77%). This is consistent with the study of El-Zanaty who reported that the percentage of Egyptian mothers who had adequate ANC during their last pregnancy was approximately 83%.<sup>(12)</sup> This finding is also

similar to that of studies in Nigeria by Dairo et al.<sup>(13)</sup> and Iyaniwura and Yussuf<sup>(14)</sup> and in Uganda by Kiwuwa et al.<sup>(15)</sup>, wherein the utilization of ANC services was found to be 76.8%, 84.6%, and 94.4%, respectively. However, this was in contrast to what was found in Kano, where only 24.7% of women had visited a clinic or facility for ANC at least once during their pregnancy period.<sup>(16)</sup> The variability in the utilization of ANC between different localities and countries was documented and linked to many factors, but the adequate utilization of ANC in the present study can be explained by the availability of free ANC services and fair awareness of the provided services and their importance.

Knowledge of pregnant mothers about the available ANC services and their importance is considered to be a

major factor in determining the extent of use of antenatal services.<sup>(17)</sup> The mean ANC knowledge score of the surveyed pregnant women was 3.1, which was considered fair compared with the minimum and maximum levels. This might explain the high utilization rate among the studied mothers. In Saudi Arabia, Anjum et al. reported a high level of knowledge that contributed to a positive attitude and good practice pattern among Saudi women.<sup>(18)</sup> In contrast to those results, the ANC knowledge of many women in Saudi Arabia was found to be below average.<sup>(19, 20)</sup>

Early and regular antenatal health care by trained medical providers is very important in assessing the physical status of women during pregnancy.<sup>(21)</sup> The present study found that 41.9% of the pregnant women were aware that the first ANC check-up should be excluded in the primary 3 months of gestation, which means that the early detection of pregnancy-associated dangerous conditions could be managed as early as possible. This percentage is lower than that of El-Zanaty (2008) and Akhtar S et al. who found that 61.0% and 66.9% of women, respectively, encounter an antenatal care provider for the first time within the first trimester.<sup>(22, 23)</sup>

In the present study, approximately 60.8% of pregnant women knew that they needed tetanus vaccination during the pregnancy period. This is consistent with the study by Hassan et al., who found that 79.8% of studied mothers had tetanus toxoid vaccination during their last pregnancy.<sup>(24)</sup> Moreover, El-Zanaty (2015) reported that 75.8% of mothers had received a minimum of one tetanus toxoid dose during their last pregnancy.<sup>(12)</sup>

The utilization of ANC services in developing countries is affected by various factors.<sup>(25)</sup> This study found that urban residence was a predictor of adequate utilization of ANC services ( $p$  value = 0.004). This might be explained by the high accessibility of MCH centers in urban areas to pregnant women in comparison to those in rural areas, where the long distance between the house of the mother and the health facility may constitute a barrier to proper utilization of the provided services. This finding is consistent with that of El-Shirbiny et al., who detected a significant difference in the utilization of ANC between urban and rural areas in Beni Suef Governorate.<sup>(26)</sup> Moreover, Nesrine et al. found that urban residence was positively related to high utilization rate ( $p$  value=0.001).<sup>(27)</sup> The level of education of the pregnant women in the present study was linked to high ANC utilization. A high education level is associated with high awareness about the provided ANC services, resulting in adequate utilization. This finding is consistent with that of many previous studies in Egypt<sup>(28-30)</sup>, which demonstrated that the probability of using ANC services was strongly influenced by the education of pregnant women and their ANC knowledge. In contrast to previous studies conducted in Egypt<sup>(27, 28)</sup>, no association was observed between women's age and occupation, family income, and the

utilization of ANC services. This might be explained by the availability of ANC services to low- and middle-income families. Moreover, housewives had a fair ANC knowledge as working women.

## CONCLUSION AND RECOMMENDATIONS

Overall, most of the study participants exhibited fair knowledge and adequate utilization of ANC services. Moreover, urban residence, higher education, and good knowledge on the importance of prenatal care services and the utilization of available ANC services are among the important factors that influence utilization of antenatal care services. Therefore, more similar studies are required to improve the accessibility of primary healthcare centers in the rural areas of Sohag Governorate and to promote ANC to increase the utilization of ANC services in these areas.

## CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

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