Research Article

Egyptian status of continuum of care for maternal, newborn, and child health: Sohag Governorate as an example

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ABSTRACT

Background: Utilization of maternal health-care service is essential for the improvement of both maternal and child health, reduction in maternal and child mortality**. Objective:** Recognize factors that affect women continuation in getting care through pregnancy, delivery and after delivery. **Material and Methods:** This is a cross-sectional study conducted at Sohag governorate, Egypt, within a period extended from April to August 2017, we approached all women aged 18–49 years, who gave birth in the past 5 years before the survey, attending primary health-care center and mother and child health centers at Sohag city. Bivariate and multivariate logistic regression models were fit, and the significant level was set to be <0.05. **Results:** The study shows that (50.4%) of the participants had achieved (continuum of care), (90%) had antenatal care (ANC4) + visits, (85%) delivered by skilled birth attendance (SBA), and (53.2%) had postpartum care, the result highlights that women's age, education level of both partners, birth orders, socioeconomic status, accessibility of services, and exposure to the mass media, are associated with women's use of ANC, and their continuation to have SBA and postnatal care (PNC). The odd of having SBA and PNC increase for mothers who have urine and blood samples were taken, and blood pressure was measured as a part of antenatal services. **Conclusion:** We conclude that half of the participants complete the continuum of care from pregnancy through postpartum care. Quality of ANC is associated with women's use of SBA and PNC that should be given more attention.

KEY WORDS: Postnatal Care; Continuum of Care; Skilled Birth Attendant

INTRODUCTION

Public health policies focus on decreasing the worldwide load of preventable maternal and child morbidity and mortality, World Health Organization (WHO) estimated maternal deaths globally in 2015 around 303,000 deaths, hence, averagely 830 maternal deaths occur every day.[1] Developing countries have the majority of these deaths, Africa alone account for 62%.[2] Egypt shows great improvement in maternal health recently. Maternal mortality ratio declined from 230 to 66 per 10,00,000 live birth between 1990 and 2010.[3] Most of the deaths happen in the course of delivery and the immediate postpartum period and could be prevented.[4] Correspondingly are neonatal and child mortality, there are about 5.9 million deaths in children under the age of five worldwide in 2015, of them around 2.7 million newborns deaths in the neonatal period (45% deaths of children under age of five).[5,6]

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Utilization of maternal health-care service is essential for the improvement of both maternal and child health, reduction in maternal and child mortality and improving women reproductive health.[7] Successful maternal and child health care (MCH) necessitates increasing the ratio of women who delivered in health institutes with the assistance of trained

staff, which is the basic goal to safe mother and child,[8] also the most effective strategy for reducing newborn mortality and stillbirths is to improved care at birth or delivery.[9] One of the important indicators of progress toward decrease in maternal mortality is child delivery by the assistance of skilled birth attendance (SBA). In developing countries, the proportion of deliveries attended by SBA in 2010 was 65%. In Egypt, the ratio of births protected by regular antenatal care (ANC) (four or more ANC visits during the pregnancy) increased from 23% to 66%, the percentage of births that occurs in a health facility increased from 27% in 1992 to 72% in 2008.[3] However, a complex dynamic lies beneath these overall trends.

A continuum of care (CoC) approach for maternal health is being defended as a means to guarantee that women were given essential services through pregnancy, delivery, and the postpartum period.[10] The services included are ANC for pregnancy-related health care check-ups, (SBA) for delivery and postnatal care (PNC) through postpartum period for mothers and newborn. Primarily, all pregnant women should have sufficient and high-quality ANC during pregnancy, at least by achieving four visits as promoted by the WHO.[11] Regular visits of ANC help women for birth preparation, permitting them to ascertain and treat illness through pregnancy, and usage of health facilities for emergency obstetric care.[12] Second, pregnant women should have SBA from trained and qualified professionals for safe and normal childbirth. Finally, women should have continued care after delivery for themselves and also for their newborns, as the postpartum time is a vital period to avoid complications, which might result in maternal or newborn mortality. In general, completion of the continuum of care follows a pathway from pregnancy to delivery to postpartum, where each step adds value to ensure better health outcomes for mothers and newborns, and also contributes in the reduction of maternal and neonatal mortality.[13]

Aims of the Study

- Determine the proportion of women receive the three types of maternal health care (from pregnancy to childbirth and through postpartum period).
- Recognize factors that affect women's continuation in getting care through pregnancy, childbirth, and after delivery.

MATERIALS AND METHODS

Study Design

This is a cross-sectional study conducted at Sohag Governorate, Egypt, within a period extended from April to August 2017, we approached all women aged 18–49 years, who gave birth in the past 5 years before the survey and attending mother and child health centers at Sohag city, primary health center at El-monsha, Tahta, Dar-El-salam, and Gehina districts, we select women who gave birth 5 years preceding the survey to avoid memory recall bias of the mother. All women approached were asked to participate in the study to recognize factors that affect their continuation in getting care through pregnancy, childbirth, and after delivery; we recruited 2790 women who accepted to participate in the study out of 3650 approached.

Outcome Variables

Complete CoC for maternal health care services was our outcome variable of interest. Complete continuum of care was considered complete when the women received the following services at three levels:

- Achievement of four or more ANC visits at the health facility or at home during pregnancy.
- Childbirth aided by SBA, e.g., doctor, nurse, and midwife.
- PNC for the mothers and newborns within 6 weeks after childbirth.

Complete continuum of care was considered as *discontinued* if the mother missed any one of these steps. In addition, reaching of 4 ANC visits was considered as continued care at pregnancy level while accomplishment of SBA with 4 ANC visit was considered as continued care at delivery level. Eventually, achievement of 4 ANC, SBA, and PNC was stately as continued care at postpartum level, which is also deduced as complete CoC. All the information mentioned in this research is based on self-reports.

Independent Variables

Concerning different factors related to CoC, we incorporated (residence, women age, Women and husband education status, Women and husband employment education status, socioeconomic status, birth order, family type, Accessibility of health, exposure to mass media, Response to Health care decision, Blood pressure measured, blood and Urine samples taken during anti natal visits) as the factors that might influence utilization of maternal healthcare services.

Ethics

The study protocol got the approval of the Ethical Committee at Sohag Faculty of Medicine. We elucidated all the study details, and related terminologies were clearly defined to the study participants. Written informed consent was obtained from each respondent before their interview.

Statistical Analysis

Data were analyzed using SPSS software program version 22.0. Quantitative data were expressed as means ± standard deviation, median, and range. We presented the

qualitative data as percentage and numbers. Then, we fit three consecutive regression models to ascertain factors predicting the continuation of care from ANC to SBA and then from SBA to PNC. Initially, bivariate logistic regression analysis was performed between dependent and each of the independent variables, in sequence. Their odds ratios (OR) at 95% confidence interval (CI) and *P*-values were obtained. The results at this phase helped us to recognize important associations. Then, all variables established to be significant at bivariate level were moved into multivariate logistic regression analysis model to check the significance of the association. All *P* values were two-sided, and the significance level was set to be <0.05.

RESULTS

Socioeconomic Characteristics of Participants

Table 1 displays the sociodemographic characteristics of the study participants (aged from 15 to 49 years) who gave birth during the past 5 years. Most of the women were from rural areas (72%) and among the age group of 20–35 years (41%), 30.1% of the participants were illiterate, and 69.7% were unemployed. Contradictory to the participant, most of the husbands were employed (95.6%). 50.5% of the study subjects had four or more children. About (50.8%) of the study participants are within the middle socioeconomic group. Findings highlight that around 51.8% of women had access to mass media, 51% had high autonomy in health-care decision-making, whereas about 60.2% of women found that it is not big problems to seek medical care.

Table 2 displays that about half of the participants (50.4%) had achieved CoC (ANC+4 visit, delivered by skilled birth attendant and had PNC), more than 90% of the studied population had completed ANC+ visits, 85% of the study participants delivered by SBA, and 53.2% had postpartum care.

Univariate and Multivariate Analysis for the use ANC4+ (Model 1)

In Table 3, we tried to identify factors that may influence the utilization of maternal health-care services during pregnancy (ANC4+). Factors found to be significant after the univariate analysis was evaluated for possible association and interaction, by multivariate logistic regression analysis. The overall findings of this Model I indicated that the richest participants had more chances to avail ANC4+ than any other category of economic status ($P < 0.001$; adjusted OR [AOR] 2.1; 95% [CI] [1.3–3.2]). Similarly, the odds of ANC4+ was high for the respondents with highly educated husbands ($P < 0.001$; AOR 1.9; 95% [CI] [1.1–2.3]). Use of ANC services is significantly associated with, working husband ($P = 0.002$; AOR 1.3; 95% [CI] (1.1–2.1]), and working

Table 1: Sociodemographic characteristics of women who had a birth in the past 5 years preceding the study

Characteristics	*n* (%)
Residence	
Urban	781 (28)
Rural	2009 (72)
Women age (years)	
<20	684 (24.5)
20–35	1144 (41)
>35	962 (34.5)
Women's education status	
Illiterate	842 (30.1)
Read and write	478 (17.1)
Obligatory education	528 (19)
Secondary	446 (16)
Faculty	496 (17.8)
Husband education status	
Illiterate	408 (14.6)
Read and write	600 (21.5)
Obligatory education	642 (23)
Secondary	714 (25.6)
Faculty	426 (15.3)
Women's employment	
Not working	1944 (69.7)
Working	846 (30.3)
Husband's employment	
Not working	122 (4.4)
Working	2668 (95.6)
Socioeconomic status	
Low	888 (31.8)
Middle	1416 (50.8)
High	486 (17.4)
Birth order	
1	448 (16.1)
2	568 (20.4)
3	362 (13)
4 or more	1412 (50.5)
Family type	
Simple	1378 (49.4)
Extended	1412 (50.6)
Accessibility of health service	
Problem	1110 (39.8)
Accessible	1680 (60.2)
Exposure to mass media	
No	1346 (48.2)
Yes	1444 (51.8)
Response to health-care decision-making	
No	1420 (50.9)
Yes	1370 (49.1)
Total	2790 (100)

Table 2: Distribution of women by different types of maternal health services received for the most recent birth

ANC+	SBA	Postpartum care	Percentage (%)
−Ve	−Ve	−Ve	10 (0.4)
+Ve	−Ve	−Ve	352 (12.6)
+Ve	+Ve	−Ve	730 (26.2)
+Ve	+ Ve	+Ve	1406 (50.4)
+Ve	−Ve	+Ve	46 (1.6)
−Ve	+ Ve	−Ve	212 (7.6)
−Ve	−Ve	+Ve	14 (0.5)
−Ve	+Ve	+Ve	20 (0.7)
90.8%	85%	53.2%	

+Ve perceived the care, −Ve perceived the care. SBA: Skilled birth attendant, ANC: Antenatal care

women (P = 0.003; AOR 1.9; 95% [CI] [1.1–2.5]). Lower birth order has a significant effect in utilization of MCH services (P = 0.01; AOR 0.4; 95% [CI] [0.2–0.8]), educated women have more chance to achieve ANC+ than illiterate one (P = 0.02; AOR 1.5; 95% [CI] [1.1–1.6]), exposure to mass media (watching TV or listening to the radio at least once a week) (P = 0.03; AOR 1.6; 95% [CI] [1.2–1.9]) and accessibility of health services increase (P = 0.03; AOR 1.3; 95% [CI] [1.1–1.4]) the odd for ANC+, and finally age group 20–35 years has a significant effect in utilization of maternal and child health services during pregnancy (P = 0.03; AOR 1.1; 95% [CI] [1.07–1.4]).

Univariate and Multivariate Analysis for the use ANC4+with Skilled Birth Attendant (Model 2)

In Table 4, we analyzed the predictors of continuation of care from pregnancy to delivery among women who received ANC. Variables related to ANC services (quality of care) were added into this model in addition to those included in Model 1. All variables in Model 1 remain significant after univariate and multivariate analysis. The results from Model 2 indicate the importance of receiving higher quality of ANC for subsequent use of SBA, the odds of having SBA is higher for women of whom urine sample was taken (P = 0.03; AOR 1.1; 95% [CI] [1.06–1.9]), blood sample was taken (P = 0.05; AOR 1.4; 95% [CI] [1.1–2.1]), and for whom blood pressure was measured during the ANC visits (P = 0.05; AOR 1.1; 95% [CI] [1.03–1.5]) 1.1 (1.03–1.5).

Univariate and Multivariate Logistic Regression Model for Factors Associated with CoC (Model 3)

Table 5, illustrates the results of Model 3, complete CoC (ANC4 and SBA and PNC), all variables that showed significant after the univariate analysis were included in the multivariate model which highlights that females who gave birth at the age of 20–35 years were significant associated with CoC (P < 0.001; AOR 1.7; 95% [CI] [1.1–1.8]). Participants belonging to the high socioeconomic status (P < 0.001; AOR 1.6; 95% [CI] [1.1–2.1]), with working husband (P = 0.003; AOR 1.4; 95% [CI] [1.1–1.9]) were more likely to achieve complete CoC. Respondents who was exposed to mass media (P = 0.003; AOR 1.3; 95% [CI] [1.1–1.6]), with higher educational level (P = 0.01; AOR 1.6; 95% [CI] [1.1–1.8]) and they are working (P = 0.01; AOR 1.6; 95% [CI] [1.1–1.9]) with highly educated husband (P = 0.02; AOR 1.2; 95% [CI] [1.1–1.7]), and with low birth order (P = 0.01; AOR 0.4; 95% [CI] [0.33–0.64]) found higher to achieve complete CoC. Participants who received better quality ANC (urine and blood samples were taken and blood pressure was measured) more likely to accomplish CoC.

DISCUSSION

The suboptimal Egyptian uptake of complete continuum of care; despite proven benefits and is considered a strategy for reducing maternal, newborn, and child morbidity and mortality for mothers and infants; stances as a precise challenge. This study delivers insights into the complete continuum of care of a sizeable Egyptian group of pregnant women, questioned to know their access, utilization and benefits gained out of such use. Most countries emphasize on improvement of MCH services to cover the underlying gaps in seeking care along the pathway of continuum of care. Thus, we explored the factors that may disturb women's continuation in obtaining care throughout the periods of pregnancy, childbirth, and after delivery. The rate of completing the minimum accepted CoC parameters is 50% and it is still away from the anticipated and the accepted rate in a non-remote governorate with availability of primary health-care unites in all villages of the governorate. More than 90% of the studied population had completed the accepted ANC visits, while only 85% delivered by SBA. The 5% accepted drop rate could be explained by that some of the deliveries are conducted at home without assistance. However, the tendency of usage of postpartum care is undesirably low 53%, which, however, in line with the WHO date[6] is a finding that needs a strenuous work from both health-care providers and health-care planners. ANC is a noteworthy predictor of seeking assistance during delivery by skilled personnel. This may be attributed to that women who exposed to ANC visits are better informed about the facilities, safety and the importance of skilled birth assistance. The findings that may explain that increasing the use of ANC could lead to delivery at health facilities with the aid of SBA. A multi-country analysis of rural Africa and another study of low-income countries had alike conclusions where ANC has a positive effect on delivery support.[14,15]

On skeletonizing our results and on discussing the factors which affecting the use of the facilities for ANC we can observe that education of women and their partners has had a weighty influence on the utilization of ANC, delivery with SBA, and postpartum care.[16,17] This positive influence may be justified by the fact that educated women are more

Table 3: Model 1 univariate and multivariate logistic regression model for factors associated with the anti-natal care of care (ANC4+)

Characteristics	ANC4+			
	Univariate		Multivariate	
	OR CI (95%)	*P*	AOR CI (95%)	*P*
Residence				
Urban	1		1	
Rural	0.97 (0.74–1.3)	0.79	0.95 (0.67–1.3)	0.81
Women age (years)				
<20	1		1	
20–35	1.3 (1.1–1.7)	0.04	1.1 (1.07–1.4)	0.03
>35	0.93 (0.69–1.2)	0.66	0.78 (0.56–1.3)	0.53
Women's education status				
Illiterate	1		1	
Read and write	0.92 (0.76–1.2)	0.46	0.89 (0.45–1.1)	0.76
Obligatory education	1.2 (0.56–1.6)	0.75	1.1 (0.49–1.3)	0.89
Secondary	1.3 (1.1–1.7)	0.04	1.1 (0.97–1.4)	0.07
Faculty	1.5 (1.03 –1.8)	0.01	1.3 (1.1–1.6)	0.02
Husband education status				
Illiterate	1			
Read and write	0.98 (0.63–1.5)	0.13	0.78 (0.53–1.3)	0.73
Obligatory education	0.89 (0.59–1.4)	0.67	0.81 (0.57–1.4)	0.95
Secondary	1.3 (0.72–1.7)	0.08	1.1 (0.52–1.6)	0.06
Faculty	2.8 (1.7–4.34)	<0.001	1.9 (1.1–2.3)	<0.001
Women's employment				
Not working	1		1	
Working	2.4 (1.6–3.6)	<0.001	1.9 (1.1–2.5)	0. 003
Husband's employment				
Not working	1		1	
Working	1.7 (1.2–2.4)	0.003	1.5 (1.1–2.1)	0.002
Socioeconomic status				
Low	1		1	
Middle	1.4 (1.2–1.8)	<0.001	1.2 (1,1–1.8)	< 0.001
High	2.3 (1.7–3.45)	<0.001	2.1 (13–.3.2)	< 0.001
Birth order				
1	1		1	
2	0.9 (0.56–0.98)	0.04	0.8 (0.56–0.73)	0.05
3	0.6 (0.34–0.89)	0.03	0.7 (0.45–0.82)	0.03
4 or more	0.38 (0.23–0.79)	0.02	0.4 (0.2–0.8)	0.01
Family type				
Simple	1	0.30	1	
Extended	0.88 (0.68–1.2)		0.7 (0.6–1.1)	0.45
Accessibility of health				
Service				
Problem	1		1	
Accessible	1.7 (1.4–1.1.9)	0.03	1.3 (1.1–1.4)	0.03
Exposure to mass media				
No	1		1	
Yes	1.8 (1.3–2.1)	0.001	1.6 (1.2–1.9)	0.03

(Contd...)

Table 3: ***(Continued)***

Characteristics	ANC4+			
	Univariate		Multivariate	
	OR CI (95%)	*P*	AOR CI (95%)	*P*
Response to Health-care decision-making				
No	1		1	
Yes	1.8 (0.84–2.4)	0.07	1.5 (0.96–1.8)	0.11

ANC: Antenatal care, OR: Odds ratio, CI: Confidence interval, AOR: Adjusted odds ratio

Table 4: Model 2 univariate and multivariate logistic regression model for factors associated with ANC4+with skilled birth attendant care

Characteristics	ANC4+with skilled birth attendant			
	Univariate		Multivariate	
	OR CI (95%)	*P*	AOR CI (95%)	*P*
Residence				
Urban	1		1	
Rural	0.87 (0.71–1.2)	0.36	0.67 (0.51–1.2)	0.56
Women age (years)				
<20	1		1	
20–35	1.3 (1.1–1.6)	0.03	1.2 (1.1–1.3)	0.01
>35	0.83 (0.69–1.2)	0.17	0.77 (0.34–1.4)	0.51
Women's education status				
Illiterate	1		1	
Read and write	0.82 (0.66–1.4)	0.46	0.89 (0.45–1.1)	0.76
Obligatory education	1.1 (0.56–1.6)	0.62	1.1 (0.49–1.3)	0.89
Secondary	1.2 (1.05–1.5)	0.04	1.08 (0.87–1.2)	0.07
Faculty	2.6 (1.2 –3.3)	0.01	1.7 (1.1–1.9)	0.02
Husband education status				
Illiterate	1			
Read and write	0.88 (0.73–1.4)	0.23	0.78 (0.53–1.3)	0.73
Obligatory education	0.99 (0.58–1.7)	0.54	0.71 (0.49–1.7)	0.95
Secondary	1.2 (0.95–1.6)	0.06	1.09 (0.43–1.8)	0.06
Faculty	1.4 (1.1–2.34)	0.002	1.3 (1.1–1.9)	0.004
Women's employment				
Not working	1		1	
Working	2.3 (1.9-3.1)	<0.001	1.7 (1.1–2.3)	0.003
Husband's employment				
Not working	1		1	
Working	1.7 (1.2–2.4)	0.003	1.5 (1.1–2.1)	0.002
Socioeconomic status				
Low	1		1	
Middle	1.3 (0.65–1.4)	0.43	1.1 (0.51–1.3)	0.45
High	2.1 (1.7–2.9)	<0.001	1.9 (1.1–.2.8)	<0.001
Birth order				
1			1	
2	1		0.7 (0.49–0.98)	
3	0.8 (0.46–0.88)	0.03	0.5 (0.45–0.73)	0.04

(Contd...)

Table 4: ***(Continued)***

Characteristics	ANC4+with skilled birth attendant			
	Univariate		Multivariate	
	OR CI (95%)	*P*	AOR CI (95%)	*P*
4 or more	0.6 (0.44–0.89)	0.01	0.4 (0.23–0.79)	0.02
	0.5 (0.33–0.89)	0.02		0.02
Family Type				
Simple	1	0.67	1	
Extended	0.7 (0.47–1.9)		0.7 (0. 4–1.3)	0.23
Accessibility of health				
Service				
problem	1		1	
Accessible	1.5 (1.1–1.6)	0.01	1.2 (1.1–1.4)	0.03
Exposure to mass media				
No	1		1	
Yes	1.7 (1.1–2.4)	0.001	1.4 (1.1–1.7)	0.002
Response to health-care decision-making				
No	1		1	
Yes	1.8 (0.84–2.4)	0.07	1.4 (0.66–1.7)	0.09
Blood pressure measured				
No	1		1	
Yes	1.2 (1.1–1.6)	0.04	1.1 (1.03–1.5)	0.05
Urine sample taken				
No	1		1	
Yes	1.4 (1.1–2.3)	0.02	1.1 (1.06–1.9)	0.03
Blood sample taken				
No	1		1	
Yes	1.6 (1.1–2.4)	0.01	1.4 (1.1–2.1)	0.05

ANC: Antenatal care, OR: Odds ratio, CI: Confidence interval, AOR: Adjusted odds ratio

Table 5: Univariate and multivariate logistic regression model for factors associated with the continuum of care (Model 3)

Characteristics	ANC4+with skilled birth attendant and postpartum care (CoC)			
	Univariate		Multivariate	
	OR CI (95%)	P- Value	Adjusted OR (AOR) CI (95%)	P- Value
Residence				
Urban	1		1	
Rural	0.67 (0.56–1.1)	0.26	0.59 (0.41–1.3)	0.29
Women age (years)				
<20	1		1	
20–35	1.9 (1.1–1.8)	0.001	1.7 (1.1–1.5)	0.001
>35	0.79 (0.66–1.7)	0.17	0.67 (0.54–1.2)	0.43
Women's education status				
Illiterate	1		1	
Read and write	0.72 (0.56–1.3)	0.46	0.89 (0.45–1.1)	0.76
Obligatory education	1.1 (0.66–1.9)	0.62	1.1 (0.49–1.3)	0.89
Secondary	1.1 (0.87–1.2)	0.13	1.08 (0.87–1.2)	0.07
Faculty	2.2 (1.7–2.9)	0.001	1.6 (1.1–1.8)	0.01

(Contd...)

Table 5: ***(Continued)***

Characteristics	ANC4+with skilled birth attendant and postpartum care (CoC)			
	Univariate		Multivariate	
	OR CI (95%)	P- Value	Adjusted OR (AOR) CI (95%)	P- Value
Husband education status				
Illiterate	1			
Read and write	0.76 (0.63–1.3)	0.23	0.58 (0.53–1.1)	0.56
Obligatory education	0.89 (0.68–15)	0.54	0.74 (0.47–1.4)	0.63
Secondary	1.1 (0.56–1.8)	0.07	1 (0.87–1.3)	0.9
Faculty	1.4 (1.1–2.34)	0.02	1.2 (1.1–1.7)	0.02
Women's employment				
Not working	1		1	
Working	1.9 (1.4–2.9)	0.01	1.6 (1.1–1.9)	0.01
Husband's employment				
Not working	1		1	
Working	1.7 (1.1–2.1)	0.004	1.4 (1.1–1.9)	0.003
Socioeconomic status				
Low	1		1	
Middle	1.4 (0.78–13)	0.11	1.2 (0.49–1.2)	0.67
High	2.1 (1.7–2.9)	<0.001	1.6 (1.1–.2.1)	< 0.001
Birth order				
1	1		1	
2	0.7 (0.36–0.81)	0.01	0.6 (0.52–0.78)	0.04
3	0.6 (0.34–0.79)	0.01	0.5 (0.42–0.63)	0.01
4 or more	0.5 (0.33–0.89)	0.02	0.4 (0.33–0.64)	0.02
Family Type				
Simple	1		1	
Extended	0.84 (0.62–1.3)	0.45	0.61 (0. 52–1.1)	0.53
Accessibility of health				
Service				
problem	1		1	
Accessible	1. 4 (1.1–1.5)	0.03	1.2 (1.1–1.1)	0.03
Exposure to mass media				
No	1		1	
Yes	1.7 (1.1–2.4)	0.001	1.3 (1.1–1.6)	0.003
Response to health-care decision-making				
No	1		1	
Yes	1. 7 (0.74–2.1)	0.13	1.4 (0.56–1.4)	0.21
Blood pressure measured				
No	1		1	
Yes	1.3 (1.1–1.7)	0.04	1.2 (1.1–1.8)	0.05
Urine sample taken				
No	1		1	
Yes	1.5 (1.2–1.8)	0.03	1.3 (1.1–1.7)	0.03
Blood sample taken				
No	1		1	
Yes	1.4 (1.2–1.6)	0.03	1.3 (1.1–1.7)	0.04

ANC: Antenatal care, OR: Odds ratio, CI: Confidence interval, AOR: Adjusted odds ratio, CoC: Continuum of care

familiar with the meaning and importance of maternal health services; they may have a good chance to approach the written information and may have a more cultural perspective. Educated partner may have a better communication with their wives and motivation to discuss the use of maternal health services. They may also provide more independence to their wives.[18,19] Not only education have a clear influencing role on the utilization of the three continuous of care parameters but also the exact differences in the mother's and partner's educational level have a clear effect; a finding that in line with previous publications.[19] Accessibility is an important variable in health service use. Several previous publications have identified that closeness and accessibility of health-care services plays an important role in service utilization.[20,21] In our study, easily accessible for health service as was significantly association with better utilization of the three components of the maternal continuous of care. This result has been consistent with many other studies.[22,23] This study has declared that socioeconomic status is significantly associated with the use of all the three maternal health services. Women who are from a household with a higher socioeconomic status are more likely to utilize all the maternal health services than those who are from the low socioeconomic status. This result is in the line with other similar studies.[24] We can expect that result since the use of high quality health service in Egypt depends on private sector with self-payment in most of cases, though the full free governmental coverage for -ANC, delivery as well as PNC- but women are supposed to pay for some medications and additional transportation costs. This study has revealed that number of previous deliveries determines health service use. Females who had only one birth were more expected to use ANC, skilled delivery attendants, and PNC services. This may be due to that women with previous birth may have settled confidence of pregnancy consequences as well as delivery and may not be encouraged to use a health practitioner aid. Moreover, women in their first pregnancy may be anxious of complications and sequels since they have had no preceding pregnancy neither delivery experience, a finding that had been documented in previous studies.[25] This study has found that women age, women job both have effect on the utilization of maternal continuous of care; since the younger the women age the more the use of parameters of continuous of care. As regard as women job, it was clear that workingwomen have more access and use for the continuous of care items. This can be attributed to those women who are working gain money so that they can have the financial ability to pay for health services.

Strength and Limitation of the Study

The strength of the study lies in it is multicenter (data collected from five health-care centers at Sohag governorate), and the majority of study populations are rural women and they are suffering from lake of health care during pregnancy and delivery. However, the study has its limitation, because of the time restraint, this research was conducted only on a small size of population, we also reached 3650 women, of these 860 women refused to sign the consent.

CONCLUSION

Half of the study participants complete the continuum of care from pregnancy through postpartum care, mother's and partner's educational level and higher socioeconomic status families have higher access to health care services, working females who had only one birth were more expected to use ANC, SBA, and PNC services, accessibility of health-care services plays an important role in service utilization. Quality of ANC is associated with women's use of skilled birth attendant and postpartum care that needs a strenuous work from both health-care providers and health-care planners.

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