



# Postnatal Care in Rural Egypt: Perspectives of Women and Health Care Providers

Ghada Wahby Elhady<sup>1</sup>, Tarek Amin Tawfik<sup>1</sup>, Eman Aly Hussein<sup>2</sup>, Sherry Magdy<sup>1</sup>, Marwa Rashad Salem<sup>1</sup>

<sup>1</sup>Department of Public Health and Community Medicine, Faculty of Medicine, Cairo University, Cairo, Egypt; <sup>2</sup>Department of Obstetrics and Gynecology, Cairo University, Cairo, Egypt

## Abstract

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**\*Correspondence:** Marwa Rashad Salem MD, Assistant Department of Public Health and Community Medicine, Faculty of Medicine, Cairo University, PO Box: 109 El Malek El Saleh, 11559, Cairo, Egypt. Tel: 01003604607, Fax +20223687673. E-mail: mr80002000@yahoo.com  
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**BACKGROUND:** Postnatal care (PNC) is an essential component of maternal care program. However, gap exists between high coverage with antenatal and natal care and low coverage with PNC in Egypt.

**AIM:** Consequently, the current study was conducted to explore pattern of early PNC (after 1<sup>st</sup> day following delivery) among rural mothers.

**METHODS:** An exploratory cross-sectional study was done in four Primary Health Care (PHC) centers related to one district in rural Egypt. Mothers who had delivered in the previous year were invited to a structured exit interview. Focus group discussions and in-depth interviews were done with mothers and health care providers (HCPs).

**RESULTS:** Out of the total mothers (n = 600), 34.2% received PNC. Multivariate analysis showed that low family income was a significant negative predictor for receiving PNC (p < 0.001), while utilization of ANC (p = 0.00), delivery at public (p = 0.004), or private health facility (p < 0.001) were significant positive predictors for receiving PNC. Qualitative data identified barriers for seeking PNC as shortage in HCPs, especially nurses, poor communication by HCPs, and mothers perceived HCPs as incompetent in PNC service delivery. Lack of knowledge among women about the importance of PNC and unavailability of female physicians are considered important social barriers.

**CONCLUSION:** Inadequate knowledge about the importance and components of PNC among service providers and served community reduces the demand for PNC.

## Background

Maternal health status has been one of the major targets of many global development initiatives in the past 30 years one of them is the Sustainable Development Goals (SDGs) [1], [2]. Using traditional maternal care services is a major determinant of poor maternal health outcomes, including maternal mortality [3]. Worldwide, annual maternal mortality is 287,000 women [4]. Most of them occur during childbirth and the 1<sup>st</sup>-week postnatal [5]. In Egypt, maternal mortality ratio is 52 deaths/100,000 live births. Over one quarter occurs during the postnatal period, whereas with one third of those cases the baby also dies [6].

There are considerable disparities in the health-seeking behaviors and utilization rates of postnatal care (PNC) among women living in Africa, with the lowest rates of utilization reported among women living in rural areas [7], [8]. In Egypt, 80% of deliveries mothers had PNC within the 1<sup>st</sup> day following delivery (early PNC) but PNC after the 1<sup>st</sup> day following delivery reached only 3%; including mothers who delivered in health facilities [9]. Thus, in Egypt a worrying gap exists between the high

coverage with antenatal and natal care and the low coverage with PNC. Since most of infant deaths (64%) take place during the neonatal period; especially the 1<sup>st</sup> week of life (44%), it is important for the PNC to take place to screen for conditions that may threaten infant's survival. In 2014 EDHS, the total wanted fertility (2.8 births per woman) is lower than the current total fertility rate (3.5 births per woman) but higher than the wanted fertility rate in 2008 EDHS (2.4 births per woman) [7]. The contraceptive prevalence rate reached an almost plateau level (around 59%) and is not increasing since 2005 [7]. Hence, missing the PNC means a missed opportunity to improve the use of family planning services.

Better understanding of predictors of PNC utilization is essential for implementing alternative strategies to increase PNC services utilization, thus reducing maternal and child morbidity and mortality. Studies that explored predictors of PNC utilization, particularly in rural Egypt, are scarce. Those examined the perspectives of mothers and health care providers (HCPs) toward PNC are lacking. This exploratory study describes PNC utilization regarding its level, predictors, and perspectives of mothers and HCPs in an Egyptian rural setting.

## Methods

### **Study design, setting, and population**

An exploratory cross sectional study that focused on the supply demand sides of PNC services was carried out in a rural district in the Nile Delta (Lower Egypt), composed of seven major villages and 37 settlements, and occupied by 473,276 inhabitants [10] mostly working in agriculture. The study was conducted in the PHC units of the district villages. All PHC units were affiliated to the Ministry of Health and Population (MOHP). The total number of women within the reproductive age (15–49 years) accounted for 127,800 women [10] and served by nine primary health care PHC units. The study included all women aged 15–49 years who gave birth within the year preceding the study and attending the PHC units. The study included all HCPs responsible for provision of maternal and child health services in the selected health care units.

### **Sample size and sampling technique**

For the quantitative data: Considering that PNC coverage in rural Lower Egyptian governorates is as low as 17% (precision  $\pm 5\%$ ) [11] and the target population to receive PNC in the study area is about 15336 women in the reproductive age (15–49 years) who gave births in the last year (GFR = 120 children/1000 women), the required sample size was 590 women within the same age group with an alpha error of 5% and power of 80%. Open-Epi. (<http://www.openepi.com/>). An additional 10% was added to compensate for the non-response, hence the total sample size was accounted for 600 women. Inclusion criteria: Women aged between 15 and 49 years and attending PHC units to receive any service within 12 months after childbirth used for sample size calculation using the following Formula:  $n = [DEFF * Np (1-p)] / [(d^2 / Z^2 (1-\alpha) / 2 * (N-1) + p * (1-p))]$ . First, three accessible villages out of 7 villages were included in the study. Then the PHC unit in each village was included in the study. Within each PHC unit, women were selected purposively amongst those who attended the PHC- child vaccination clinic. For the qualitative component: Focus group discussions (FGDs) and in-depth interviews were conducted. Eight FGDs were carried out at the PHC units. Each FGD was conducted in groups of 8 women (total = 64). In-depth interviews were conducted with 8 HCPs: 3 physicians, 3 nurses, and 2 rural community health workers/visitors.

### **Data collection**

Quantitative data were collected using a structured interview questionnaire form. The questionnaire included close-ended questions about the participants' socio-demographic characteristics, reproductive history, receiving PNC routine package of

services for the mother and the baby. Qualitative data were collected by FGDs and in-depth interviews. FGDs' primary objectives were to assess the perceived value, rationale and importance of the various components of PNC for mothers and their neonates and identify the possible barriers toward not utilizing PNC.

The FGDs were conducted at the PHC units. Before each FGD, the investigator led the discussion, introduced all participants, explains the general topics of discussion, and encouraged all participants to contribute their ideas. A trained note-taker assisted the investigator in recording the sessions using voice recorders as well as written notes. The reviewed recorded scripts are typed after each FGD.

In-depth interview with the HCPs were done at their workplaces and at times that were convenient for them. Discussion guidelines were used to explore perspectives and experiences of HCPs regarding PNC.

Pilot testing: The data collection instruments for the quantitative data were tested on women (n=60, beyond the sample size) attending a nearby PHC unit. Results of the pilot testing were used to assess comprehension, practicability and reliability of the data collection instruments, and no changes were done in the data collection sheet based on the pilot results.

### **Operational definitions**

- Early PNC is any PNC service received by the mother and/or the baby within 24 h following delivery
- Late PNC is any PNC service received by the mother and/or the baby after 24 h and within 42 days following delivery. The main outcome explored in this study was the utilization of late PNC.

### **Data management and analysis**

Quantitative data: Collected data were checked for quality control on the field. Data entry was carried out using Statistical Package for the Social Science (SPSS) version 24.0 (IBM, SPSS, USA). Variables were examined for normality. Categorical variables were expressed in numbers and percentages; Chi-square and Fisher's exact tests were applied. Continuous variables were expressed using mean, median, and standard deviation. Uni-variate analysis was generated for the main outcome, which was the utilization of PNC against the different independent variables; socio-demographic and reproductive health history and stated barriers and expressed as odds ratio (OR) with 95% confidence intervals (CI).  $p < 0.05$  was considered significant. Significant predictors at the univariate level were used for the generation of multivariate logistic regression models.

Qualitative data: FGDs and in-depth interviews: Transcripts were reviewed, coded, and analyzed using

classical content analysis with generation of matrices containing the most frequent responses under the relevant themes.

### Ethical considerations

Ethical approval to the study obtained from the review board of Public Health Department, Faculty of Medicine, Cairo University. Personal approach was employed to orient the study women about the objectives, methods, and impact of the study. Woman enrolled in the study after giving her informed consent to participate. HCPs similarly were approached following orientation, with the emphasis on their right of not to participate and with an informed consent form. Data confidentiality was maintained throughout the study and filled questionnaires were coded and accessed by the investigators only.

## Results

Mothers aged between 25 and <30 years constituted 40.6%. One third of the mothers were illiterate while those with college or higher educational levels constituted <15%. The majority (95%) of the mothers were unemployed and more than half had a family income of <1000 Egyptian Pound (EP)/month as displayed in Table 1. For the participants who received PNC (n = 205), PNC started in the 2<sup>nd</sup> week following delivery for more than half (53.2%), in the 1<sup>st</sup> week for about quarter (24%) and in the 6<sup>th</sup> week for 2%. More than two thirds (67.3%) of PNC utilizers sought PNC for routine follow-up after delivery and 24.4% sought it because of health problems.

**Table 1: Socio-demographic characteristics of the study participants (n = 600)**

Socio-demographic characteristics	n (%)
Age (Years)	
<25	214 (35.7)
25–30	284 (40.6)
≥30	182 (30.3)
Educational status	
Illiterate/read and write	183 (30.5)
Primary/preparatory	101 (16.8)
Secondary	228 (38.0)
Tertiary	88 (14.7)
Employment status	
Unemployed	568 (94.7)
Employed	32 (5.3)
Family income per month (Egyptian Pounds)	
<1000	314 (51.8)
2000–<3000	271 (45.2)
≥3000	18 (3)

Table 2 showed the pattern of PNC utilization according to socio-demographic and reproductive health characteristics of the participants. About one out of three (34%) of the studied women received PNC. Most PNC examinations (90.2%) were carried out at private clinics/hospitals compared to 6.8% in teaching hospitals and only 2.9% at PHC centers. The most

**Table 2: Pattern of postnatal care utilization among the study participants**

Items	n (%)
Pattern for the mothers	
Received PNC (n = 600)	
Yes	205 (34.2)
No	395 (65.8)
Timing of the first PNC examination (n = 205)	
Week 1	50 (24.4)
Week 2	109 (53.2)
Week 3	14 (6.8)
Week 4	16 (7.8)
Week 5	12 (5.8)
Week 6	4 (2.0)
Reasons for seeking PNC for the mothers (n = 205)	
Routine follow-up after delivery	138 (67.3)
Health problems	50 (24.4)
Routine care of delivery surgical wounds	17 (8.3)
Place of PNC (n = 205)	
PHC	6 (2.9)
Public hospitals	14 (6.8)
Private clinics and hospitals	185 (90.2)
Reasons for choosing these places (n = 205)	
Close to home	15 (7.3)
Competent providers	43 (21)
Same place of delivery	83 (40.5)
Quality care	48 (23.4)
Used to seek care at them	10 (4.9)
Affordable cost	6 (2.9)
Pattern for the neonate	
Received PNC	
Yes	600 (100)
Reason for seeking PNC for the neonates	
Health problems	454 (75.7)
Routine follow-up after delivery	143 (24.3)

stated reason for preferring postnatal examination for the mothers at these facilities was being the same place of delivery (40.5%) followed by the accepted quality of service provided (23.4%). All the 600 participants (100%) had PNC for their neonates mostly because of neonatal health problems (75.7%).

Table 3a and b displayed the results of multivariate logistic regression model for the possible predictors of the dependent variable (receiving PNC) in relation to significant independent variables (including socio-economic and reproductive history) at the univariate analysis. Mothers aged ≥30 years were significantly less likely to utilize PNC services 26.5% versus 37.4% of those <30 years old (p = 0.009, OR = 1.7, CI = 1.1–2.4). On the other hand, mothers of higher education and income ≥3000 Egyptian Pound (EP)/month were significantly more likely to utilize PNC services (p < 0.001, OR = 2.56, CI = 1.45–3.04 and p < 0.001, OR = 5, CI = 1.87–14.1, respectively). Employed mothers were 2 times more likely to utilize PNC but that relation was not significant. As well, the usual source of health care was insignificantly associated with PNC utilization.

The results showed that a lower family income (<1000 EP/month) is a significant negative predictor for utilizing PNC (p < 0.001, OR = 0.28, CI = 0.9–0.85), while receiving ANC (p = 0.000, OR = 6.28, CI = 2.91–13.52) and delivery at a governmental health facility (p = 0.004, OR = 4.44, CI = 1.61–12.24) or a private health facility (p < 0.001, OR = 3.45, CI = 1.81–6.58) were significant positive predictors for PNC utilization.

Mothers were significantly more likely to utilize PNC service with their first and second child (p < 0.001, OR = 2.92, CI = 1.58–5.38 and p = 0.031, OR = 1.91, CI = 1.05–3.49, respectively).

**Table 3a: Postnatal care utilization in relation to socio-demographic and reproductive health characteristics of the participants and the usual source of health care**

	PNC utilization		Total n = 600 (100%)	P	Odds ratio (95% CI)
	Yes n = 205 (34%)	No n = 395 (76%)			
Mother's age at last pregnancy (years)	n (%)	n (%)	n (100%)		
<25	83 (38.8)	131 (61.2)	214		Reference
25-<30	74 (36.1)	131 (63.9)	205	0.569	1.14 (0.79–1.62)
≥30	48 (26.5)	133 (73.5)	181	0.01	1.7 (1.1; 2.4)
Educational status					
Illiterate/read and write	53 (29)	130 (71)	183		Reference
Primary/preparatory	38 (37.6)	63 (62.4)	101	0.134	1.20 (0.73-1.86)
Secondary/intermediate institution	69 (30.2)	159 (69.7)	228	0.774	0.85 (0.59–1.23)
College or higher	45 (51)	43 (48)	88	<0.001	2.56 (1.45–3.04)
Employment					
Unemployed	189 (33.3)	379 (66.7)	568	0.052	Reference
Employed	16 (50)	16 (50)	32		2.01 (0.98–4.09)
Family income per month (Egyptian Pounds)					
<1000	87 (28)	224 (72)	314		Reference
2000-<3000	106 (39)	165 (61)	271	0.004	1.65 (1.06–2.11)
≥3000	12 (66.6)	6 (33.4)	18	<0.001	5.15 (1.87–14.1)
Usual sources of health care					
Traditional practitioners and self-care	3 (27.3)	8 (72.7)	11		Reference
Governmental Hospitals	43 (27.8)	110 (72.2)	153	0.989	1.01 (0.25–3.98)
Private clinics	160 (36.7)	276 (63.3)	436	0.521	1.53 (0.40–5.91)

OR and CI are from multivariate analysis.

**Table 3b: Postnatal care utilization in relation to socio-demographic and reproductive health characteristics of the participants and the usual source of health care**

PNC utilization	Yes No = 205 (34%)	No n = 395 (76%)	Total n = 600 (100%)	p value	Odds ratio (95% CI)
Number of pregnancies					
1–3	171 (35.8)	307 (64.2)	478		Reference
4–6	32 (29.4)	77 (70.6)	109	0.203	0.76 (0.48-1.22)
≥7	2 (15.4)	11 (84.6)	13	0.128	0.34 (0.11-1.57)
Number of previous abortions:					
None	171 (33.7)	336 (66.3)	507		Reference
1 or 2	30 (38.5)	48 (61.5)	78	0.412	1.24 (0.76-2.03)
>2	4 (26.7)	11 (73.3)	15	0.568	0.69 (0.22-2.21)
Number of living children					
1–2	137 (39.6)	210 (60.4)	347	0.115	2.23 (0.80–6.18)
3–4	63 (27.3)	169 (72.7)	231	0.645	1.27 (0.45–3.6)
>4	5 (22.7)	17 (77.3)	22		Reference
Order of the latest child					
First	69 (45)	84 (55)	153	<0.001	2.92 (1.58–5.38)
Second	68 (35)	126 (65)	194	0.031	1.91 (1.05–3.49)
Third	50 (29.2)	121 (70.8)	171	0.220	1.46 (0.79–2.72)
Fourth or more	18 (22)	64 (78)	82		Reference
Receiving antenatal care					
Yes	197 (40.8)	286 (59.2)	483		Reference
No	8 (6.8)	109 (93.2)	117	<0.001	0.11 (0.06–0.22)
Type of last delivery					
Normal	204 (71.8)	80 (28.2)	284		Reference
C-section	191 (60.4)	125 (39.6)	316	0.003	1.67 (1.18–2.35)
Place of last delivery					
Governmental hospitals/centers	11 (39.3)	17 (60.7)	28		Reference
Teaching/University hospitals	11 (31.4)	24 (68.6)	35	0.515	0.87 (0.25–2.01)
Home	13 (11.5)	100 (88.5)	113	0.000	0.20 (0.01–0.52)
Private (clinics/hospitals)	170 (40)	254 (60)	424	0.932	1.03 (0.47–2.26)

OR and CI are from multivariate analysis.

Number of living children and history of previous abortions had an insignificant influence on PNC utilization ( $p > 0.05$ ).

Regarding the effect of antenatal and natal care services, mothers who did not receive ANC ( $p = 0.000$ , OR = 0.11, CI = 0.06–0.22) and those who gave birth at home ( $p < 0.001$ , OR = 0.20, CI = 0.01–0.52) were significantly less likely to utilize PNC services and mothers delivered by C-section were more likely to utilize PNC ( $p = 0.003$ , OR = 1.67, CI = 1.18–2.35).

### Results of qualitative data

Results of analysis of qualitative data derived from FGDs and in-depth interviews were sorted and presented in themes that served the objectives of the study:

#### A) Clients' perspective

The importance of seeking PNC services: Approximately two thirds (42/64) of the clients highlighted that PNC services “aren't important at all except for vaccination of the child” and one third of PHC clients mentioned the importance of PNC services for the mother to be “*Motivating mothers for breast feeding, providing family planning services, following up mothers' health status after delivery and referral services together with raising awareness about outreach services*” and for the baby for “*vaccinations, early detection of serious illness and quick referral.*” One mother stated.

All interviewed HCPs (8/8) affirmed that PNC is important for both mothers and babies. HCPs

mentioned that *“PNC is important for mothers for checking health status especially hemorrhage and fever, in addition to encouraging breast feeding and family planning services utilization”* and for babies in *“checking baby’s health, encouraging vaccination, taking heel blood sample for thyroid hormone assessment and referral if danger signs present”*

B) The appropriate timing to start PNC:

The majority (60/64) of the clients mentioned that the appropriate timing to start receiving PNC services was *“after one week following delivery”* while some clients believed it to be *“the third day following delivery”*

All HCPs affirmed that PNC should start from the 1<sup>st</sup> h till 42 days after delivery.

C) Barriers for seeking PNC services:

Health care system-centered barriers: Clients’ perspective:

- Shortage in human resources and lack of logistics: One client mentioned that *“shortage of trained staff, lack of specialized physicians, unavailability of medications, and poor maintenance of the equipment all interfere with providing quality PNC services.”*
- Poor Communication of HCPs: Nearly all clients mentioned that *“Maltreatment of Health Care Providers and PHC unit employees constitute important barrier toward utilizing PNC services”*
- Perceived incompetence and ineffective case management by HCPs: There was a consensus that services provided to babies were of fair quality, whereas PNC services delivered to mothers were of relatively low quality in terms of HCP competence and effective case management.
- Inadequate amenities: Majority of the clients stated that *“crowdedness, poor hygienic measures, and lack of privacy constituted barriers facing utilizing PNC services.”*

HCPs perspective:

Shortage in human resources and lack of motivation

Insufficient number of nurses together with scarcity of financial resources and lack of incentives were highlighted by almost all interviewed physicians as barriers challenging providing quality PNC services. One physician mentioned that *“shortage of nurses number and overload of staff duties interfere with providing quality PNC services.”*

### **Lack of standardized protocol for PNC services**

All interviewed HCPs highlighted the complete absence of standard protocol for PNC services.

Availability of standard protocols is crucial to quality PNC services delivery; this protocol should include all components of PNC services, for mothers, e.g., *giving vitamin A capsule, encouraging breastfeeding, motivating family planning, and referral in case of presence of dangerous signs. Also services for child including, e.g., measuring weight and length, assessing jaundice and measuring head circumference and encouraging vaccination.*

Community and cultural barriers (clients’ perspectives)

1. Cultural barriers: Several cultural beliefs were affirmed by the PHC clients to halt seeking PNC services. Nearly all clients declared that *“Husbands’ resistance and pressure from relatives due to lack of female doctors rooted low utilization rate of PNC services.”*
2. Lack of knowledge: Nearly two thirds of the interviewed clients expressed their lack of adequate knowledge regarding the importance and components of PNC services.
3. Geographical accessibility: Most of clients walk for the PHC unit for about half an hour whereas others mentioned that it took about a complete hour to reach the PHC unit which is believed to be long distance, halting utilizing PNC services.
4. Dissatisfaction and previous bad experience: There was general consensus that the services were dissatisfying, and those who were satisfied, mentioned that *“vaccination is the only fair quality service in the PHC units.”*

From the HCPs perspective:

All HCPs stated that *“mothers usually do not know the importance of PNC as critical period and the services provided in it especially mothers who had previous uncomplicated deliveries and healthy babies”* whereas *“mothers having health problems for them or their babies during this period, express fine knowledge concerning the importance of this critical period and the provided services.”* This concept makes HCPs demarcate mothers who are more compliant with utilizing PNC services. Socioeconomic status and health status criteria are related to utilization pattern of PNC, where *“mothers with low income, illiterate or primary school, have low utilization rate for PNC services while anemic mothers achieved the highest rate.”*

D) Suggestions for PNC services improvement: (Clients’ suggestions)

1. Quality of service provided: Decreasing waiting time, organizing PNC service delivery, and improving physical environment of PHC units were highly appreciated as means for improving utilization rate of PNC services.
2. Logistics and supplies: A general agreement was declared concerning *“Ensuring availability of medication, emergency care and radiological*

services, increasing number of trained doctors and specialists are crucial for increasing PNC services utilization rate”

3. Providing PNC services as outreach services: Outreach services were highly recommended especially in remote areas. Majority of the interviewed clients mentioned the importance of outreach services in *“Detection of puerperal sepsis, bleeding and anemia, raising awareness concerning breast feeding practices, caring for the newborn and for vitamin A supplementation”*

HCPs suggestions were concerned with the following themes:

1. Raising the community awareness about importance of PNC services: Nearly all health care providers demanded *“To hold seminars presented by nurses discussing the importance of PNC services for the mother and her baby also health education messages about family planning”* for mothers attending the PHC units. Aiming at raising their awareness toward the importance of this service and consequences of not receiving it on both mother and child health
2. One Physician recommended *“improving the quality of service provided by PHC unit is a way to increase demand for PNC services.”* Another physician suggested *“Reduce the length of waiting time in the PHC units will raise the rate of PNC services utilization”*
3. Availability of supplies including medicines and vaccinations and competent manpower; well-trained doctors and nurses were suggested by most of the interviewed physicians as ways for improving PNC services utilization.

## Discussion

The study covered the pattern, predictors, and barriers of PNC (PNC received after the 1<sup>st</sup> day and within 42 days following delivery) services utilization. In the current study, only 34% received PNC after the 1<sup>st</sup> day of delivery. The study raised the issue of continuum of care to mothers through the health system. There was a gap between the proportion of mothers ANC and natal care at health facility and the proportion of mothers received PNC. A similar gap is generally observed in the latest two EDHS (2008 and 2014) [7], [12], where coverage with ANC, giving birth in a health facility and PNC for mothers and babies (in the first 24 h after delivery). EDHS, 2014 [7] ANC, Natal Care, PNC to mothers, and PNC to babies reached 90%, 83%, and 78%, and 7%, respectively at a national level and 93%, 90%, and 76% and 7%, respectively, in Lower Rural Egypt. Our findings are also consistent

with a similar study in the Republic of Congo where at least 93% of women received ANC but only 34.6% utilized PNC services [12]. The overall utilization rate of PNC in most parts of Africa is about 13% [13]. This could be explained by shortage of trained staff, lack of specialized physicians, unavailability of medications, poor maintenance of the equipment, lack of privacy, maltreatment of HCP and PHC unit employees, and the relatively low quality in terms of HCP competence and effective case management. As mentioned by the interviewed mothers.

Our findings showed a significant association between PNC utilization and mother's age and parity. Mothers of 30 years or older at the time of pregnancy and those of higher parity (have 3 or more children) are less likely to utilize PNC services possibly because of previous experience and maturity in dealing with health problems. It seems that younger women with lower parity were more likely to deliver in a hospital or private clinic and seek PNC services. This suggests that the more experience a woman had in childbirth, the less likely she would use a health facility for delivery and seek PNC services. These findings are supported by similar studies in India and Ethiopia [13]. However, studies conducted in Nigeria found that multiparous women received PNC services more than primipara. This may be explained by their previous knowledge of PNC importance and fearing of complications to occur.

Furthermore, our study showed that women who received higher education utilized PNC services more than those with primary education. This is consistent with EDHS (2014) [7] findings and studies conducted by Singh *et al.* [14], and Rai *et al.* [15]. It is suggested that women education allows better recognition of illness and perception of health care benefits.

Our results also revealed that working status has no significant association with utilization of PNC services. This finding is different from the results reported in EDHS (2014) [7] that mothers working for cash were more likely to receive postnatal checkup. Yet, we believe that employment can increase health awareness and modify mother's behavior through social and community interaction, as well as having financial support to seek medical care.

A higher household income was significantly associated with PNC services utilization which is consistent with EDHS findings (2014) [7] and other studies that found that the higher the wealth index of the family the more likely is the access to and utilization of PNC services [15].

Our study also showed a significant association between PNC utilization and the source of health care. About 91% of women sought PNC services at private facilities. More importantly, women used to receive health care services from private clinics were

significantly more likely to utilize PNC services, which is consistent with the national level findings EDHS, 2014) [7]. In Palatos, Brazil, a cohort study of patients at private and public health facilities found that 96% of private hospital attendees utilized PNC compared to 72% at public health facilities [16]. In Palastine, mothers who delivered at private health facilities reported higher rate of PNC utilization [17]. This might be due to the higher quality of service provided such as greater experience and better communication by doctors in addition to better amenities at the private health facilities.

Furthermore, the utilization of PNC services was significantly more likely with the first child ( $p = 0.009$ , OR = 1.78, CI 1.25–2.52) and this finding is consistent with EDHS (2014) [7] findings. This may be due to that the first child received more care from the mother and the whole family whatever the circumstances are. Unfortunately, in our study, the bigger was the number of children, the less was the likelihood of PNC utilization.

Our results showed that ANC is another positive predictor for PNC utilization by both bivariate and logistic regression analyses. Women who did not have ANC were less likely to utilize PNC services ( $p = 0.019$ , OR = 0.16, CI = 0.06–0.22). Our results matched EDHS (2014) findings [7] and similar studies in Indonesia, Nepal, and Uganda [18]. A possible explanation is that mothers receive health education and counseling about PNC during ANC visits.

This study found a significant association between PNC utilization and the place of delivery. Mothers who gave birth at private clinics/hospitals were about 2 times more likely to utilize PNC services than other mothers which goes with EDHS (2014) [7] findings. This might be explained that continuum of maternal care is one of quality-of-care component of the standards of maternal care. Affordable (financial accessibility) care was a significant determinant of PNC satisfaction in both facility deliveries and PNC in Pakistan [19].

On the other hand, women who delivered at home were significantly less likely to utilize PNC services ( $p = 0.027$ , OR = 0.20, CI = 0.11–0.37). More than half of the births in South Asia and Sub-Saharan Africa are delivered by traditional birth attendants and other untrained attendants [19]. In those countries, there is less utilization of PNC that could explain high maternal mortality rates. Most maternal deaths occur during or after childbirth, largely due to bleeding, sepsis, eclampsia, ruptured uterus, and complications of underlying medical conditions. Qualitative data identified barriers for seeking PNC as shortage in HCPs, especially nurses, poor communication by HCPs, mothers perceived HCPs as incompetent in PNC service delivery. Lack of knowledge among women about the importance of PNC and unavailability of female physicians are considered important social barriers.

In the current study, multivariate logistic regression analysis showed that high family income was positively associated with PNC utilization while under-utilization of ANC and home delivery were negatively associated with PNC utilization. This is similar to the reported findings in Ethiopia by Fikirte Tesfahun *et al.* [20], and in urban Indian by Aditya Singh *et al.* [21].

## Conclusion and Recommendations

This mixed model exploratory study revealed that of the sampled rural mothers surveyed, only 34.2% were examined late within the 42 days following delivery. Embracing the concept of continuum of maternal care (ANC, NC, and PNC) at both supply side (health facilities) and demand side (served community) is the key for improving utilization of PNC services

### Recommendations

Educate mothers during ANC visits about the importance of PNC services utilization. Policymakers should consider delivering PNC services at both health facilities and at home to overcome the perceived financial, geographical, and cultural barriers. Development of standards of practice guidelines for quality management of PNC complications and health-related problems

### Study limitations

The results of the current study should be viewed in the light of the following limitation, the cross-sectional design allows for inevitable chances of recall bias. However, the researchers try to overcome this limitation by using mixed methods (both quantitative and qualitative).

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