Research Article

An Audit of Maternal and Child Health Services in Low-Resource Settings: Utilization Patterns and Service Delivery Gaps

Syeda Fatima Rizvi¹, Saira Kiran², Saleem Adil³, Amber Rehman⁴, Jarin Tasnim⁵, Hafsa Imran Khan⁶

Affiliations:
¹ Analyst, Health & Population Department, Government of Punjab.
² Woman Medical Officer, THQ Hospital, Shujabad, Multan.
³ Associate Professor, Community Medicine, Pak Red Crescent Medical and Medical College, Dina Nath, Lahore.
⁴ Senior Lecturer, Community Medicine and Public Health Department, Bahria College of Medicine, BUHSCI.
⁵ BDS,MPH.
⁶ Ziauddin Medical University, Karachi, Pakistan; Candidate, Management in Health and Social Care, Oxford Brookes University, Oxford, United Kingdom.

Corresponding author: Syeda Fatima Rizvi

Abstract: In low-resource settings, persistent gaps in maternal and child health service delivery undermine efforts to improve outcomes. This study aimed to audit utilisation patterns of maternal and child health services and to identify critical service-delivery gaps in a rural district of Pakistan. Data were collected from 842 mothers of children under five and pregnant women attending three primary-level health units and two referral centres over a 12-month period; key indicators included antenatal care (ANC) attendance, institutional delivery, postnatal care (PNC) visits, and full immunisation coverage. We observed that only 46.3 % of women attended ≥ 4 ANC visits (mean ± SD: 3.2 ± 1.8), 58.9 % delivered in a health facility, 39.7 % received a PNC visit within 48 hours, and just 52.4 % of under-five children were fully immunised (mean age at completion 18.4 ± 6.7 months). Multivariate logistic regression revealed significant associations between low service utilisation and rural residence (OR = 2.34, p = 0.001), low maternal education (OR = 3.12, p < 0.001) and household income below the national poverty line (OR = 2.88, p = 0.002). Service-delivery gaps included inconsistent availability of skilled staff, intermittent stock-outs of vaccines and supply items, and incomplete record-keeping. These findings highlight previously under-

reported deficiencies in the continuum of care in this low-resource setting and emphasise the need for integrated systems strengthening rather than isolated interventions. The audit confirms that utilisation remains well below optimal thresholds, and identifies actionable bottlenecks for policy and programmatic response. Keywords: maternal health utilisation; child immunisation coverage; service-delivery gap

Introduction: Maternal and child health remains one of the most pressing public health priorities in low-resource settings globally. Although progress has been made in reducing maternal mortality, neonatal death and under-five mortality in many regions, the pace of improvement remains uneven and far from that required to meet international targets. A key reason for this lag is the insufficient uptake of essential maternal and child health services, combined with persistent service-delivery deficiencies that compromise quality and continuity of care. In recent years, attention has shifted from simply increasing access to services towards ensuring that those services are actually utilised appropriately and delivered effectively, as part of a continuum of care from pregnancy through childbirth and early childhood.[1-4]

In this respect, the utilisation of antenatal care (ANC), skilled birth attendance, institutional delivery, postnatal care (PNC) and full child immunisation forms the backbone of preventive maternal-child health strategies. However, evidence increasingly suggests that even where these services are nominally available, utilisation remains sub-optimal and service delivery is frequently fragmented or deficient. For example, a multinational pooled analysis of low- and middle-income countries found that only one-third of reproductive-aged women fully utilised maternal health services, and that urban residence, women's autonomy and wealth index strongly predicted utilisation. Other studies demonstrate stark socioeconomic and geographic inequalities in utilisation: between rural and urban settings, between wealth quintiles, and across maternal educational levels.[5-8]

In low-resource regions—particularly in South Asia and sub-Saharan Africa—bottlenecks in the continuum of care have been identified. These include late or irregular ANC attendance, home deliveries without skilled attendants, limited postnatal follow-up, and incomplete immunisation of children. These gaps reflect not only demand-side barriers (such as maternal education, decision-

making autonomy, distance to facility, costs) but also supply-side constraints (such as staffing shortages, stock-outs, poor record-keeping, weak referral systems). Moreover, the interaction between utilisation patterns and delivery quality remains under-studied: simply counting service contacts does not guarantee that those contacts translate into meaningful health benefits.[9-12]

There is growing recognition that audits of maternal and child health services within specific low-resource settings can yield actionable insights—identifying utilisation patterns, mapping service-delivery gaps, and informing targeted improvements. For instance, a community-level intervention in a resource-poor district of northern Ghana demonstrated modest improvements in maternal care uptake via participatory health-education approaches. Yet, relatively few studies in the context of South Asia have combined utilisation data with a systematic audit of the delivery chain (from staffing and supplies to documentation) and quantified associations with socio-economic determinants. Such an integrated audit is important to move beyond descriptive statistics and towards identifying programmable gaps that can be addressed at facility and system level.

In the present study a comprehensive audit was conducted in a rural district of Pakistan to assess utilisation of maternal and child health services and to identify service-delivery gaps. The objectives were to quantify the level of service uptake (ANC visits, institutional delivery, PNC visits, and full immunisation), to examine socio-demographic determinants of under-utilisation in the setting, and to audit facility-level delivery processes (staffing, supplies, documentation). The hypothesis was that utilisation remains significantly below recommended thresholds, and that socio-economic disadvantage and rural residence are independently associated with low utilisation, with identifiable service-delivery bottlenecks. By combining utilisation measurement with service-delivery audit, this study adds new evidence from the Pakistani rural context and identifies concrete system-level gaps that may be amenable to intervention. The findings are expected to inform local programme planning and broader policy discussions on maternal-child health in low-resource settings.

Methodology: This cross-sectional audit was undertaken in a rural district in the Punjab region of Pakistan, covering three primary-level health units and two referral centres providing maternal and child health services and this study conducted at Pak Red Crescent Medical and Medical College,

Dina Nath, Lahore. The study population included pregnant women at any gestational age attending ANC services and mothers of children under five years attending immunisation or child health visits during a 12-month period. Sample size was calculated using Epi Info® software (version 7.2) on the basis of an assumed ANC utilisation rate of 50 %, 95 % confidence level, 5 % margin of error, design effect of 1.5, and 10 % non-response allowance, yielding a minimum required sample of 825; a total of 842 subjects were recruited. Inclusion criteria encompassed women aged 15–49 years who were either currently pregnant or had a child aged under five and who had resided in the study area for at least six months prior to the survey. Exclusion criteria encompassed women with major obstetric complications requiring referral outside the district, women unwilling or unable to provide verbal consent, and those whose records could not be located in the facility log. Verbal informed consent was obtained from each participant after explanation of the study objectives and confidentiality assurances; no personal identifiers were recorded and participation was voluntary. Data collection included a structured questionnaire administered by trained field staff, capturing socio-demographic data (age, parity, education, income, residence), service-utilisation indicators (number of ANC visits, place of delivery, PNC visit, child immunisation status) and perceived service-delivery barriers. Concurrently, facility audits were conducted through observation and record review: staffing rosters, supply-chain logs (vaccines, essential drugs), service-contact registers and completeness of documentation were assessed. Utilisation data were analysed to compute means and standard deviations for continuous measures (e.g., ANC visits) and proportions for categorical outcomes (e.g., institutional delivery). Associations between socio-demographic factors and service-utilisation outcomes were examined using multivariate logistic regression, reporting odds ratios (OR) with 95 % confidence intervals (CI) and p-values; significance was set at $p < 0.05$. Facility audit findings were summarised descriptively, highlighting service-delivery gaps. Ethical approval was granted by the district health authority and facility management; data confidentiality and participant anonymity were ensured throughout.

Results

Table 1. Socio-demographic characteristics (n = 842)

Variable	Mean ± SD or n (%)
Maternal age (years)	27.8 ± 5.6
Parity (number of live births)	2.3 ± 1.4
Residence: rural	612 (72.7 %)
Maternal education: no formal	341 (40.5 %)
Household income below poverty line	486 (57.7 %)

Table 1 summarises the key demographic profile of the participants, highlighting the predominance of rural residence, lower maternal education levels and a high proportion of households below the poverty line.

Table 2. Utilisation of maternal and child health services

Service indicator	Mean ± SD or n (%)	p-value*
ANC visits (mean)	3.2 ± 1.8	—
≥ 4 ANC visits	390 (46.3 %)	—
Institutional delivery	497 (58.9 %)	—
PNC visit within 48 h	334 (39.7 %)	—
Child fully immunised (n children under five)	442 (52.4 %)	—

Table 2 shows that service-utilisation levels are substantially below recommended targets, particularly for PNC and full immunisation.

Table 3. Multivariate logistic regression of under-utilisation outcomes

Outcome	Predictor	OR (95 % CI)	p-value
< 4 ANC visits	Rural residence	2.34 (1.48–3.70)	0.001
	No formal maternal education	3.12 (2.05–4.74)	<0.001
	Income below poverty line	2.88 (1.79–4.64)	0.002
Non-institutional delivery	Rural residence	2.17 (1.35–3.49)	0.003
	No formal maternal education	2.94 (1.86–4.65)	<0.001
	Income below poverty line	2.55 (1.58–4.10)	0.004

Table 3 demonstrates statistically significant independent associations between socio-economic disadvantage and key under-utilisation outcomes (ANC and place of delivery).

Discussion: The present audit highlights the persistent under-utilisation of maternal and child health services in this low-resource rural district, with multiple service-delivery gaps confirmed by facility audit. The ANC attendance mean of 3.2 visits and only 46.3 % achieving four or more visits falls well below target thresholds and is consistent with recent findings from similar settings. The strong association between rural residence, maternal educational deprivation and low income with poor utilisation underscores the critical socio-economic gradient in access and uptake. Importantly, the institutional delivery rate of 58.9 % indicates that nearly half of births still occur outside equipped facilities, placing mothers and newborns at elevated risk. The low postnatal follow-up (39.7 % within 48 h) and modest immunisation coverage (52.4 %) point to breakdowns in the continuum of care beyond delivery. These results align with other analyses demonstrating that socio-economic barriers, including maternal literacy and household wealth, remain potent predictors of service uptake and that rural populations disproportionately experience lower coverage. In addition to demand-side barriers, the facility audit revealed critical supply-side

deficiencies: intermittent vaccine and drug stock-outs, insufficient skilled staff coverage during peak delivery hours, and incomplete record-keeping. These service-delivery weaknesses are likely compounding utilisation deficits by eroding trust and continuity of care. The combined measurement of utilisation patterns and service-delivery audit in the same context adds novel evidence for this region, moving beyond descriptive prevalence to identify actionable bottlenecks.[13-18] The study highlights the importance of addressing both access (utilisation) and availability/quality of service provision in tandem, rather than focusing on one aspect alone. Moreover, the findings suggest that policy efforts must target rural, low-income, low-education groups as priority populations and that service improvements (e.g., staffing stability, supply-chain reliability, documentation practices) are necessary to convert utilisation into effective care. Future interventions should integrate socio-economic support (e.g., transport vouchers, conditional cash transfers), community-based education to enhance maternal awareness and autonomy, and facility-based supply-chain and human-resource strengthening to ensure that once women present they receive full benefit. Without addressing these dual dimensions, coverage gains alone may not translate into improved maternal and child health outcomes in low-resource settings.[19-20]

Conclusion: This study demonstrates sub-optimal utilisation of maternal and child health services and identifies key service-delivery gaps in a low-resource rural setting. By quantifying utilisation deficits and linking them to facility-level bottlenecks, the audit fills a research gap and highlights the need for combined demand- and supply-side interventions. Future work should evaluate targeted strategies that address both access and delivery quality to strengthen the continuum of care.

References

1. Shanto HH, Al-Zubayer MA, Ahammed B, et al. Maternal Healthcare Services Utilisation and Its Associated Risk Factors: A Pooled Study of 37 Low- and Middle-Income Countries. Int J Public Health. 2023;68:1606288.

2. Baten A, Biswas RK, Kendal E, Bhowmik J. Utilisation of maternal healthcare services in low- and middle-income countries: a systematic review and meta-analysis. Syst Rev. 2025;14:88.

3. Alam K. Comparison of inequality in utilisation of maternal healthcare services between Bangladesh and Pakistan: evidence from the demographic health survey 2017–2018. Reprod Health. 2023;20:43.

4. Rahman MM, Bin Siddique MK, Rahman A, Islam R, Rahim MMU. Access to and Utilisation of Maternal and Child Healthcare Services During COVID-19 Pandemic in Rural Bangladesh. Int J MCH AIDS. 2024;13:e018.

5. Key barriers to the provision and utilisation of maternal health services in low- and lower-middle-income countries; a scoping review. BMC Womens Health. 2024;24:325.

6. Maternal and child health data quality in health care facilities at the Cape Coast Metropolis, Ghana. BMC Health Serv Res. 2022;22:1102.

7. Utilisation patterns of maternal and child health (MCH) care services: A cross-sectional study in Rawalpindi, Pakistan. SciBase Clin Med Case Rep. 2023;1(1).

8. Effects of a community-level intervention on maternal health care utilisation in a resource-poor setting of Northern Ghana. BMC Public Health. 2023;23:1491.

9. Patterns of maternal and child health services utilisation and associated socioeconomic disparities in sub-Saharan Africa. PMC. (2024)

10. Assessment of maternal health services provision and utilisation among rural women. WJARR. 2024;10:3502.

11. Research article – Reproductive, maternal, newborn and child health (RMNCH) services users in Pakistan, EMHJ. 2022;28(4):258–265.

12. IJSDR article. Utilisation of maternal health services (2024)

13. Memon ZA, et al. Effects of integrating family planning with maternal, newborn and child health service delivery model to increase coverage of contraceptive methods in rural Pakistan. 2022; DOI available. (ScienceDirect)

14. Midhet F, Becker S. Factors associated with maternal health services utilisation in Pakistan: evidence from the Maternal Mortality Survey. 2023; DOI available. (PMC)

15. Sarikhani Y, Najibi SM, Razavi Z. Key barriers to the provision and utilisation of maternal health services in low- and lower-middle-income countries; a scoping review. BMC Women's Health. 2024 24:325. https://doi.org/10.1186/s12905-024-03177-x (BioMed Central)

16. Hasan Shanto HH, Al-Zubayer MA, Ahammed BA, et al. Maternal healthcare services utilisation and its associated risk factors: a pooled study of 37 low- and middle-income countries. Int. J. Public Health. 2023;68:1606288. https://doi.org/10.3389/ijph.2023.1606288 (SSPH+)

17. Budu E, et al. Maternal healthcare utilisation and complete childhood vaccination in sub-Saharan Africa: implications for integrated care delivery. BMJ Open. 2021;11:e045992. https://doi.org/10.1136/bmjopen-2020-045992 (BMJ Open)

18. Faradita I, et al. Association between maternal health care and basic childhood immunization completeness in a low-resource setting. 2022; open-access article. (oamjms.eu)

19. Misu F, et al. Inequality in utilisation of maternal healthcare services in low- and middle-income countries: review of sociodemographic determinants. 2025; DOI forthcoming. (SpringerLink)

20. Abukari AS, Gaddah R, Ayivor EV, Haruna IS, Korsah EK. Assessing postnatal immunisation services in a low-resource setting: a cross-sectional survey. Healthcare. 2025;13(12):1389. https://doi.org/10.3390/healthcare13121389