

Postnatal Care Attendance and its contributing factors in Pakistan: Analysis of Demographic and Health Survey 2017-18

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Abstract

This research is aimed to assess the determinants and contributing factors of postnatal care (PNC) attendance among ever-married women in Pakistan. Its secondary analysis of the recent Pakistan Demographic and Health Survey (PDHS) 2017-18, limited to 3,935 ever-married women between 15-49 years of age, who gave childbirth in last 2 years prior to the survey. Weighted analysis was performed, presenting multivariate logistic regression. Results informed that more than half of the women attended PNC in Pakistan. Majority of the women, who attended PNC were resided in urban areas, aged 15-24 years, attained >10 years of education, employed as professionals, belonged to the richest wealth quintile, had access to information and autonomy for healthcare decision-making, and faced no problem to access health facility. Regarding women's reproductive health behavior, results revealed that those mothers who gave their first births, had <20 years age, had 1-2 children ever born and alive, attended at least 4 or more antenatal care visits, delivered their first child at the private facility with large size baby during last 2 years had higher PNC attendance. Research recommends engaging the government, mass media, local service providers, and families to raise awareness, educate and sensitize regarding the significance of PNC for maternal survival.

Keywords: Postnatal care attendance, PNC, contributing factors, Pakistan, reproductive health.

Introduction

Ending Preventable Maternal Mortality (EPMM) is the most essential and acceptable goal worldwide. Statistics revealed that around 295,000 women deacease globally, due to avoidable pregnancy or childbirth-related problems (World Health Organization, 2019a). Almost 94% of maternal deaths occur in developing countries (World Health Organization, 2019b). "Sub-Saharan Africa and Southern Asia altogether make up ~86% of the estimated maternal deaths (World Health Organization, 2019b): Under the agenda of Sustainable Development Goals (SDGs), maternal mortality reduction remains the priority, where member states are striving to decrease the maternal mortality ratio (MMR) to less than 70 deaths per 100,000 live births by 2030 (Mental Health Task Force, 2021)."

Maternal mortality risk is higher during the postpartum period – begins an hour after the delivery and lasts for first 6 weeks (42 days) of the delivery (Sines et al., 2007). The postpartum period is the most critical to save the lives of both mothers and newborns. Postnatal care (PNC) refers to availing services mainly within the first 42 days after childbirth for better diagnosis, prevention, and management of the complications and postnatal danger signs (World Health Organization, 2019a, 2019b; Ndugga et al., 2019). Further, during PNC mothers also got opportunities to discuss their health problems, e.g., breastfeeding, a balanced nutritious diet for themselves and newborns, and family planning (Sloan et al., 2011; Ndugga et al., 2019).

Studies found that most of the mothers die during postpartum period – between 1 hour to 42 days after delivery (World Health Organization, 2014a, 2014b; WHO & MCHIP, 2015). The most common life-threatening complications are associated to childbirth include postpartum hemorrhage and various infections. These complications can be managed through the timely diagnosis of postnatal danger signs and the provision of appropriate PNC (Titaley et al., 2009; Kirkwood et al., 2013) Therefore, the World Health Organization (WHO)' Department of Maternal, Newborn, Child and Adolescent Health" recommended that PNC is crucial

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for averting postnatal maternal deaths (WHO & MCHIP, 2015). Nonetheless, the use of PNC service is relatively lower within low-resource countries, particularly poor women living in rural areas (Dhakal et al., 2007; Mohan et al., 2015; Somefun & Ibisomi, 2016; Akibu et al., 2018).

In lower-middle-income country of Pakistan, the low utilization of PNC is evident from the high maternal mortality. Overall, the country has 186 MMR, while the pregnancy-related mortality ratio (PRMR) is unacceptably higher with 255 deaths per 100,000 live births (NIPS&ICF, 2020). Although these ratios have been decreased over the period, nevertheless, the country has yet to focus more for achieving the SDGs target for averting maternal mortality (Naseem et al., 2017; NIPS&ICF, 2020). Further, the PNC component has often received less attention, in contrast to antenatal care and skilled birth attendance, highlighting a gap to attain safe motherhood (Iqbal et al., 2017).

Regardless of the importance of PNC, evidence revealed that postpartum is the most neglected area in the continuum of care, where a significant number of maternal morbidities remain undiagnosed (WHO, 2010; Yunus et al., 2013; Iqbal et al., 2017). Ironically, PNC is the least utilized maternity service due to limited advocacy, particularly in developing countries, including Pakistan (NIPS & ICF, 2019). According to the recent Demographic and Health Survey (DHS) of Pakistan (2017-18), only 6 women out of 10 received PNC services from a health professional within two days after childbirth, nevertheless, rest either had received PNC beyond the first two days or never availed any PNC service (NIPS & ICF, 2019). This highlights the fact that Pakistani women usually don't prefer institutional delivery, except for complications, thus lacking contact with health facilities, service providers, and PNC consultation. Previous studies highlighted that various socio-demographic factors influence the significance of attainment of PNC, such as place of residence, educational status of parents, households' socio-economic status, birth order, and awareness about the visit importance (Sultana & Shaikh, 2015; Yunus et al., 2013; Iqbal et al., 2017).

Given the context, the present research aims to bridge the existing gap in the literature, highlighting connotation of PNC utilization in the country. This research investigated the determinants and contributing factors of PNC attendance among women in Pakistan, who gave childbirth in the 2 years prior to the survey. This research would be crucial to understand the various factors, motivating or inhibiting women to seek PNC services for safe motherhood.

Conceptual Framework

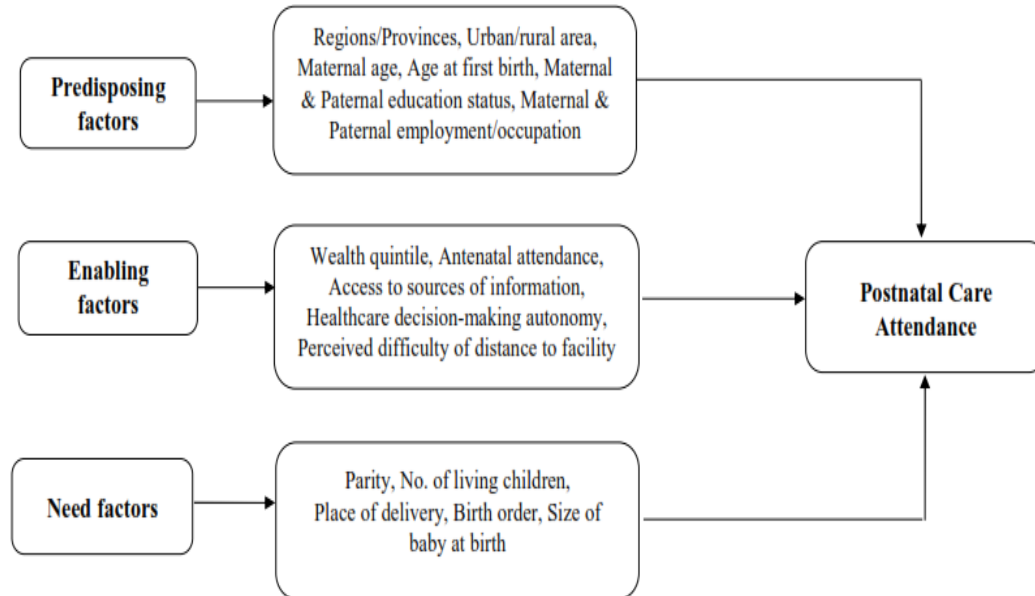
This research adapted its conceptual framework from the Behavioral Model (BM) of health services utilization, proposed by Andersen and Aday (Aday, 1993; Andersen, 1995). It's a multidimensional model and is widely used to assess patients' behavior for utilizing the available health services (Andersen, 1968; Aday & Andersen, 1974; Adey et al., 1980; De Boer et al., 1997; Bradley et al., 2002; Kadushin, 2004; Babitch et al., 2012; Ndugga, 2019). In the purview of this research, the suggested behavioral model provides a relevant framework to comprehend the various factors, which influence PNC attendance. Moreover, this framework recommends that healthcare utilization, including PNC, is a combination of three sets of factors, i.e. predisposing, enabling, and need factors (Adey et al., 1980; De Boer et al., 1997; Andersen et al., 2011; Ndugga, 2019).

According to BM, predisposing factors mainly include those socio-demographic characteristics at an individual level, which play a vital role in influencing the use of healthcare services (Ayanore et al., 2016). In the present research, regions/provinces, urban/rural residential areas, maternal age, age at first birth, maternal and paternal education, and employment status were taken as predisposing factors. It is evident from the literature that there is an established link between individuals' age, education, employment, and place of residence with the utilization of health services, including PNC attendance (Simkhada et al., 2008; Regassa, 2011; Ayanore et al., 2016; Izudi & Amongin, 2015).

Further, the BM highlights that enabling factors are those economic and structural conditions, which facilitate individuals to utilize healthcare services (Adey et al., 1980; De Boer et al., 1997; Andersen et al., 2011; Ndugga, et al., 2019). For this particular research, respondents' wealth quintile, antenatal care attendance, access to sources of information, maternal healthcare autonomy, and perceived difficulty to

access distant health facilities were chosen as enabling factors. This research assumed that respondents, having higher wealth quintile, access to information, autonomy for decision-making, and facing no difficulty in accessing distant health facilities are more likely to avail healthcare services, particularly PNC attendance.

Figure 1: Proposed Conceptual Framework for Postnatal Care attendance



Furthermore, the BM suggests that need factors predominately encourage individuals to avail healthcare services (De Boer et al., 1997; Ndugga, et al., 2019). In the present research, the need factors included parity, living children, birth order, delivery place, and size of child at birth are linked with the healthcare services utilization including PNC attendance (Ononokpono et al., 2014; Wang & Hong, 2015).

Methods and Material

Data Source

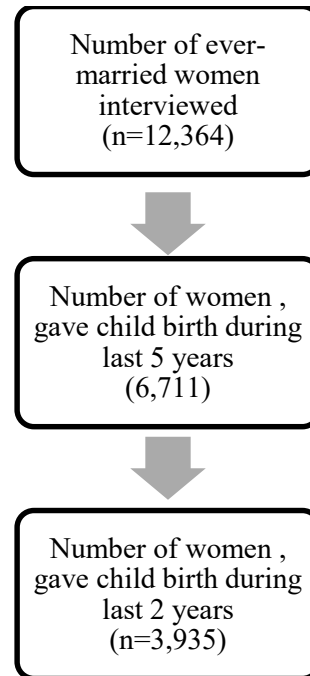
The research is based on secondary analysis of the latest, cross-sectional, and nationally representative DHS 2017-18 of Pakistan (NIPS & ICF, 2019). In Pakistan, DHS was conducted by “National Institute of Population Studies” under MEASURE DHS Program, with technical support provided by ICF International and Pakistan Bureau of Statistics, while United States Agency for International Development provided financial support (NIPS & ICF, 2019). The DHS applied a two-stage cluster random sampling to sample ever-married women (15-49 years) and men (15-59 years) in sampled households. In the first stage, clusters with urban and rural stratification were selected, while in the second stage, eligible households with ever-married women were interviewed, using the interview method, including questions related to postnatal care (NIPS & ICF, 2019). Sampling procedures and data processing/management are described in detail in the Pakistan DHS final report (NIPS & ICF, 2019).

Sample and inclusion criteria

The Pakistan DHS (2017-18) interviewed 12,364 ever-married women across the country, excluding Azad Jammu & Kashmir and Gilgit Baltistan (NIPS & ICF, 2019). Among them, all those women, who had delivered a child in the last 5 years, prior to the survey were asked regarding their reproductive health and check-ups after delivery, which comprised of a sample of 6,711 women. Nonetheless, the inclusion criteria for this research was limited to women delivered child during the last 2 years before the Pakistan DHS 2017-18. This inclusion criterion has been selected, considering the significance of global PNC indicator (Moran

et al., 2013; Demographic Health Survey, n.d.), as well as avoiding any recall bias (Ndugga, 2019). Thus, the final sample comprised of 3,935 women, as exhibited in figure 2. Further, this analysis of PNC attendance was limited to the mothers only.

Figure 2: Sample Selection Criteria



Measures of Outcome variable

The World Health Organization (WHO) 'Department of Maternal, Newborn, Child and Adolescent Health' best practices for PNC for all mothers and newborns recommends that PNC is essential, regardless of where the birth took place (WHO & MCHIP, 2015). The timing of PNC contact is the most critical aspect. In the case of the health facility, the first PNC check-up is desirable within 24 hours after delivery, however, for home-based deliveries, the first PNC contact must be within the first 24-48 hours, or within 42 days of childbirth. Thus, considering the WHO recommended practices for PNC, this analysis focused on PNC attendance, both for health facility and home-based deliveries. Since PNC utilization is cardinal, hence its utilization within the most critical period increase the likelihood of survival for both mothers and newborn.

Outcome variable is "postnatal care attendance", referred to those women with a live birth in the 2 years prior to the survey, who have utilized PNC after childbirth, were coded as 'yes'. Nevertheless, women did not receive PNC were coded as 'no'.

Though DHS women's questionnaire was administered to all those women, gave childbirth during 5 years prior to the survey to inquire about their health check-ups after delivery. However, to avoid recall bias this analysis focused on the most recent births within last 2 years, especially for those women, who may have had more than one birth in the given period, as guided by literature (Ndugga, et al., 2019). Furthermore, this research aligns the measurement of PNC with the global PNC indicator, which also focuses on those mothers, who had given live births in last 2 years, and availed health services after birth (Moran et al., 2013; Demographic Health Survey, n.d.).

Measures of independent variables

The independent variables were related to the characteristics of socio-demographics, covariates, reproductive health, and PNC utilization. The socio-demographic characteristics consisted of women's geographical location (region/province, urban/rural residence classification), age, women's education and their husbands' education and occupation status, and wealth quintile. Respondents' geographical location

was measured in terms of regional/provincial presence (Punjab, Sindh, Baluchistan, Khyber Pakhtunkhwa, Federally Administered Tribal Areas (FATA,) and Islamabad) and residential classification into urban or rural areas. In DHS, the maternal age was documented as a continuous variable and regrouped in three groups i.e. 15 to 24 years, 25 to 34 years, and 35 years. & above. The educational status was defined as the levels of schooling attained and was categorized into four groups (no formal education/schooling, up to 5 years, 6 to 10 years, and more than 10 years of schooling). The engagement of both maternal and paternal into various employment/occupations was regrouped (in 4 groups) as unemployed/not working, working as 'professional/clerical/sales & services, agriculture, manual or household workers'. Lastly, household wealth status was measured through five quintiles i.e. poorest, poorer, middle, richer, and richest.

This research selected three key covariates, entailing respondents' autonomy, and access to information and health facilities for medical care. In the DHS, maternal autonomy particularly for their contribution in healthcare-related decisions was measured through six possible responses. Corresponding to the previous studies (Rirash, 2014; Musonera & Heshmati, 2016), these responses were computed into binary categories (yes/no), indicating, either respondent has the autonomy to make healthcare decisions (alone or jointly with husband/others) or has no autonomy at all. Respondents' access to information was determined, using their experience to mass media, informing respondents' regularity (frequency) of reading newspaper, watching television (TV), or listening to the radio for seeking healthcare information. These were computed into binary categories (yes/no). Further, DHS measures the respondents' perception regarding distance to the health facility, impeding their medical access. This perceived difficulty was dichotomized into the problem or not a problem.

Seeking guidance from literature, this research included various characteristics related to women's reproductive health (Yunus et al., 2013; Sultana & Shaikh, 2015; Ndugga, et al., 2019), including mother's age at first birth, no. of living children, baby's birth size, parity, birth order, antenatal care and place of delivery. In DHS, the data for age at first birth, no. of living children, parity, and birth order was collected as continuous variables, hence these variables were regrouped for the analysis, such as maternal age at first birth was divided into three groups, i.e. less than 20 years, between 20-34 years, and 35-49 years, the number of children ever born or parity was regrouped into three categories (1-2, 3-4, 5 children or above), while the no. of living children was classified into four groups (0, 1-2, 3-4, 5 children or above). Similarly, birth order was grouped into 1, 2-3, 4-5, 6 or more births.

Antenatal care attendance is considered an important indicator to lessen the risk of morbidity and mortality during pregnancy, delivery, and PNC period. Under DHS, respondents were asked regarding their antenatal attendance in terms of the number of visits conducted, which was recorded as a continuous variable. Nonetheless, antenatal care attendance for this research was grouped into two categories, i.e. no visit or less than 4 visits conducted, and at least 4 visits or more conducted. The benchmarking of at least 4 visits has been considered, given the WHO's recommendation of at least 4 antenatal visits for pregnant women (UNICEF, 2020). Further, the delivery place was re-categorized into 3 groups, i.e. home-based delivery or other, public health facility, or private health facility-based delivery. DHS also recorded respondents' perception about the baby's size at birth into 'very large, larger than average, average, smaller than average, and very small'. This variable was regrouped into 'large, average and small'.

Data Analyses

Analysis was conducted using SPSS version 21 after calculating the sampling weights. Descriptive analysis of key variables, both in frequencies and percentages, cross-tabulation and chi-square test were presented. Further, bivariate and multivariate logistic regression analysis were performed to examine the relationship between PNC attendance and various independent variables. Odds ratios (OR) for bivariate regression and adjusted odds ratios (AOR) with 95% confidence interval (CI) for multivariate regression were calculated, where p-value ≤ 0.05 was found significant. Before applying regression, the multicollinearity between variables was also calculated using variation inflation factor (VIF) which was found > 10 , highlighting no multicollinearity (Hair et al., 1995).

Results

Descriptive statistics of Socio-demographic and covariates

Table 1 informed the frequency and percentage of key socio-demographic characteristics and co-variants of 3,935 respondents (mothers aged 15-49 yrs who gave live birth in 2 years preceding PDHS- 2017-18). Findings showed that the most of the women were from Punjab province (52.8%), followed by Sindh (23.1%) and Khyber Pakhtunkhwa (16%), while the least was from the Islamabad capital (0.8%). Further, most of the respondents were resided in rural areas (67.1%), between the maternal age group of 25-34 years (54.5%) and 15-24 years (31.5%).

Table 1: Socio-Demographics Characteristics of Respondents (PDHS 2017-18)

Characteristics	n=3,935	
	f	%
Socio-demographic characteristics		
“Regions/Provinces”		
“Punjab”	2,077	52.8
“Sindh”	909	23.1
“Baluchistan”	197	5
“Khyber Pakhtunkhwa”	630	16
“Islamabad”	32	0.8
“FATA”	90	2.3
“Geographical classification”		
“Urban”	1,296	32.9
“Rural”	2,639	67.1
“Maternal age”		
“15-24 years”	1,239	31.5
“25-34 years”	2145	54.5
“35 years and above”	551	14
Maternal Education status		
No formal schooling	1,867	47.4
Up to 5 years of schooling	618	15.7
6-10 years of schooling	895	22.7
More than 10 years of schooling	556	14.1
Paternal Education status		
No formal schooling	1,120	28.8
Up to 5 years of schooling	640	16.5
6-10 years of schooling	1,355	34.8
More than 10 years of schooling	775	19.9
Maternal Employment/Occupation		
Not Working /Unemployed	3,313	84.2
Professional/Clerical/Sales & Services	132	3.3
Agriculture	217	5.5
Manual or Household worker	274	7
Paternal Employment/Occupation		
Not Working /Unemployed	106	2.7
Professional/Clerical/Sales & Services	1,248	32.1

	Agriculture	692	17.8
	Manual or Household worker	1,848	47.5
Wealth Quintile			
	Poorest	841	21.4
	Poorer	751	19.1
	Middle	851	21.6
	Richer	734	18.7
	Richest	758	19.3
	Covariates		
	Access to sources of information ^a		
	No	1,493	38
	Yes	2,440	62
	Maternal Healthcare decision-making autonomy		
	No	2,192	56.2
	Yes	1,707	43.8
	Perceived difficulty of distance to health facility		
	Problem	1,798	45.7
	Not a Problem	2,134	54.3

^a refers to the frequency of reading a newspaper or watching TV or listening to radio

Regarding maternal educational status, 47.4% of respondents had not received formal education, while 22.7% completed 6-10 years of education, while only 14.1% of women completed more than 10 years of education. However, in case of paternal education, findings highlighted that 34.8% of fathers had attended 6-10 years of school, whereas 28.8% had no formal schooling. Concerning employment status, data showed that a significant proportion of women (84.2%) were unemployed, nonetheless, majority of the fathers (47.5%) were employed as manual and household workers, and a significant percentage (32.1%) was employed as professionals/clerical work or sales and services.

In terms of household wealth index, results found that 38% of respondents belonged to the rich quintile (18.7% richer and 19.3% richest) while 40.5% of respondents were from the poor quintile (19.1% poorer and 21.4% poorest); and 21.6% of respondents belonged to the middle wealth quintile. Table-1 also highlighted the results of co-variants for this study. Findings indicated that a large number of the respondents (62%) had access to sources of information (e.g., newspaper, TV, and radio). However, more than half of the mothers (56.2%) had no autonomy to take the decision about their healthcare. Further, a little less than half of the mothers (45.7%) reported regarding the difficulty of distance to visit or access healthcare facility to seek medical services.

Characteristics related to Reproductive Health and PNC

Table 2 indicated frequency distribution of respondents' reproductive health and PNC attendance characteristics, gave birth in last 2 years prior to the survey. These included maternal age at first birth, number of living children, parity, antenatal attendance, birth order, place of delivery, baby size at birth, and PNC attendance.

Findings showed that more than half of the mothers (54%) gave first birth between 20-34 years, while 45.4% of respondents gave first birth during the younger age group, i.e. <20 years of age. With reference to parity (number of children ever born), results revealed that around 47% of respondents had 1-2 children, 30% had 3-4 children and only 23% had >5 children. Similarly, more than 49% of respondents had 1-2 living children and 30% had 3-4 living children, while approximately 19% had >5 living children.

Regarding maternal antenatal care (ANC) attendance, findings highlighted that 59.8% of the respondents had availed at least four ANC visits or more, in contrast to 40.2% women, who availed less than 4 ANC visits or had never visited for ANC. Further, data showed that most of the mothers delivered either at private health facilities (46.2%) or at home (28.6%). However, a significant percentage of the respondents

(25.2%) availed public health facilities for delivery. With reference to birth order, the results found that 23.8% of respondents delivered 1st child in the last 2 years, while 39.3% of respondents had 2-3 birth orders and 23.2% had 4-5 birth orders of children. Furthermore, findings also revealed that the majority of respondents (71.5%) reported the average size of the baby at birth, nonetheless, 22.3% informed the small size of the child at birth. Most significantly, the results showed that 64.5% of mothers attended PNC in the last 2 years after childbirth, however, 35.5% of mothers didn't attend any PNC.

Table 2: Reproductive Health and PNC related Characteristics of Respondents (PDHS 2017-18)

Characteristics	n=3,935	
	f	%
Reproductive Health behavior		
Age at first birth		
< 20 years	1,787	45.4
20-34 years	2,126	54
35-49 years	22	0.6
Parity (number of children ever born)		
1-2 children	1,841	46.8
3-4 children	1,185	30.1
5 children or above	909	23.1
No. of living children		
0	65	1.7
1-2	1,946	49.4
3-4	1,187	30.2
5 or above	737	18.7
Antenatal Attendance		
Less than 4 visits or no visit	1,394	40.2
At least 4 visits or more	2,076	59.8
Place of delivery		
Home	1,125	28.6
Public health facility	991	25.2
Private health facility	1,819	46.2
Birth order		
1	937	23.8
2-3	1,548	39.3
4-5	913	23.2
6 or more	538	13.7
Size of baby at birth		
Large	244	6.2
Average	2806	71.5
Small	874	22.3
Postnatal Care Characteristics		
PNC Utilization		
Yes	2,538	64.5
No	1,398	35.5

Bivariate Analysis

Table 3 indicates the association of maternal PNC attendance with key characteristics of socio-demographic and reproductive health.

Table 3: Association of Postnatal Care (PNC) with Socio-demographics and Reproductive Health-related characteristics among respondents (PDHS 2017-18)

Characteristics	PNC Utilization n=3,935			p-value*
	f	Yes	No	
Socio-demographic characteristics				
Regions/Provinces				
Punjab	2,077	69.7	30.3	0.00
Sindh	909	74	26	
Baluchistan	197	40.1	59.9	
Khyber Pakhtunkhwa	630	44.9	55.1	
Islamabad	32	81.2	18.8	
FATA	90	32.2	67.8	
Geographical classification				
Urban	1,296	78.1	21.9	0.00
Rural	2,639	57.8	42.2	
Maternal age				
15-24 years	1,239	62.4	37.6	0.00
25-34 years	2145	68	32	
35 years and above	551	55.5	44.5	
“Maternal Education status”				
“No formal schooling”	1,867	50.8	49.2	0.00
“Up to 5 years of schooling”	618	65	35	
“6-10 years of schooling”	895	78.8	21.2	
“More than 10 years of schooling”	556	87.1	12.9	
“Paternal Education status”				
“No formal schooling”	1,120	49.8	50.2	0.00
“Up to 5 years of schooling”	640	58	42	
“6-10 years of schooling”	1,355	70.3	29.7	
“More than 10 years of schooling”	775	80.5	19.5	
“Maternal Employment/Occupation”				
“Not Working /Unemployed”	3,313	64.6	35.4	0.00
“Professional/Clerical/Sales & Services”	132	78	22	
“Agriculture”	217	50.2	49.8	
“Manual or Household worker”	274	68.4	31.6	
“Paternal Employment/Occupation”				
“Not Working /Unemployed”	106	59.4	40.6	0.00
“Professional/Clerical/Sales & Services”	1,248	73.8	26.2	
“Agriculture”	692	53.5	46.5	
“Manual or Household worker”	1,848	62.2	37.8	
Wealth Quintile				
Poorest	841	47.3	52.7	0.00
Poorer	751	49.9	50.1	
Middle	851	62.9	37.1	

	Richer	734	75.7	24.3	
	Richest	758	88.9	11.1	
Covariates					
Access to sources of information					
	No	1,493	49.4	50.6	0.00
	Yes	2,440	73.6	26.4	
Maternal Healthcare decision-making autonomy					
	No	2,192	57.3	42.7	0.00
	Yes	1,707	73.3	26.7	
Perceived difficulty of distance to health facility					
	Problem	1,798	56.6	43.4	0.00
	Not a Problem	2,134	71.1	28.9	
Reproductive Health Behavior					
Age at first birth					
	< 20 years	1,787	56.1	43.9	0.00
	20-34 years	2,126	71.4	28.6	
	35-49 years	22	86.4	13.6	
Parity					
	1-2 children	1,841	70	30	0.00
	3-4 children	1,185	67.5	32.5	
	5 children or above	909	49.5	50.5	
Number of living children					
	0	65	66.2	33.8	0.00
	1-2	1,946	69.1	30.9	
	3-4	1,187	67	33	
	5 or above	737	48.2	51.8	
Antenatal Attendance					
	Less than 4 visits or no visit	1,394	54.4	45.6	0.00
	At least 4 visits or more	2,076	79	21	
Place of delivery					
	Home	1,125	23.4	76.6	0.00
	Public health facility	991	73.5	26.5	
	Private health facility	1,819	85	15	
Birth order					
	1	937	71.4	28.6	0.00
	2-3	1,548	68.3	31.7	
	4-5	913	60.8	39.2	
	6 or more	538	47.8	52.2	
Size of baby at birth					
	Large	244	71.3	28.7	0.00
	Average	2,806	65.9	34.1	
	Small	874	58.7	41.3	

* Chi-square test was applied to determine p-value

According to findings of socio-demographics, PNC attendance was found higher among those mothers, who were residing in the urban area, preferably from Islamabad, Sindh, and Punjab

provinces/regions, between the maternal age group of 25-34 years, received more than 10 years education by themselves and their husbands as well, employed as professionals and belonged to the richest household wealth quintile. In addition, PNC attendance was seen higher amongst those mothers, who had access to the various sources of information, had the autonomy for decision-making about their healthcare, and found no problem in accessing the distant health facility for medical care.

With reference to reproductive health behavior, the findings revealed the higher PNC attendance during first 2-days among the mothers, who gave 1st birth at age of <20 years, had 1-2 children ever born and alive, availed at least 4 or more ANC visits, delivered at the private health facilities with large size during last 2 years.

Further, mothers' PNC attendance was observed significant ($p \leq 0.05$) with all key variables, as exhibited in table 3, including region/province, place of residence, maternal and paternal education and occupation, wealth quintile, access to sources of information, healthcare autonomy, accessibility to the distant health facility, age at 1st birth, no. of living children, parity, ANC visits, birth order, delivery place, and baby' size.

Bivariate and multivariate regression

Table 4 shows the findings of logistic regression of maternal PNC attendance with socio-demographic and reproductive health-related characteristics at bivariate and multivariate levels. The multivariate logistic regression results in Table 4 highlighted that mothers living within the provinces of Sindh (AOR = 4.48, 95%CI: 2.36-8.52), and Punjab (AOR = 2.25, 95%CI: 1.21-4.18), particularly urban area (AOR = 0.88, 95%CI: 0.69-1.12) had higher odds to attend PNC services.

Findings highlighted that mothers aged 25-34 years were more likely to avail PNC attendance (AOR = 1.11, 95% CI: 0.84-1.45) than 35 years of age or above (AOR = 0.75, 95% CI: 0.48-1.14). In the case of educational status, the results revealed that mothers, who completed 6-10 years of education (AOR = 1.05, 95%CI: 0.79-1.40) and their husbands attained above 10 years of education (AOR = 1.45, 95%CI: 1.04-2.02) were more probability to attend PNC services. However, the results of maternal education status are somehow unclear, as indicated from lower ORs in the multivariate model in contrast to bivariate regression.

Further, respondents serving within professional/clerical/sales & services had higher odds of PNC attendance (AOR = 1.78, 95% CI: 1.03-3.09) than those working as manual/household workers (AOR = 1.53, 95% CI: 1.04-2.25). Furthermore, the women belonging to the richest household wealth quintile (AOR = 2.02, 95%CI: 1.26-3.24) and having maternal healthcare autonomy (AOR = 1.29, 95%CI: 1.06-1.58) were more likely to attend PNC services.

Regarding maternal reproductive health behavior the findings showed that respondents, who gave first birth between 35-49 years age (AOR = 7.04, 95% CI: 0.95-52.18), had parity of 1-2 children (AOR = 2.02, 95% CI: 1.02-4.02), availed at least 4 or more ANC visits (AOR = 1.31, 95% CI: 1.08-1.60), delivered at private facilities (AOR = 11.71, 95% CI: 9.27-14.80) and had a large baby size at birth (AOR = 2.14, 95% CI: 1.38-3.31) had higher odds of PNC attendance.

Table 4: Bivariate and Multivariate Logistic Regression of Postnatal Care (PNC) with Socio-demographics and Reproductive Health-related characteristics among respondents (PDHS 2017-18)

Characteristics	PNC Utilization n=3,935					
	OR	CI (95%)	p-value*	AOR	CI (95%)	p-value*
Sociodemographic Characteristics and Co-variates						
Regions/Provinces						
FATA	1			1		
Punjab	4.75*	3.03-7.46	0.00	2.25*	1.21-4.18	0.01
Sindh	5.91*	3.71-9.41	0.00	4.48*	2.36-8.52	0.00

Baluchistan	1.39	0.82-2.35	0.21	1.57	0.75-3.32	0.23
Khyber Pakhtunkhwa	1.69*	1.06-2.69	0.02	0.97	0.53-1.84	0.97
Islamabad	8.81*	3.27-23.68	0.00	3.81	0.83-12.19	0.09
Geographical classification						
Rural	1			1		
Urban	2.60*	2.23-3.03	0.00	0.88	0.69-1.12	0.31
“Maternal age”						
“15-24 years”	1			1		
“25-34 years”	1.28*	1.11-1.48	0.00	1.11	0.84-1.45	0.46
“35 years and above”	0.75*	0.61-0.92	0.00	0.75	0.48-1.14	0.18
Maternal Education status”						
“No formal schooling”	1			1		
“Up to 5 years of schooling”	1.80*	1.49-2.18	0.00	0.98	0.76-1.28	0.91
“6-10 years of schooling”	3.61*	3.00-4.34	0.00	1.05	0.79-1.40	0.71
“More than 10 years of schooling”	6.49*	4.99-8.44	0.00	0.93	0.63-1.37	0.70
“Paternal Education status”						
“No formal schooling”	1			1		
“Up to 5 years of schooling”	1.39*	1.14-1.68	0.00	0.94	0.72-1.24	0.69
“6-10 years of schooling”	2.39*	2.03-2.82	0.00	1.29*	1.01-1.67	0.04
“More than 10 years of schooling”	4.15*	3.35-5.13	0.00	1.45*	1.04-2.02	0.03
“Maternal Employment/Occupation”						
“Not Working /Unemployed”	1			1		
“Professional/Clerical/Sales & Services”	1.95*	1.29-2.97	0.00	1.78*	1.03-3.09	0.04
“Agriculture”	0.55*	0.42-0.73	0.00	1.24	0.82-1.87	0.31
“Manual or Household worker”	1.19	0.91-1.55	0.19	1.53*	1.04-2.25	0.03
“Paternal Employment/Occupation”						
“Not Working /Unemployed”	1			1		
“Professional/Clerical/Sales & Services”	1.93*	1.28-2.90	0.00	1.04	0.59-1.86	0.91
“Agriculture”	0.79	0.52-1.19	0.26	0.84	0.46-1.53	0.57
“Manual or Household worker”	1.13	0.76-1.68	0.45	0.99	0.56-1.77	0.99
“Wealth Quintile”						
“Poorest”	1			1		

“Poorer”	1.11	0.91-1.35	0.30	0.85	0.62-1.16	0.31
“Middle”	1.89*	1.55-2.29	0.00	0.97	0.70-1.36	0.88
“Richer”	3.47*	2.79-4.31	0.00	1.17	0.79-1.74	0.44
“Richest”	8.96*	6.87-11.66	0.00	2.02*	1.26-3.24	0.00
“Access to sources of information”						
“No”	1			1		
“Yes”	2.86*	2.49-3.27	0.00	1.08	0.87-1.34	0.46
“Maternal Healthcare decision-making autonomy”						
“No”	1			1		
“Yes”	2.04*	1.78-2.34	0.00	1.29*	1.06-1.58	0.01
“Perceived difficulty of distance to health facility”						
“Problem”	1			1		
“Not a Problem”	1.89*	1.65-2.15	0.00	0.92	0.75-1.12	0.39
Reproductive Health Behaviors						
“Age at first birth”						
“< 20 years”	1			1		
“20-34 years”	1.95*	1.71-2.23	0.00	1.38*	1.10-1.74	0.00
“35-49 years”	4.51*	1.38-14.74	0.01	7.04*	0.95-52.18	0.05
“Parity”						
“5 children or above”	1			1		
“3-4 children”	2.11*	1.77-2.52	0.00	1.70*	1.03-2.83	0.03
“1-2 children”	2.37*	2.01-2.79	0.00	2.02*	1.02-4.02	0.04
“Number of living children”						
“0”	1			1		
“1-2”	1.15	0.69-1.94	0.58	0.85	0.43-1.70	0.65
“3-4”	1.04	0.62-1.77	0.86	1.48	0.66-3.36	0.34
“5 or above”	0.48*	0.28-0.82	0.01	1.49	0.59-3.78	0.39
“Antenatal Attendance”						
“Less than 4 visits or no visit”	1			1		
“At least 4 visits or more”	3.15*	2.71-3.65	0.00	1.31*	1.08-1.60	0.01
Place of delivery						
Home	1			1		
Public health facility	9.09*	7.46-11.07	0.00	8.14*	6.37-10.40	0.00
Private health facility	18.59*	15.39-22.45	0.00	11.71*	9.27-14.80	0.00
Birth order						
6 or more	1			1		
4-5	1.69*	1.36-2.10	0.00	0.81	0.54-1.21	0.31
2-3	2.35*	1.92-2.87	0.00	0.85	0.49-1.46	0.57

	1	2.73*	2.19-3.40	0.00	0.84	0.46-1.56	0.59
Size of baby at birth							
	Small	1			1		
Average	1.36*	1.16-1.59	0.00	1.37*	1.11-1.69	0.00	
Large	1.75*	1.29-2.39	0.00	2.14*	1.38-3.31	0.00	

VIF was calculated before Multivariate regression to assess Multicollinearity which was found > 10.

Discussion

The present study examined contributing factors of PNC attendance among women of reproductive age 15-49 years, who gave live birth in 2 years prior to the Pakistan DHS (2017-18). This study focused on various socio-demographic factors, covariates, and reproductive health-related characteristics, influencing women's PNC attendance in Pakistan.

Overall, this research revealed that a significant percentage of women (35.5%) had not attended any PNC service during 42 days after childbirth. This percentage is somehow similar to the previous Pakistan DHS (2012-13), where 37.6% of mothers had no PNC check-up. Similarly, a limited pattern has been observed for PNC attendance within countries of South Asia, i.e. India, Bangladesh, and Nepal (Khanal et al., 2014; Islam & Masud, 2018; Ali & Chauhan, 2020).

Findings of the study highlighted that the women, who attended PNC mainly resided in urban areas of Islamabad, Sindh, and Punjab, between 15-24 years age groups, received more than 10 years of education by themselves and their husbands as well, employed as professionals and belonged to the richest household wealth quintile. In view of education, these results are comparable with the previous studies (Dhokal et al., 2007; Somefun & Ibisomi, 2016; Akibu et al., 2018; Ndugga et al., 2019), which reported that education level is positively associated with women's PNC attendance, as education provides awareness regarding danger signs of the postpartum period. Therefore, education enables women for informed decision making about their and children's health. Likewise, our findings also correspond with previous researchers, highlighting the significance of employment (Simkhada et al., 2008; Izudi & Amongin, 2015 Ndugga et al., 2019), where low PNC attendance was seen among unemployed women, in contrast to the employed women. It is argued that women's participation in labor or their employment status may provide them economic empowerment or financial autonomy to avail healthcare services for better health (Simkhada et al., 2008; Izudi & Amongin, 2015 Ndugga et al., 2019).

In addition to the above, results demonstrated that PNC attendance was observed higher amongst those mothers, who had access to various sources of information, had the autonomy for healthcare decision-making and found no problem in accessing the distant health facility for medical care. It is evident from the literature that distance to health facility serves as barrier in utilization of PNC (Kok et al., 2015; Amare et al., 2018). Thus, it is argued that women usually avoid visiting far-off health facilities for medical care, due to their multiple roles in the family and involvement in household chores. Further, women are not allowed to travel alone and they have to accompany someone, which hinders them to access healthcare (Kok et al., 2015; Izudi et al., 2017; Amare et al., 2018). Similarly contributing role of autonomy and access to information is also evident from the literature. It is reported that the women, who had information regarding postpartum danger signs and had decision-making autonomy are more inclined to avail maternal health services (Ethiopian Society of Population Studies, 2008; Tesfahun et al., 2014; Abota & TadeleAtenafu, 2018).

With reference to reproductive health behavior, our study revealed that those mothers who gave 1st birth, had < 20 years age, had 1-2 children ever born and alive, availed at least 4 or more ANC visits, delivered at the private health facilities with large size baby during last 2 years had higher PNC attendance, as compared to others. These findings are aligned with studies carried out in Uganda (Ndugga, et al., 2019), Bangladesh (Mosiur Rehman, 2011), and Nepal (Khanal et al., 2014), particularly for ANC visits. Likewise, it is also observed that younger women have higher attendance of PNC in contrast to older women (Ndugga, et al., 2019). Further, the literature also supported our findings that the women delivered at health facilities are more inclined to attend PNC services (Chungu et al., 2018).

Strengths and Limitations

Results of this research are inferred using a nationally representative sample size, which enhances the probability of generalization across provinces/regions of the country. Further, this research limited its inclusion criteria to the mothers, who gave birth during last 2 years prior to the survey to avoid any recall bias. On the other hand, the limitation of this research includes the non-establishment of causal relations between PNC attendance and contributing factors due to the cross-sectional dataset.

Recommendations

This research calls for designing and implementing more focused interventions to raise awareness and change the behavior of communities to enhance PNC attendance across the country. It is suggested that government should augment their efforts in health promotion, particularly in rural areas of Pakistan to well-versed mothers, fathers, and families regarding the significance of PNC attendance (within the first 6 weeks) for ensuring optimal health for both mothers and newborns. There is a need to engage mass media to sensitize women in varied regional and local languages regarding the availability and connotation of PNC. Engagement of local service providers and dissemination of communication material in local languages is also pivotal to ensuring safe motherhood and avert maternal mortality in Pakistan.

Conclusion

The present research concludes that more than half of the women attended PNC, however, a significant percentage of women had not attended PNC in Pakistan. Further, the study highlighted contributing factors of PNC attendance, such as residing in the urban area, higher educational attainment, employed women and their husbands, younger age group, rich socioeconomic status, more ANC visits, and accessibility to healthcare services. These findings suggested that there is a need to uplift the education and employment opportunities amongst women in general and particularly in rural areas to maximize health education about the postpartum period. In addition to the above, mothers' autonomy for healthcare decision-making and access to various sources of information were also found to be associated with PNC attendance. Therefore, an active role of government and mass media is essential to raise awareness, educate and sensitize women, families, and communities regarding the availability and significance of PNC for maternal survival.

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