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GLOBAL ECONOMICS REVIEW



Determinants of Continuum of Care: Evidence from the Conditional Cash Transfer Program of the Khyber Pakhtunkhwa Pakistan

Pages: 68 – 89

Vol. VII, No. II (Spring 2022)

DOI: 10.31703/ger.2022(VII-II).07

p-ISSN: 2521-2974

e-ISSN: 2707-0093

L-ISSN: 2521-2974

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Abstract: In the province of the Khyber Pakhtunkhwa (K.P.), maternal and neonatal mortality is alarmingly high. To cope with MNCH challenges, cost-effective and low technology intervention like Continuum of Care (CoC) is required. This study examines ANC visits, delivery assisted by SBA, and PNC to determine CoC for maternal health care (MHC) services in K.P. In doing so, the study analysed primary data from 806 reproductive-age women (15-49) who gave birth in the previous two years. The data has been collected from randomly selected five districts of K.P. namely Peshawar, Swabi, Nowshera, Kohat, and Malakand. Personal, family, reproductive, and community factors are categorised as Predisposing, enabling and perceived need factors. First, bivariate analysis was done to see how these factors associated with ANC, SBA, and PNC visits. Multivariate analysis using the Logit and Probit models has been done to assess results consistency. Multivariate study showed that women's age at first birth, total number of children, years of schooling, husband education, place of residence, health service provider, birth interval, and enrolment in conditional cash transfer (CCT) program were significantly associated with CoC from ANC to skilled assisted delivery and PNC. The results indicate lack of CoC among women in the study area.

Key Words: Continuum of Care, ANC, PNC, Skilled Birth Attendant, Conditional Cash Transfer

JEL Classification:

Introduction

In order to improve overall health and preserve the lives of women and their babies, adopting the CoC in K.P. could play an instrumental role. One of the main Sustainable development Goals (SDG) is to reduce maternal and child mortality. Towards this end, promoting antenatal, postnatal visits and the proportion

of births by trained birth attendants are important. Pakistan has one of South Asia's highest maternal death rates notwithstanding global declines (UNFPA, 2013). It remained at 186 deaths per 100,000 live births in 2019, indicating Pakistan still confronts challenges in decreasing maternal and child mortality and lagging to fulfill its SDG targets. Pakistan's MHC services are underutilised compared to

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other developing countries. Most maternal and neonatal deaths in K.P. occur after birth and postpartum. Many such fatalities go undetected due to cultural difficulties and humiliation. The report by [DHIS \(2018\)](#) claims maternal deaths of 383 women out of 228936 deliveries of which 167 deaths occurred at government health facilities. Most maternal deaths can be avoided ([Bustreo et al., 2013](#)) if MHC services are available and given in a continuous manner, as recommended by the Continuum of Care (CoC) strategy ([Bhutta et al., 2014](#)). According to WHO, more than half of women and babies in underdeveloped countries don't receive MHC during and after birth. Despite having community midwives, trained birth attendants, and lady health workers, K.P.'s MNCH utilisation is minimal.

CoC improves maternity, newborn, and child health (MNCH) outcomes by integrating time and place factors ([Iqbal et al., 2017](#); [Berhan et al., 2014](#)). Timely care throughout the lifecycle improved maternal and neonatal survival and health whereas, place dimension connects homes, communities, and hospitals. ([Kerber et al., 2007](#); [Iqbal et al., 2017](#); [Yeji et al., 2015](#); [Akinyemi et al., 2016](#)). It encourages women to choose a skilled delivery provider, reducing mother and infant death and disability ([Campbel et al., 2006](#); [Darmstadt et al., 2005](#); [Rockerset et al., 2009](#))

Most women in K.P. do not seek MHC and almost half do not give birth in a hospital ([Bhutta et al. 2013](#)). As a result, most deliveries in K.P. still take place at home (NIPS, 2013). Further, ANC, PNC, and delivery supported by a SBA as well as institutional delivery have been demonstrated to lower maternal and child mortality ([Bustreo et al. 2013](#); [WHO 2014a](#)). This study examines ANC, SBA, and PNC from pregnancy to birth to determine CoC's MHC service continuity. It represents the need for optimal care when risk of complication for mother and child is the highest ([de Graft et al., 2006](#)).

Conditional cash transfers (CCT), a demand-side program, encourage households or pregnant women to seek MHC services. These financial incentives aimed to promote preventive care thus, improved health

outcomes. In places where institutional births are still low, economic incentives are utilised to promote MHC and institutional births. Nepal, India, and Bangladesh all have similar policies. Financial incentives are meant to improve health outcomes by shifting health expenditures and/or consumption patterns. In March 2014, the K.P. government started giving pregnant women Rs. 2700 stipend. K.P. Chief Minister (CM) initiative for MCH encourages pregnant mothers to attend ANC, PNC, and SBA checkups. To successfully apply CoC, underutilised ANC, SBA, and PNC variables must be analysed. Demographic and socioeconomic factors also affect MHC use.

Previous research studies have examined the impact of related factors on MHC usage ([Govindasamy and Ramesh, 1997](#); [Thind et al., 2008](#); [Dixit et al., 2013](#); [Chandrashekar, 1998](#); [Chakaraborty, et al., 2003](#); [Dwivedi, 2009](#); [Baral et al., 2010](#); [Joshi et al. 2014](#); [Karkee et al. 2013](#); [Khanal et al., 2011](#)). These studies mostly focused on one component MNCH service (ANC, SBA, PNC), therefore, missing the CoC. So far, no research has been done in K.P. on factors related to underutilisation of MHC services given the CCT and CoC theory. Thus, this evaluated ANC, SBA, and PNC as an integrated MHC to examine the CoC in K.P. The study used primary data from 806 pregnant females from Peshawar, Swabi, Nowshera, Kohat, and Malakand districts.

Here's how the paper continues. Second portion covers conceptual framework followed by empirical analysis. Section three discusses the study area and data collection, whereas section four explains empirical results and related discussion. The last and final section represents conclusion and policy recommendations.

Conceptual Framework

Continuum of Care (CoC) & Three Delay (3D) Model

A functional continuum of care is sensitive to newborn health because it depends on effective links between maternal and child health programs and reducing delays in care for difficulties during and after. Thus, this

study connects CoC theory with the "Three Phases of Delay Model" (Andersen, 2005; Thaddeus & Maine, 1994; WHO, 2005) because it is used to define factors related with underutilisation of MHC services. As indicated

in the figure 1 below, a successful CoC connects vital MNCH services during adolescence, pregnancy, childbirth, postnatal and neonatal periods, and into childhood.

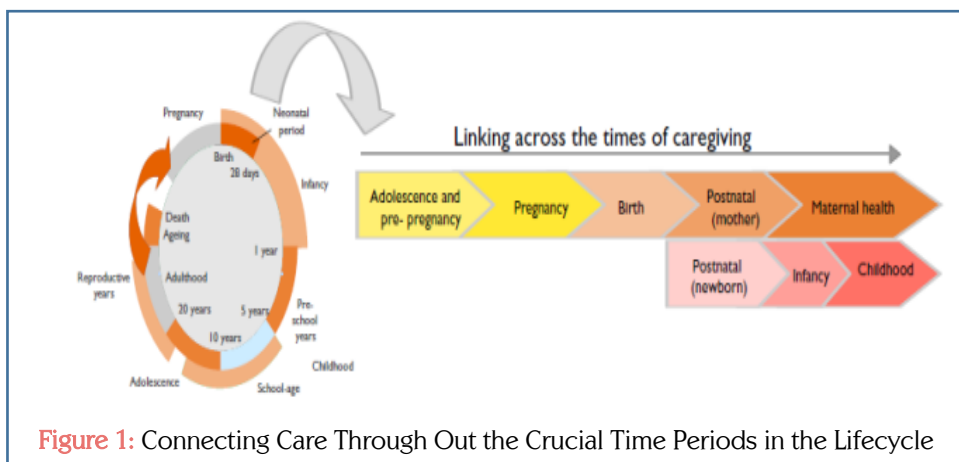


Figure 1: Connecting Care Through Out the Crucial Time Periods in the Lifecycle

Thaddeus and Maine (1994) cited insufficient time-dimension care for increased maternal mortality in developing countries. The 3D model has three features and conditions. *Delayed* decision to seek care when issues arise; *Delayed* arrival at an obstetric medical institution; then, *Delayed* receiving of proper and essential care.

Traditional parameters such as prior health system experience, place of residence, transportation availability, road conditions, and cost of transportation and/or distance to health facility influence the decision to seek medical care. Once in the facility, operational challenges in the health care delivery system further impede effective service. The delay model helps develop preventive interventions and strategies by identifying socio-demographic and cultural factors related to maternal death. Numerous sociocultural and socio demographic factors influence maternal mortality in K.P. The three delays model highlighted three factors impacting MNCH service use and access: These are

Phase 1: Delay in receiving treatment: largely attributable to socio-demographic factors

Phase 2: Delay in seeking care: factors

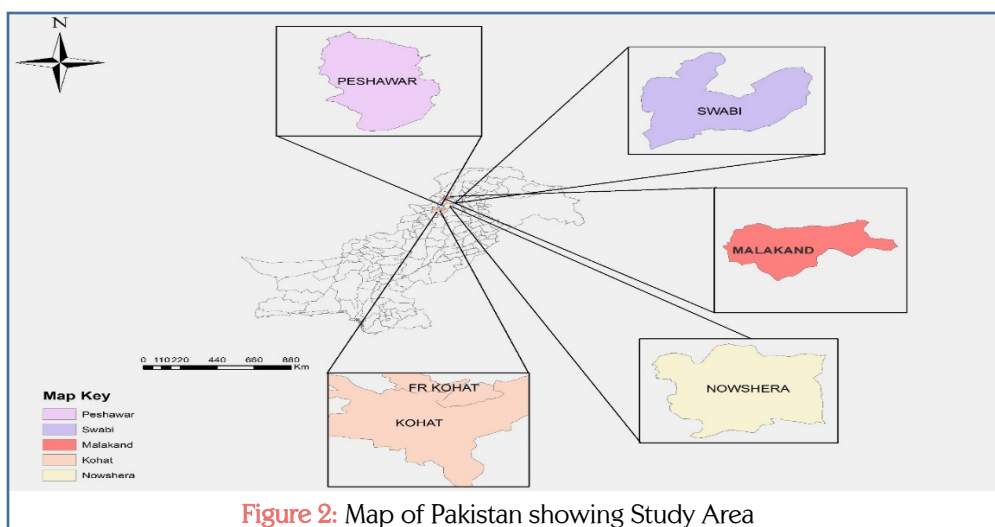
Relating physical and financial availability

Phase 3: Delay in receiving appropriate medical care: variables associated with the quality of facility-based health care.

Material and Methods

Study Area, Data Collection and Sampling Procedure

Study districts were Swabi, Peshawar, Nowshera, Kohat, and Malakand (figure 2). Peshawar, Nowshera, and Swabi represent the centre province, Kohat the south, and Malakand the north. These districts' socioeconomic and demographic characteristics make the sample representative. 806 women between 15 and 45 who had birth in the past two years were interviewed using a structured questionnaire. The survey covered socioeconomic, demographic, and reproductive histories from two groups. One that participated in the CCT program (n=408) and a control group (n=398). Beneficiaries and non-beneficiaries were contacted through community midwives (CMW) in a randomly selected union council (U.C.).



Data Analysis

Three CoC-based outcome variables for pregnancy, labor, and postpartum has been constructed. The initial model used ANC as an outcome variable, with a value of "1" for at least one ANC from a trained birth attendant (TBA) and "0" otherwise. The second model focuses on SBA as an outcome and assigns 1 if a woman received ANC and delivery assisted by skilled birth attendant (SBA), 0 otherwise. The final outcome variable is complete CoC as indicated by women who obtained MHC services from skilled physicians. The third model outcome variable is "1" if a woman receives all three types of skilled care and "0" otherwise. To illustrate, the factors that influence MHC services are categorised into the sociocultural, accessibility, and perceived need factors. The study used bivariate and multivariate logistic regression to investigate the connection between these variables and

the outcome.

Independent variables such as socio-demographic characteristics of women (such as age, education, occupation, and her husband's age and education, and occupation), household characteristics (total household size, total household income, family system (Joint/Nuclear), household arrangement (owned/ rented), contextual factor (place of residence, type of house (kacha/pakka)) maternal and reproductive history (total number of pregnancies, place of delivery (institution/non-institutional), the complications in previous pregnancies, experience any neonatal mortality or miscarriage (yes/no) are provided in table 1. This study uses information and communication technology (ICT) if the respondent has access to media like T.V., newspapers, radio, listening to the radio, meeting LHV/CMW, or community setting.

Table1. Summary Statistics of the Variable used in the study

Variables	Units	Mean	SD
Age	Years: continuous	30.83	6.36
Age at first birth	Years: continuous	21.35	3.34
Women total years of schooling completed	in years:	6.26	4.15
Husband's years of schooling	in years	7.85	2.77
Total Household size	in numbers	21.33	8.35
Live pregnancies	in numbers	4.53	2.014
Total number of pregnancies	in numbers	5.58	2.34

Variables	Units	Mean	SD
Health services provider (Skilled/ Unskilled)	in numbers	0.797	0.403
Residence: Rural/ Urban	Binary Variable	0.850	0.357
Exposure to television	Binary Variable	0.641	0.48
Access to the health facility	Binary Variable	0.656	0.475
Birth Interval (<1/>=2 years)	Binary Variable	0.815	0.388
Have you been vaccinated during ANC	Binary Variable	0.757	0.429
TFR Vaccination	Binary Variable	0.695	0.461

Multivariate logistic regression comprised bivariate correlated variables, as chi-square (X^2) has been tested for categorical data and the F test for continuous variables. Once all independent variables are incorporated, likelihood probabilities for each model are calculated to determine the CoC from ANC, SBA, and PNC.

Model Specification

We utilise logistic regression to understand women's propensity to use MHC services offered by a skilled health professional.

Given the logistic function G in the logit model:

$$p(y = 1|x) = G(\beta_0 + \beta_1x_1 + \beta_2x_2 + \dots + \beta_kx_k) \tag{1}$$

For all real numbers z, the function G accepts only values between 0 and 1: $0 < G_z < 1$. This guarantees that the predicted response probabilities are always between 0 and 1. For instance, in estimating the logit model, G denotes the logistic function:

$$G(z) = \frac{\exp z}{[1 + \exp(z)]} = G(z) \tag{2}$$

The probit model cumulative distribution function (cdf) for a standard logistic random variable G is presented below.

$$G(z) = \Phi(z) \equiv \int_{-\infty}^z \varphi(v) \theta v \tag{3}$$

Where the standard normal density function is $\Phi(z)$ is specified as:

$$G(z) = \Phi(z) = (2\pi)^{-1/2} \exp\left(-\frac{z^2}{2}\right) \tag{4}$$

The present study estimates the logit and probit model using the following specification

$$\log \left[\frac{p_{ij}}{1-p_{ij}} \right] = \beta_0 + \beta_{1j}X_{ij} + \beta_{2j}Y_{ij} + \beta_{3j}Z_{ij} + \varepsilon_{ij} \tag{5}$$

In this example, the dependent variable is the log chances a lady will choose j over 0. In this scenario, the dependent variable is the log odds that a mother will choose choice j over alternative 0, indicating no SBA in ANC Visits, with '1' suggesting consultation with a physician, nurse, or midwife. Similarly, Models 2 and 3 are estimated in the same way.

Individual-level variables are represented by X, household-level variables by Y, and community-level variables by Z. The model includes a provincial dummy variable. 0 represents fixed effects, while 1, 2, and 3 imply random effects on the CoC from MHC services.

Results

CoC Measure of Association with a Number of Fundamental Predisposing, Enabling and Perceived Need Factors

Table 2 shows an association of predisposing factors, i.e. individual women and their household characteristics, along with some enabling and perceived need factors with ANC visits and with SBA. Age is a significant predictor of MHC use. The behaviour model by (Andersen, 1995 & Cropper, 1977) reports that younger generations are more concerned about their health and education compared to older people. Women who had ANC from a trained practitioner are mostly of older age than those who didn't. The variable age was found to be insignificant for the SBA visits. Moreover, the place of delivery and the health service provider (whether skilled or unskilled) also played a significant and positive role in promoting the CoC from MHC services. Access to health facilities was one of the most critical

enabling factors related to CoC utilisation. It was discovered that if a respondent had relatively simple access to a health institution, they made more frequent hospital visits. Difficult access to health facilities, on the other

hand, deters women from seeking MHC ([Khan, Hotchkiss, Berruti & Hutchinson, 2006](#)). ANC use is much higher among respondents with relatively greater access to health facilities than among those who do not.

Table 2. CoC Measure of Association with Various Key Predisposing, Enabling and Perceived Need Factors

ANC		Care at Delivery assisted by SBA followed by ANC					PNC followed by ANC and Delivery assisted by SBA		
Variables	Received	Did not		Received	Did not		Received	Did not	
Predisposing factors	Care	Received care		Care	Received care		Care	Received care	
Continuous Covariates	Mean (SD)	Mean (SD)	F-Stat(p value)	Mean (SD)	Mean (SD)	F-Stat(p value)	Mean (SD)	Mean (SD)	F-Stat(p value)
Respondent age	30.85 (6.4)	30.5 (6.3)	0.15	30.872 (6.386)	29.8 (5.749)	0.95	30.870 (6.377)	29.621 (5.858)	1.08
Respondent age at first birth	21.46 (3.36)	20.13 (2.73)	9.33**	21.402 (3.331)	20.286 (3.339)	3.76 **	21.389 (3.323)	20.414 (3.621)	2.39
Respondents total years of schooling	6.301 (4.194)	5.79 (3.655)	0.87	6.249 (4.167)	6.543 (3.906)	0.17 (0.6826)	6.277 (4.172)	5.862 (3.681)	0.28
Husband Age	36.28 (6.24)	35.51 (5.71)	0.91	36.309 (6.233)	34.314 (5.166)	3.47 (0.0627)	36.284 (6.225)	34.552 (5.336)	2.19
Husband total years of schooling	7.899 (2.78)	7.32 (2.589)	2.56*	7.852 (2.781)	7.886 (2.564)	0.00 (0.9441)	7.847 (2.781)	8.034 (2.514)	0.13
Total household size	21.094 (8.38)	24.079 (7.57)	7.48**	21.223 (8.337)	23.629 (8.468)	2.78*	21.254 (8.331)	23.310 (8.8)	1.7
Number of children	4.50 (2.039)	4.86 (1.68)	1.82	4.510 (2.032)	4.943 (1.533)	1.55 (0.2137)	4.508 (2.028)	5.069 (1.534)	2.17

ANC			Care at Delivery assisted by SBA followed by ANC				PNC followed by ANC and Delivery assisted by SBA		
Variables	Received	Did not		Received	Did not		Received	Did not	
Predisposing factors	Care	Received care		Care	Received care		Care	Received care	
Continuous Covariates	Mean (SD)	Mean (SD)	F-Stat(p value)	Mean (SD)	Mean (SD)	F-Stat(p value)	Mean (SD)	Mean (SD)	F-Stat(p value)
Categorical Covariates	Number (%)	Number (%)	Chi square (p value)	Number (%)	Number (%)	Chi square (p value)	Number (%)	Number (%)	Chi square (p value)
Total number of pregnancies	5.56 (2.37)	5.75 (1.9)	0.32	5.584 (2.361)	5.6 (1.958)	0.00 (0.9679)	5.577 (2.358)	5.793 (1.953)	0.24
Type of delivery (Normal/ C-section)	698 (86.6)	108 (13.4)	0.03	698 (86.6)	108 (13.40)	0.74 (0.3913)	698 (86.60)	108 (13.40)	1.1
Place of delivery (Public/ Private)	653 (81.02)	153 (19)	54.39***	653 (81.02)	153 (18.98)	145.34 (0.00)	653 (81.02)	153 (18.98)	117.69***
Health services provider (Skilled/ Unskilled)	642 (79.65)	164 (20.35)	52.27***	642(79.65)	164 (20.35)	143.23 (0.00)	642 (79.65)	164 (20.35)	117.76***

ANC			Care at Delivery assisted by SBA followed by ANC				PNC followed by ANC and Delivery assisted by SBA		
Variables	Received	Did not		Received	Did not		Received	Did not	
Predisposing factors	Care	Received care		Care	Received care		Care	Received care	
Continuous Covariates	Mean (SD)	Mean (SD)	F-Stat(p value)	Mean (SD)	Mean (SD)	F-Stat(p value)	Mean (SD)	Mean (SD)	F-Stat(p value)
Enabling factors									
Continuous Covariates	Mean (S.D.)	Mean (S.D.)	F-Stat(p value)	Mean (S.D.)	Mean (S.D.)	F-Stat(p value)	Mean (S.D.)	Mean (S.D.)	F-Stat(p value)
Husband Income	24251.01 (13735.17)	20825.397 (9741.07)	3.76*	24144.617 (13644.352)	20428.571 (8968.19)	2.54	24098.456 (13604.939)	20896.552 (9685.574)	1.58
Total Household income	46402.423 (41013.55)	41396.825 (11739.8)	0.93	46309.987 (40316.587)	39428.571 (12081.307)	1.01	46235.521 (40179.49)	40000 (12351.99)	0.7
Per capita income	2424.27 (1994.96)	1819.199 (614.33)	5.74*	2403.952 (1964.452)	1782.625 (625.703)	3.48**	2424.266 (1994.96)	1819.199 (614.332)	5.74**
Poverty headcount	0.84 (0.37)	(0.968) (0.176)	7.56 **	0.844 (0.363)	0.971 (0.169)	4.25**	0.846 (0.362)	0.966 (0.186)	3.16*
Distance to Health Facility	13.83 (10.81)	12.94 (9.39)	0.4	13.794 (10.754)	(12.943) 9.698	0.21	13.748 (10.728)	14 (10.278)	0.02
Categorical Covariates	Number (%)	Number (%)	Chi square (p value)	Number (%)	Number (%)	Chi square (p value)	Number (%)	Number (%)	Chi square (p value)

ANC			Care at Delivery assisted by SBA followed by ANC				PNC followed by ANC and Delivery assisted by SBA		
Variables	Received	Did not		Received	Did not		Received	Did not	
Predisposing factors	Care	Received care		Care	Received care		Care	Received care	
Continuous Covariates	Mean (SD)	Mean (SD)	F-Stat(p value)	Mean (SD)	Mean (SD)	F-Stat(p value)	Mean (SD)	Mean (SD)	F-Stat(p value)
Residence: Rural/ Urban	685(84.99)	121(15.01)	0.29	685 (84.99)	121 (15.01)	0.76	685 (84.99)	121 (15.01)	0.76
Type of House (Kacha/Pakka)	377 (47)	429 (53.23)	1.38	429 (53.23)	377 (46.77)	1.36	429 (53.23)	377 (46.77)	0.35
Exposure to television	516 (64)	280(36)	3.84	516 (64.02)	290 (35.98)	0.91	516 (64.02)	290 (35.98)	1.28
Access to the health facility	321(40)	485(60)	3.43*	321 (39.83)	485 (60.17)	10.23***	321 (39.83)	485 (60.17)	4.43**
Rooms for sleeping (<2/>=2)	369 (46)	437 (54)	0.24	369 (45.78)	437 (54.22)	0.2	369 (45.78)	437 (54.22)	0.35
Access to Electricity	765 (95)	41(4.09)	3.66	765 (94.91)	41 (5.09)	1.96	765 (94.91)	103 (5.09)	1.61
Perceived need factors									
Categorical Covariates	Number (%)	Number (%)	Chi square (p value)	Number (%)	Number (%)	Chi square (p value)	Number (%)	Number (%)	Chi square (p value)

ANC			Care at Delivery assisted by SBA followed by ANC				PNC followed by ANC and Delivery assisted by SBA		
Variables	Received	Did not		Received	Did not		Received	Did not	
Predisposing factors	Care	Received care		Care	Received care		Care	Received care	
Continuous Covariates	Mean (SD)	Mean (SD)	F-Stat(p value)	Mean (SD)	Mean (SD)	F-Stat(p value)	Mean (SD)	Mean (SD)	F-Stat(p value)
beneficiary/ non- beneficiary	408(50.62)	398(49.38)	65.73***	408 (50.62)	398 (49.38)	33.39***	398 (49.38)	408 (50.62)	26.78***
Place of residence: Rural/ Urban	685(84.99)	121(15.01)	0.29	685 (84.99)	121(15.01)	0.13	685 (84.99)	121 (15.01)	0.76
Respondent employment status	66 (8.56)	737 (91.44)	0.57	69 (8.56)	737 (91.44)	0.64	69 (8.56)	737 (91.44)	0.18
Joint or Nuclear Family System	749 (92.93)	57(7.07)	5.20**	749 (92.93)	57 (7.07)	2.78*	749 (92.93)	57 (7.07)	2.29
HH arrangement (Owned/ Rented)	644(79.9)	162 (20.1)	17.19***	644 (79.90)	162 (20.10)	9.20**	644 (79.90)	162 (20.10)	7.57**
Experience any Neonatal Mortality	503 (62.4)	303 (38)	0.81	503 (62.41)	303(37.59)	7.83**	503 (62.41)	303 (37.59)	2.56*

ANC			Care at Delivery assisted by SBA followed by ANC				PNC followed by ANC and Delivery assisted by SBA		
Variables	Received	Did not		Received	Did not		Received	Did not	
Predisposing factors	Care	Received care		Care	Received care		Care	Received care	
Continuous Covariates	Mean (SD)	Mean (SD)	F-Stat(p value)	Mean (SD)	Mean (SD)	F-Stat(p value)	Mean (SD)	Mean (SD)	F-Stat(p value)
Complications in past delivery	616 (76.5)	189 (23.48)	1.38	616 (76.52)	189 (23.48)	1.72	616 (76.52)	189 (23.48)	0.65
Birth Interval	657(82)	149 (19)	8.54**	657 (81.51)	149 (18.49)	2.39	657 (81.51)	149 (18.49)	2.68*
Vaccinated during ANC	610 (76)	196 (24)	2.87	610 (75.68)	196 (24.32)	3.69	610 (75.68)	196 (24.32)	3.45
Tetanus toxoide vaccination	560 (70)	246 (30)	0.05	246 (30.52)	560(69.48)	1.01	246 (30.52)	560 (69.48)	0.58

The income per capita serves as an indicator of the community's overall social and economic well-being. Per capita income is linked to medical facilities, transportation, health, education and MHC awareness. This study calculates per capita income using household size. Higher per capita income assists individuals in managing CoC costs. Both spouse income and per capita income are associated with SBA's utilisation of ANC services, followed by PNC. Families with higher income and per capita income used MHC services more. Participants who received financial assistance (like the CCT) increased the likelihood of receiving ANC from the SBA. Access to health facility significantly associated with MHC service utilisation. If getting to a hospital is difficult, MHC service utilisation will reduce. The location of one's home also has a positive and significant effect on the utilisation of preventative

MHC services. MHC services are more popular in urban than rural areas. Respondents who own a home are more likely to receive MHC than a renter.

Multivariate logistic regression examined ANC, PNC, and SBA utilisation. Predisposing, enabling, and perceived need variables affect health care seeking. Among predisposing factors age of a woman at first delivery, their education, household size, and health care provider all affect CoC use. Table 3 lists predisposing, enabling, and perceived need factors for MHC during delivery. The model I examines ANC correlations. This study found a statistically significant connection between women's age at first birth, respondent and spouse's education level with ANC usage from SBA as educated partners tend to have higher use of ANC service from a skilled provider, where it decreases with larger household size.

Table 3. Multinomial Logistic Regression of Predisposing, Enabling and Perceived Factors of Women of K.P., who had Received ANC, SBA and PNC

Variables	Care at Delivery assisted by SBA				PNC followed with ANC and Delivery assisted by SBA							
	followed with ANC		followed with ANC		followed with ANC		followed with ANC					
	Logit model	Probit Model	Logit model	Probit Model	Logit model	Probit Model	Logit model	Probit Model				
	Coefficients (S.E.)	P value	Coefficients (S.E.)	P value	Coefficients (S.E.)	P value	Coefficients (S.E.)	P value	Coefficients (S.E.)	P value	Coefficients (S.E.)	P value
Predisposing factors												
Age	-0.0321 (0.027)	0.247	-0.0177 (0.0152)	0.245	-0.0308 (0.0527)	0.559	-0.0160 (0.027)	0.556	-0.00651 (0.0529)	0.902	-0.0056 (0.028)	0.839
Age at first birth	0.1377* (0.065)	0.035	0.0723*(0.0346)	0.037	-0.00094 (0.094)	0.992	-0.0064 (0.048)	0.893	-0.0401 (0.0955)	0.674	-0.027 (0.049)	0.578
Women total years of schooling completed	.0943* (0.0447)	0.035	0.048* (0.0244)	0.052	0.0793 (0.0680)	0.243	0.0246 (0.036)	0.498	0.123 (0.0685)	0	0.0504 (0.036)	0.067
Husband years of schooling	.1134* (0.065)	0.082	0.0614* (0.0351)	0.08	-0.0356 (0.1029)	0.729	-0.0167 (0.054)	0.76	-0.0886 (0.1015)	0.382	-0.046 (0.0548)	0.403
Total Household size	-0.0389* (0.0210)	0.064	-0.000276	0.047	-0.0221 (0.033)	0.5	-0.0097 (0.0177)	0.582	-0.0114 (0.0320)	0.721	-0.0045 (0.0175)	0.797
Live pregnancies	-0.1244 (0.2218)	0.575	-0.0263 (0.1157)	0.82	-0.764 (0.4176)	0.067	-0.3415 (0.2119)	0.107	-0.553 (0.4007)	0.169	-0.238 (0.2064)	0.249
Total number of pregnancies	-0.0087 (0.195)	0.964	-0.0329 (0.1034)	0.75	0.4176 (0.358)	0.244	0.1952 (0.1864)	0.295	0.1763 (0.3423)	0.607	0.078 (0.1810)	0.665
Health services provider (Skilled/Unskilled)	2.748* (0.3832)	0	1.552 (0.2127)	0	6.236 (1.1257)	0	2.891 (0.4124)	0	5.716 (1.01)	0	2.623 (0.4088)	0

Enabling factors												
ANC		Care at Delivery assisted by SBA				PNC followed with ANC and Delivery						
		followed with ANC				assisted by SBA						
Variables	Logit model		Probit Model		Logit model		Probit Model		Logit model		Probit Model	
	Coefficients (S.E.)	P value	Coefficients (S.E.)	P value	Coefficients (S.E.)	P value	Coefficients (S.E.)	P value	Coefficients (S.E.)	P value	Coefficients (S.E.)	P value
Predisposing factors												
Residence: Rural/ Urban	-1.592 (0.5126)	0.002	-0.855 (0.269)	0.001	-1.381 (0.7099)	0.052	-0.8172 (0.403)	0.042	-0.9989 (0.677)	0.14	-0.6063 (0.385)	0.115
Exposure to television	.0396 (0.2513)	0.875	0.0420 (0.1354)	0.756	0.5212 (0.4291)	0.224	0.089 (0.209)	0.669	0.393 (0.417)	0.346	0.0482 (0.2072)	0.816
Access to health facility	0.7712 (0.2224)	0.729	0.042 (0.1165)	0.722	1.043 (0.413)	0.012	0.4443 (0.207)	0.032	0.6719 (0.403)	0.095	0.2738 (0.2042)	0.18
Perceived need factors												
Status	5.0329 (1.060)	0	2.416 (0.4247)	0	4.744 (1.154)	0	2.383 (0.506)	0	4.38 (1.152)	0	2.161 (0.5012)	0
Birth Interval (<1/>=2 years)	-2.009 (0.675)	0.003	-1.184 (0.379)	0.002	-1.254 (0.7727)	0.105	-0.8178 (0.4344)	0.06	-1.645 (0.8801)	0.062	-0.9834 (0.479)	0.04
Have you been vaccinated during ANC	-0.0611 (0.4162)	0.883	-0.000 (0.2242)	1	0.936 (0.7630)	0.22	0.560 (0.416)	0.179	1.146 (0.7867)	0.145	0.644 (0.4353)	0.139
TFR Vaccination	-0.3407 (0.4215)	0.419	-0.1292 (0.2260)	0.568	-0.335 (0.7303)	0.647	-0.284 (0.385)	0.461	-0.0648 (0.7001)	0.926	-0.1344 (0.3772)	0.722
Number of obs	806		806		806		806		806		806	
LR chi-square (p value)	175.32		175.29	0	185.6 (0.00)		181.59 (0.00)		145.62 (0.00)		142.44 (0.00)	
Log likelihood	-133.39356		-133.40956		-51.26		-53.218434		-52.081159		-53.66948	
Pseudo R ²	0.4		0.3965		0.6444		0.6305		0.583		0.5703	

The variable SBA was positively related to CoC (ANC to SBA) and PNC. This suggests that women are more likely to use MHC services if the health care provider is skilled in this regard. Women in rural areas are less likely to seek ANC care because they lack access to modern health care facilities. According to previous research, urban mothers are more likely to seek out medical attention ([Tesema et al., 2002](#); [Nigusie et al., 2004](#); [WHO, 2003](#)), as these women have better access to health care, public relations and formal education.

Among the perceived need factors, status and birth interval are associated with ANC use. The study found that respondents who got economic assistance were more likely to receive ANC from SBA. The study indicated that respondents with a birth interval of less than a year are less likely to use skilled ANC. This is because the more children a woman has, the more expensive it is for her to receive ANC treatments from an institution due to the user fee and transportation costs. Model II examines the correlations between ANC and SBA utilisation. All significant variables remained in the second model except for women's and spouses' education. Additionally, we discovered a substantial correlation between live births and access to health care for model II.

Model III examines CoC from ANC to birth and postpartum in women who got MHC services from skilled attendants. Model III had all of Model II's qualities, and model III stresses more mothers' education in acquiring PNC. Perhaps this is due to the fact that educated women have better access to contemporary health care and are more likely to utilise MHC services.

Discussion of Results

While focusing particularly on maternity and newborn health outcomes, the government of K.P. should priorities CoC as a primary strategy. It advocates for an integrated health care system that connects all levels of ANC, SBA, and PNC. However, because the data on CoC is inadequate, we cannot accurately analyse the province's position in terms of CoC. As such, this study will examine the

factors that impede the CoC from delivery to the postpartum period.

According to studies, complications during childbirth and postpartum increase maternal mortality ([Bustreo et al., 2013](#)). Around a quarter of pregnant women in K.P. don't receive prenatal care, and half don't deliver in a hospital. ([Bhutta et al., 2013](#); [Bustreo et al., 2013](#); [WHO, 2014](#)). The majority of deliveries still occur at home in K.P. (NIPS, 2013). In comparison to other provinces of Pakistan, the rate of receiving ANC services is quite low in K.P. In Kohistan or Tor Ghar, ANC visits averaged 361 and 199 in the first quarter of 2018. However, this study showed a substantial increase in the rate of CoC completion. The main reason attributed could be the awareness that an expecting mother has during exposure to the MHC care program, *i.e. Chief Minister initiative for pregnant women in K.P.* (CCT program 2014), their childbearing age, level of education, and kind of health service provider.

Nonetheless, women in K.P. continue to experience a lack of continuity of treatment at all three levels. Most dropouts occur between ANC and SBA delivery, probably due to limited ANC and home-based deliveries. In K.P., lack of access to a health facility drives home births. This is due to structural and cultural limits in Pashtoon society, as well as traditional orthodox traditions like TBA ([Sarfaraz & Hamid, 2014](#); [Iqbal, 2017](#)), as more than half of residential deliveries are made without SBA help ([Sarfaraz & Hamid, 2014](#)).

With the exception of ANC visits, women who live more than an hour from a health care institution are eight times more likely to deliver at home than those who do not. Similarly, women who have had SBA during delivery are more likely to obtain PNC ([Iqbal et al., 2017](#); [Wang & Hong, 2015](#)). Most women are abandoned following ANC and do not receive appropriate delivery support or PNC for themselves or their newborns. Our results show that strengthened CoC requires health facilities and experienced healthcare professionals. High-quality ANC helps women understand pregnancy complications and the need for SBA. Most mothers who received

appropriate birth assistance and PNC for the first 48 hours improved MCH significantly. Our analysis shows that most reproductive stage determinants, such as older age at first birth, higher level of education, fewer children, and spouse's level of education, are directly correlated with CoC components (ANC, SBA, and PNC) utilisation in K.P. when combined with enabling factors such as rural or urban residence and access to health facilities.

Women with less than a year birth interval, larger families, and more than two children are less likely to receive these services. Given the study's descriptive nature, this could be coincidental. Previous studies in Ghana, Tanzania, India, China, and Cambodia verify these findings ([Gao et al., 2010](#); [Ghazi et al., 2012](#); [Rishworth, 2014](#); [Wang & Hong, 2015](#); [Yeji et al., 2015](#)).

The study found respondents' education level as a significant predictor of CoC as women with a higher level of education are more expected to use MHC services ([Olanyinka et al., 2014](#); [Iqbal et al., 2017](#); [Dahiru & Oche, 2015](#); [Ononokpono & Odimegwu, 2014](#); [Singh & Jha, 2016](#)). Unfortunately, women's education levels are significantly lower, as the study reports respondents have an average of six years of schooling. Approximately 85 per cent of sample respondents are from rural areas. Thus, rural women confront health care access issues due to topography, roads, and public transit ([Karkee et al., 2013](#); [Olanyinka et al., 2014](#)). Similarly, fewer K.P. women get continuous care. At the same time, total live births and birth interval affected CoC negatively.

Women who have more than one child with a birth gap of less than a year are less likely to use MHC throughout pregnancy and postpartum ([Iqbal et al., 2017](#); [Olanyinka, 2014](#); [Terekegan et al., 2014](#)). The study's findings highlight the relevance of community-based health care programs supporting MHC continuity, which may reduce MCH accessibility barriers. Home visits and outreach programs could help rural and impoverished women get ANC and PNC services ([Jennings et al., 2017](#)). The availability

of modern MHC treatments is linked to service utilisation, which affects treatment-seeking behaviour and pregnancy outcomes ([Singh et al., 2012](#); [Ray et al., 2018](#); [Zakar, 2017](#)).

In K.P., education, age, spouse education, the total number of children, health care provider, residence location, and availability to health facility indicate ongoing MHC utilisation from pregnancy to postpartum. Thus, discontinuation of CoC use in K.P. is associated with typical structural and cultural constraints in Pashtun society, including the traditional orthodoxy's function of DAI ([Sarfraz & Hamid, 2014](#)), restrictions on women's spatial mobility (ADB, 2000), and women's family autonomy ([Ghazi, 2012](#)).

[Iqbal et al. \(2017\)](#) studied CoC in Pakistan; however, no such study has been done in K.P. This work also contributes to existing knowledge in the following ways. Unlike other surveys, this study used a structured questionnaire on 806 respondents from five randomly selected areas (namely Peshawar, Swabi, Nowshera, Malakand and Kohat). Second, most surveys can't follow ANC or PNC visits. This study calculates ANC and PNC services assisted by SBA based on patient visits. This helps us understand the reasons for care discontinuity and proposes ways to reduce it.

The study has other drawbacks, though. Cross-sectional surveys can't show causal linkages. Second, many district union councils were inaccessible owing to the pandemic Covid-19 because most people dislike face-to-face interviews. Thus, self-reports may influence the survey's results. Owing to the sample's representativeness for each district and a response rate of 98 per cent, this does not alter the generalizability of the findings.

Conclusion

KP has fewer ANC visits followed by SBA and PNC delivery than other provinces. Despite a minor rise in ANC visits, CoC progress is unsatisfactory. This study examines factors that affect CoC from pregnancy through postpartum. The study indicates substantial dropout during delivery and postpartum. The factors associated include household size, the

total number of live pregnancies, place of residence, and shorter birth intervals. At the same time, education of women, age at first birth, health facility access, and cash transfers improve the likelihood of getting ANC, SBA, and PNC.

There is limited literature available in exploring the determinants of MHC service utilisation and correlates of CoC in Pakistan ([Iqbal, 2017](#); [Sarfraz & Hamid, 2014](#), [Zakar et al., 2017](#)), but a huge deficiency exists in explaining the main factors responsible for low utilisation of CoC services in K.P. K.P.'s maternal program aims to improve MNCH quality and continuity. It provided free birth care and cash incentives to women who had at least four prenatal sessions. Also, free neonatal care is offered (Govt of KPK, 2014). High dropout rates during SBA-assisted birth

indicate addressing supply-side restrictions, such as drug and health professional shortages. The study further suggests addressing supply-side barriers to better assist the expecting mother during and after delivery ([Austin et al., 2011](#); [Jacob et al., 2011](#)).

Other suggested strategies should include media campaigns, health education workshops, specialised workers, and community-based initiatives. SBA, community-based interventions, and women's education boost ANC coverage and institutional delivery ([Ray, 2018](#); [Mbuagbaw et al., 2015](#)). K.P. women should be included in designing these initiatives, which should be targeted to their specific needs. Both the public and private sectors should be engaged in building health systems that eliminate CoC obstacles.

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