

Maternal Knowledge and Patterns of Postnatal Care Utilization: Coverage, Timing, and Completion in Primary Health Facilities in Ondo State, Nigeria

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ABSTRACT

Background: Postnatal care (PNC) is essential for maternal and newborn health, but coverage alone may conceal delayed and incomplete follow-up. This study assessed maternal knowledge and patterns of PNC utilization in Ondo State, Nigeria.

Methods: A cross-sectional survey of 330 mothers who delivered within the preceding 12 months was conducted in six Local Government Areas using multistage and systematic random sampling. Data were collected with an interviewer-administered structured questionnaire, including a 22-item PNC knowledge scale. Descriptive statistics, chi-square, Mann-Whitney U test, and multivariable binary logistic regression were performed in SPSS version 26.

Results: Overall, 79.7% received at least one PNC contact; among attendees, 7.6% initiated PNC within 24 hours and 33.9% completed at least four contacts within six weeks. Mean knowledge score was $10.96 \pm 3.77/22$ and 50.9% had good knowledge. Only 8.5% knew the recommended timing of the mother's first contact and 36.7% knew that at least four contacts were recommended. Good knowledge was associated with PNC uptake (87.5% vs 71.6%; $\chi^2=12.88$, $p<0.001$) and remained independently associated after adjustment (AOR=3.35; 95% CI: 1.79–6.26). ANC attendance was also independently associated with uptake (AOR=4.09; 95% CI: 1.20–13.91).

Conclusion: PNC reach was relatively high, but timely initiation and completion were low. Maternal knowledge, particularly knowledge of the PNC schedule, was strongly associated with utilization. Strengthening counselling during ANC, before discharge, and through community follow-up may improve timely and complete PNC use.

Keywords: Postnatal care; maternal knowledge; PNC utilization; timing; completion; primary health care; Ondo State; Nigeria

INTRODUCTION

The first six weeks after childbirth are a critical period for maternal and newborn survival and well-being. WHO recommends postnatal assessment within 24 hours of birth, followed by additional contacts at 48–72 hours, 7–14 days, and six weeks; however, PNC remains unevenly utilized across sub-Saharan Africa and Nigeria, and simple coverage measures may not capture whether care is timely, repeated, and complete (WHO, 2022; Tessema et al., 2020; Dickson et al., 2023; Lateef et al., 2026).

In Nigeria, national and subnational evidence shows substantial gaps across the maternity continuum, with PNC utilization shaped by education, residence, socioeconomic position, ANC use, place of delivery, access to information, and health-system factors (NPC & ICF, 2019; Oyedele et al., 2023a; Oyedele et al., 2023b; Adewuyi et al., 2021; Olajubu et al., 2020; Oguntunde et al., 2018). The 2023–24 Nigeria DHS also highlights persistent gaps in timely postnatal checks despite progress in maternal and newborn service coverage (FMoHSW, NPC, & ICF, 2024).

This study therefore aimed to assess maternal knowledge of routine PNC, describe PNC coverage, timing, frequency and completion of the recommended contact schedule, and determine the association between maternal knowledge and PNC uptake among mothers attending PHC facilities in Ondo Central Senatorial District, Nigeria.

METHODS

Study Design and Setting

A cross-sectional, quantitative survey was conducted among mothers in primary health facilities and their catchment communities across the six Local Government Areas (LGAs) of Ondo Central Senatorial District, Ondo State, South-West Nigeria. The district comprises a mix of urban, peri-urban, and rural settlements and was purposively selected over the state's other two senatorial districts because of security challenges that made data collection there unsafe during the study period.

Study Population, Eligibility, and Sample Size

The study population comprised mothers who had delivered within the 12 months preceding data collection and who had resided for at least six months in the catchment communities of selected primary health facilities. Mothers who voluntarily consented were eligible; those who had experienced acute, life-threatening obstetric complications requiring specialist inpatient management were excluded, as their care-seeking pathways differ substantially from routine PHC-level PNC. Mode of delivery alone (caesarean section or assisted delivery) was not an exclusion criterion. Sample size was estimated using the Cochran formula ($Z = 1.96$; $p = 0.625$, from Bello & Bello, 2023; $d = 0.05$), yielding a target of 399 mothers after adjustment for 10% non-response. A total of 330 mothers were interviewed, a response rate of 82.7%.

Sampling Technique

A multistage sampling technique was used. All six LGAs were enumerated completely. Immunization registers from primary health facilities within each LGA were collated to create a sampling frame of eligible mothers per LGA, as PNC registers were less complete and consistently maintained. Allocated samples per LGA were calculated proportionate to projected population size, and systematic random sampling with a random start was applied within each LGA's sampling frame to select individual participants.

Data Collection Instrument

Data on sociodemographic and obstetric characteristics, maternal knowledge, and PNC utilization were collected using an interviewer-administered structured questionnaire. Maternal knowledge was assessed across 13 domains using 22 items covering the definition and purpose of PNC, recommended timing and number of contacts for mother and newborn, maternal and newborn danger signs, postpartum mental health, breastfeeding, and cord care. Correct responses were summed (range 0–22) and dichotomized at $\geq 11/22$ (50%) as good knowledge. PNC utilization was assessed as: (i) any PNC contact; (ii) timing of first contact; (iii) number of contacts within six weeks; and (iv) completion of at least four contacts within six weeks, consistent with WHO recommendations (WHO, 2022a).

Data Analysis

Data were collected digitally via the KoboCollect app, exported to Microsoft Excel for cleaning and coding, and analyzed in IBM SPSS Statistics version 26. Categorical utilization variables (coverage, timeliness category,

visit-frequency category, completion status) were summarized as frequencies and percentages; the knowledge composite score was summarized as mean, standard deviation, median, and interquartile range. The association between maternal knowledge and PNC coverage was tested using Pearson chi-square (with Cramér's V as the effect size) and the Mann–Whitney U test for the continuous knowledge score, given its skewed distribution. Binary logistic regression identified independent predictors of PNC coverage, adjusting for maternal education, age, settlement, antenatal care (ANC) attendance, place of delivery, decision-making autonomy, and pregnancy intention. The multivariable model included 324 observations, as reported in the thesis regression table.

Ethical Considerations

Ethical approval was granted by the Ondo State Health Research Ethics Committee (Protocol Number: OSHREC/16/01/2026/1136). Permissions were sought from Local Government Chairmen, community elders, and heads of selected health facilities. Written and verbal informed consent was obtained from all participants, and anonymity and confidentiality were assured and maintained.

RESULTS

Sociodemographic and Obstetric Characteristics

A total of 330 mothers were interviewed. Respondents were predominantly aged 26–30 years (34.8%), married (97.3%), had at least secondary education (88.5%), and were self-employed or traders (75.8%). Slightly over half (54.5%) resided in urban areas. ANC attendance was high (93.9%), 81.3% completed four or more ANC visits, and delivery predominantly occurred in a health facility (86.7%).

Maternal Knowledge of PNC Components

Maternal knowledge of routine PNC was modest overall (composite mean 10.96 ± 3.77 of 22 points; 49.8% of maximum; median 11, IQR 8–14), with 50.9% of mothers classified as having good knowledge ($\geq 11/22$). Knowledge was highly uneven across components. It was strong for essential newborn-care practices: exclusive breastfeeding for six months (87.6% correct), appropriate cord care (85.5%), and initiation of breastfeeding within one hour of birth (84.8%). It was markedly weaker for the schedule and structure of PNC itself: only 8.5% of mothers knew the recommended timing of their own first PNC visit (within 24 hours), only 36.7% knew that four or more visits were recommended, only 38.8% recognized PNC as a necessary routine visit rather than an as-needed one, and only 49.1% could correctly define PNC as covering both mother and newborn. Mothers were considerably more likely to know the recommended timing of the newborn's first contact (43.0% correct) than their own (8.5% correct) — the single largest gap identified across all knowledge domains.

Table 1: Maternal Knowledge of Routine PNC by Component (N = 330)

Knowledge Domain	% Correct
PNC definition — covers both mother and newborn	49.1
Necessity of PNC as a routine (not as-needed) visit	38.8
Timing of mother's own first PNC visit (within 24 hours)	8.5
Baby should attend PNC as a routine visit	50.0
Timing of newborn's first PNC visit (within 24 hours)	43.0
Recommended number of PNC visits (≥ 4)	36.7
Maternal danger signs recognized (domain mean, of 5)	43.9



Newborn danger signs recognized (domain mean, of 3)	50.3
PNC includes emotional wellbeing / mental health	73.9
Postpartum depression symptoms identified (domain mean, of 4)	41.9
Breastfeeding initiation within 1 hour of birth	84.8
Correct cord care practice	85.5
Exclusive breastfeeding for 6 months	87.6

Composite score: mean = 10.96 ± 3.77 (49.8% of maximum, 22 points); median = 11 (IQR: 8–14). Good knowledge ($\geq 11/22$): n = 168 (50.9%); Poor knowledge ($< 11/22$): n = 162 (49.1%).

PNC Coverage

Overall, 79.7% of mothers (95% CI: 75.0–83.7%) received at least one postnatal contact, while 20.3% received none. This measure describes reach but does not, by itself, indicate whether PNC was initiated at the recommended time or whether subsequent contacts were completed.

Timeliness of First PNC Contact

Among mothers who received any PNC (n=263), only 7.6% had their first postnatal contact within 24 hours. A further 39.2% initiated within 2–3 days, 32.3% within 4–7 days, 11.4% later but within six weeks, and 9.5% could not recall the timing. Because 86.7% of the full sample delivered in a health facility, the low proportion reporting a first PNC contact within 24 hours suggests a missed opportunity to ensure and document the recommended immediate postnatal assessment before discharge.

Frequency and Completion of the Four Recommended Contacts

Among PNC attendees (n=263), 14.4% reported one visit, 20.2% two visits, 31.6% three visits, 16.0% four visits, and 17.9% five or more visits within six weeks. Thus, 33.9% of attendees completed at least four contacts, while 66.1% did not.

Table 2: Coverage, Timeliness, Frequency, and Completion of Routine PNC Contacts (N = 330)

Utilization Dimension	Category	n	%
Coverage (any PNC contact)	Received PNC	263	79.7
	No PNC received	67	20.3
Timing of first contact*	Within 24 hours	20	7.6
	Within 2–3 days	103	39.2
	Within 4–7 days	85	32.3
	Within six weeks	30	11.4
	Do not know	25	9.5
Number of visits (6 weeks) *	1 visit	38	14.4



	2 visits	53	20.2
	3 visits	83	31.6
	4 visits	42	16.0
	5 or more visits	47	17.9
Completion of ≥ 4 contacts*	Completed (≥ 4 visits)	89	33.9
	Not completed (< 4 visits)	174	66.1

*Timing, frequency, and completion calculated among PNC attendees only (n = 263).

Association Between Maternal Knowledge and PNC Coverage

Maternal knowledge was significantly associated with PNC coverage: 87.5% of mothers with good knowledge received PNC, compared with 71.6% of those with poor knowledge ($\chi^2(1) = 12.88$, $p < 0.001$; Cramér's $V = 0.198$). Mothers who received PNC also had significantly higher median knowledge scores than those who did not (11 vs. 9; Mann–Whitney $U = 11,436$, $z = 3.77$, $p < 0.001$, $r = 0.207$). In the multivariable logistic regression model (n = 324), maternal knowledge and ANC attendance remained independently associated with PNC coverage after adjustment for maternal education, age, settlement, place of delivery, decision-making autonomy, and pregnancy intention. Mothers with good PNC knowledge had more than three times the odds of receiving PNC compared with those with poor knowledge (AOR = 3.35; 95% CI: 1.79–6.26; $p < 0.001$), while mothers who attended ANC had approximately four times the odds of receiving PNC compared with non-attendees (AOR = 4.09; 95% CI: 1.20–13.91; $p = 0.024$). Education, maternal age, settlement, place of delivery, decision-making autonomy, and pregnancy intention were not independently associated with PNC coverage (all $p > 0.05$).

Table 3: Multivariable Binary Logistic Regression of Selected Predictors of PNC Coverage

Predictor	Category	N	AOR	95% CI	p-value
Knowledge of PNC	Poor (ref)	119	1.00	—	—
	Good	205	3.35	1.79–6.26	$<0.001^{***}$
ANC attendance	No (ref)	16	1.00	—	—
	Yes	308	4.09	1.20–13.91	0.024*
Education level	Primary or less (ref)	37	1.00	—	—
	Secondary	193	1.11	0.45–2.70	0.824
	Tertiary	94	2.52	0.81–7.85	0.110
Maternal age group	≤ 25 (ref)	88	1.00	—	—
	26–30	112	0.72	0.34–1.52	0.395
	31–35	87	0.73	0.32–1.62	0.435
	≥ 36	37	2.26	0.57–8.91	0.246
Settlement	Rural (ref)	148	1.00	—	—

	Urban	176	1.03	0.55–1.93	0.932
Place of delivery	Home/TBA (ref)	38	1.00	—	—
	Health facility	286	1.30	0.53–3.18	0.563
Decision-making autonomy	Other-decided (ref)	150	1.00	—	—
	Self-decided	174	1.00	0.55–1.82	0.991
Pregnancy intention	Unplanned (ref)	36	1.00	—	—
	Planned	288	1.10	0.45–2.68	0.831

AOR = adjusted odds ratio; CI = confidence interval; ref = reference category. Model n = 324, as reported in the thesis regression table. *** $p < 0.001$; * $p < 0.05$.

DISCUSSION

This study found a clear gap between PNC reach and adherence to the recommended schedule. Although 79.7% of mothers reported at least one PNC contact, only 7.6% of attendees initiated PNC within 24 hours and 33.9% completed at least four contacts. This distinction is important because contemporary PNC guidance emphasizes not only contact with services but also timely, repeated, person-centred care across the first six weeks after birth (WHO, 2022; WHO, 2023a; Beňová et al., 2023; Habte et al., 2023). Recent evidence across sub-Saharan Africa similarly demonstrates wide variation in PNC uptake, timing, content, and continuity, with important rural–urban and socioeconomic disparities (Tessema et al., 2020; Dickson et al., 2023; Negero et al., 2023; Lateef et al., 2026; Okyere et al., 2024).

Maternal knowledge was modest overall and was particularly weak for the structure of routine PNC. Only 8.5% knew that the mother’s first contact should occur within 24 hours, 36.7% knew that at least four contacts were recommended, and 38.8% recognized PNC as routine rather than only as-needed care. In contrast, knowledge of breastfeeding and cord-care practices was high. This pattern suggests that maternal and newborn counselling may communicate newborn-care messages more effectively than the mother’s own postnatal schedule. The association between good knowledge and PNC uptake remained strong after adjustment (AOR=3.35), consistent with studies linking awareness of PNC, recognition of danger signs, education and health information with service utilization in Ethiopia, Tanzania, Zambia and other comparable settings (Berhe et al., 2019; Konje et al., 2021; Bwalya et al., 2023; Degefa et al., 2023; Taye et al., 2022).

The low proportion initiating PNC within 24 hours is also programmatically important. WHO recommends that healthy women and newborns receive high-quality care in the facility for at least 24 hours after birth, followed by additional scheduled contacts (WHO, 2022a). Studies using DHS and population-based data show that ANC attendance, facility delivery, maternal education, media exposure, financial access and geographic accessibility are recurrent determinants of timely or adequate PNC (Kebede et al., 2022; Quraish et al., 2022; Dickson et al., 2023; Ahinkorah et al., 2023; Oyedele et al., 2023a). In Nigeria, mHealth reminders have also been shown to increase completion of four recommended PNC visits, supporting the value of structured education and reminder systems (Olajubu et al., 2020).

These findings should not be interpreted as proof that women intentionally use PNC only for curative purposes; the cross-sectional design did not measure care-seeking intent or establish temporality. Rather, the observed combination of high any-contact coverage, delayed initiation, incomplete contact schedules and limited knowledge of maternal PNC timing indicates a need to strengthen the preventive and continuity functions of PNC. Interventions should integrate clear maternal PNC scheduling into ANC counselling, discharge planning, community follow-up and reminder systems, while also addressing access and quality barriers documented in Nigeria and across the region (Oguntunde et al., 2018; Dzinamarira et al., 2023; Ameme et al., 2022; WHO,

2024). Broader maternal and newborn evidence also reinforces the importance of content and quality, not contact alone, including essential newborn-care knowledge, equity in service use, continuum-of-care completion, mental-health support and survival outcomes (Berhea et al., 2018; Bello & Bello, 2023; Quraish et al., 2022; NPC & ICF, 2019; National Bureau of Statistics, 2024; UN IGME, 2024; United Nations Maternal Mortality Estimation Inter-Agency Group, 2023; UNICEF, 2024; WHO, 2022b; WHO, 2023b).

CONCLUSION

Among mothers attending PHC facilities in Ondo Central Senatorial District, PNC reach was relatively high, but timely initiation and completion of the recommended schedule were low. Maternal knowledge—especially knowledge of when and how often mothers should receive PNC—was independently associated with uptake. Programmes should strengthen PNC counselling during ANC and before discharge, explicitly schedule subsequent contacts, and use community or digital reminders to support continuity through six weeks postpartum.

This study has limitations. Its cross-sectional design does not establish the temporal direction of the association between knowledge and PNC uptake, and self-reported timing and visit frequency may be affected by recall error. The study was restricted to Ondo Central Senatorial District and PHC catchment populations; therefore, findings may not be generalizable to the other senatorial districts, other states, or higher levels of care. In addition, care-seeking intent was not directly measured, so preventive versus curative motivation cannot be inferred. Longitudinal or intervention studies should assess whether improving mothers' knowledge of the PNC schedule increases timely initiation and completion of recommended contacts.

Authors Contribution

Adeyinka Odejimi: Conceptualization, manuscript drafting, and data analysis interpretation
Tolulope Afolaranmi: Manuscript review, and data analysis interpretation

Agboola Adebayo: Data Analysis, and manuscript review

Alikeju Odoh: Manuscript review, and data analysis interpretation

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