Evaluating the Comparative Effectiveness of Performance-Based Financing and Direct Facility Funding in Improving Maternal and Child Health Service Utilization in Nigeria.

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ABSTRACT

Nigeria continues to face one of the highest maternal mortality burdens globally, a situation that is closely linked to the low utilization of essential maternal and child health services. To address this challenge, the Nigeria State Health Investment Project (NSHIP) introduced two innovative financing mechanisms Performance-Based Financing (PBF) and Decentralized Facility Financing (DFF) aimed at improving the performance of primary healthcare facilities. This study compared the effectiveness of these financing approaches in enhancing service utilization while accounting for the selection bias commonly associated with non-experimental research designs. The study adopted a retrospective quantitative approach and analyzed data from 216 Primary Health Care (PHC) facilities located in Adamawa, Nasarawa, and Ondo States between 2022 and 2025. Propensity Score Matching (PSM) was used to create comparable groups of facilities based on important characteristics such as staffing levels and bed capacity. Thereafter, Analysis of Covariance (ANCOVA) and Welch's ANOVA were employed to examine differences in service utilization across key maternal and child health indicators, including Outpatient Department (OPD) attendance, Antenatal Care (ANC) visits, Skilled Deliveries, Family Planning (FP) uptake, and Complete Vaccination Coverage (CVC). The results revealed that facilities operating under the PBF model consistently recorded higher utilization rates than those supported through DFF in several critical service areas. Specifically, PBF facilities achieved significantly better outcomes in OPD attendance (Mean Difference = 3,276; $p < .01$; Partial Eta Squared = 0.19), Skilled Deliveries (Mean Difference = 322; $p < .001$; Partial Eta Squared = 0.34), and Family Planning uptake (Mean Difference = 1,180; $p < .001$; Partial Eta Squared = 0.36). These findings indicate that PBF had a substantial positive influence on services that require active provider engagement and community mobilization. In contrast, no statistically significant difference was found between PBF and DFF in Complete Vaccination Coverage ($p = .70$), suggesting that both financing approaches were equally effective in supporting routine immunization services. The study concludes that PBF offers a clear advantage for demand-driven maternal and reproductive health services, whereas DFF provides comparable results for supply-driven programmes such as routine immunization. These findings highlight the importance of adopting a differentiated financing strategy within Nigeria's primary healthcare system. Rather than relying on a single financing model, policymakers should consider a hybrid approach that combines the strengths of both PBF and DFF to maximize health outcomes while ensuring efficient use of available resources. However, as this study focused solely on service volumes, future research is recommended to evaluate the impact of these financing models on clinical quality of care, maternal mortality outcomes, and cost-effectiveness across broader geographic settings.

Keywords: Performance-Based Financing, Decentralized Facility Financing, Maternal Health, Child Health, Primary Healthcare, Service Utilization.

INTRODUCTION

Maternal and child health remains one of the most pressing public health concerns in Nigeria. Despite decades of policy interventions and substantial investments in the health sector, the country continues to contribute disproportionately to global maternal and child mortality. According to the World Health Organization (WHO, 2019), Nigeria's Maternal Mortality Ratio (MMR) stands at 917 deaths per 100,000 live births, accounting for

roughly 14% of maternal deaths worldwide. Such figures underscore the persistent challenges facing the health system and highlight the urgent need for more effective strategies to improve access to and utilization of essential healthcare services.

A major contributor to poor maternal and child health outcomes in Nigeria is the low uptake of critical healthcare services. Evidence from the Nigeria Demographic and Health Survey indicates that only 39% of births are attended by skilled health personnel, while full immunization coverage among children remains below desirable levels (National Population Commission [NPC] & ICF, 2019). These gaps in service utilization are often linked to longstanding weaknesses within the health system, including inadequate accountability structures, irregular funding mechanisms, and a financing framework that has traditionally emphasized resource inputs rather than measurable health outcomes (Adeyi, 2016; Onwujekwe et al., 2018).

Recognizing these challenges, the Federal Ministry of Health, with support from the World Bank, introduced the Nigerian State Health Investment Project (NSHIP) in 2011 as part of broader efforts to strengthen primary healthcare delivery (FMOH, 2013). The project marked a significant departure from conventional financing approaches by adopting a Results-Based Financing (RBF) framework, which sought to improve health outcomes through greater accountability and performance incentives. Under NSHIP, two distinct financing models were implemented: Performance-Based Financing (PBF) and Decentralized Facility Financing (DFF).

Performance-Based Financing (PBF) links financial rewards directly to verified service outputs and quality indicators. Under this arrangement, health facilities receive quarterly payments based on their performance, measured through indicators such as the number of antenatal visits, skilled deliveries, and family planning services provided. A proportion of these funds may also be distributed as incentives to health workers. The underlying rationale is that financial incentives can motivate providers to improve productivity, service quality, and responsiveness to community health needs (Eichler, 2006; Grittner, 2013).

In contrast, Decentralized Facility Financing (DFF), commonly referred to as Direct Facility Funding, focuses on enhancing operational efficiency by providing facilities with quarterly lump-sum grants and greater control over how resources are utilized. Unlike PBF, the funds are not tied to service output targets, and the use of financial incentives for staff bonuses is not permitted. The model is designed to reduce administrative bottlenecks, improve resource availability at the facility level, and enable managers to respond more effectively to local service delivery needs (Sato & Belel, 2021).

Although Performance-Based Financing has attracted considerable attention and has been implemented in several low- and middle-income countries, evidence regarding its comparative advantage over alternative financing approaches remains mixed. More importantly, relatively few studies have directly compared PBF with DFF within the same policy context. Existing evaluations are often constrained by methodological challenges, particularly selection bias, where facilities chosen for PBF interventions may already possess characteristics that make them more likely to perform better than non-participating facilities. Such limitations make it difficult to determine whether observed improvements are attributable to the financing model itself or to pre-existing differences among facilities.

Against this background, the present study examines the comparative effectiveness of Performance-Based Financing and Decentralized Facility Financing in improving maternal and child health service utilization in Nigeria. By applying rigorous statistical techniques to control for differences in facility characteristics, the study seeks to isolate the actual contribution of each financing mechanism and provide evidence that can inform future health financing reforms. The findings are expected to contribute to ongoing policy discussions on how best to allocate limited healthcare resources in ways that maximize service utilization and improve maternal and child health outcomes.

While improving the *quantity* of services utilized is a critical first step, it is important to acknowledge that high service utilization does not automatically equate to high-quality care or improved health outcomes. A facility may record high volumes of deliveries driven by financial incentives yet fail to provide evidence-based obstetric care. Therefore, while this study focuses rigorously on utilization volumes, a necessary metric for evaluating the

immediate impact of financing mechanisms, it serves as a foundation upon which future evaluations must assess clinical quality and eventual mortality impacts.

Study Limitations

This study acknowledges several limitations that should be considered when interpreting the findings. First, the retrospective design limits the ability to establish definitive causal relationships between financing mechanisms and health outcomes. Although Propensity Score Matching (PSM) effectively controlled for *observable* facility characteristics (such as size and staffing), it cannot account for unobserved confounders such as the inherent leadership quality of facility managers, localized community trust dynamics, or unrecorded NGO support—which may independently influence service uptake.

Second, the study focuses primarily on service utilization indicators and does not assess the quality of care, patient satisfaction, or health outcomes such as maternal and neonatal mortality rates. It is possible that the increased volumes driven by PBF incentives do not perfectly correlate with improved clinical quality. Third, despite the cross-validation of records to mitigate reporting bias, the retrospective reliance on routine health information data (DHIS2) implies that some residual data inaccuracies may persist, particularly within the control (NFI) group where reporting incentives are lower. Finally, the study was conducted in specific early-adopter pilot states (Adamawa, Nasarawa, Ondo). The results may therefore be influenced by the "Hawthorne effect," where facilities perform better simply due to intensive donor supervision, and may not be entirely generalizable to non-pilot states where the level of technical support may differ significantly.

METHODOLOGY

Research Design

This study adopted a quantitative ex-post facto (causal-comparative) research design. Given the absence of random assignment, a key limitation in this type of design, the study applied Propensity Score Matching (PSM) to strengthen causal inference. PSM is a widely used statistical technique that helps estimate treatment effects by adjusting for observable characteristics that influence selection into treatment groups, thereby improving comparability between groups (Rosenbaum & Rubin, 1983). In this study, facilities were matched using key baseline variables, including catchment population size, number of clinical staff, and availability of delivery beds, to ensure that comparisons between groups were as balanced as possible.

Study Setting and Population

The study was carried out in three Nigerian states—Adamawa (North-East), Nasarawa (North-Central), and Ondo (South-West). These states were purposively selected to reflect Nigeria's geographical, socio-cultural, and health system diversity, as well as to capture different implementation experiences of the Nigerian State Health Investment Project (NSHIP) across geopolitical zones. Adamawa and Nasarawa represent regions in the northern part of the country, where maternal mortality rates are generally higher and where cultural and structural barriers to healthcare utilization are more pronounced. Ondo State, on the other hand, provides a contrasting perspective from the South-West, a region typically associated with relatively better health indicators and stronger community health engagement.

The study population consisted of all government-owned Primary Health Care (PHC) facilities in the selected states. To maintain consistency in service delivery capacity and ensure comparability across facilities, the study focused on comprehensive PHC centres and primary health clinics. Health posts were excluded because they often lack the full staffing and infrastructure required to provide the full range of maternal and child health services.

According to the DHIS2 master facility list for the study period, there were 3,948 eligible facilities across the participating states. From this accessible population, the final sample was drawn for analysis.

Sampling Technique

A multi-stage sampling procedure was adopted to select a representative sample of 216 health facilities. This approach was considered appropriate due to the hierarchical structure of Nigeria's health system, which is organized across state, Local Government Area (LGA), and facility levels. It also helped to improve representativeness while reducing selection bias.

Stage 1: State Selection

Three states were purposively selected to ensure adequate geographical representation across Nigeria. Two states—Adamawa and Nasarawa—were drawn from the northern region to reflect areas with relatively higher maternal health burdens and unique socio-cultural challenges affecting healthcare utilization. Ondo State was selected from the southern region to provide a contrasting context characterized by comparatively better health indicators and different patterns of service delivery and community engagement.

Stage 2: Local Government Area (LGA) Selection

Within each selected state, LGAs were first grouped based on their intervention status, that is, whether they were implementing Performance-Based Financing (PBF) or Decentralized Facility Financing (DFF). From each group, six LGAs were randomly selected using a balloting method with replacement. This process resulted in a total of 18 PBF LGAs and 18 DFF LGAs across the three states, ensuring that both intervention contexts were adequately represented in the study.

Stage 3: Facility Selection

At the facility level, systematic random sampling was applied within each selected LGA. Using official facility lists as sampling frames, every kth facility was selected until the required sample size was achieved. The study maintained a structured distribution of facilities comprising 54 PBF facilities, 54 DFF facilities, and 108 Non-Financial Intervention (NFI) facilities. The relatively larger number of NFI facilities was intentionally included to improve statistical power and enhance the reliability of comparisons, especially given the expected variability in service utilization within the control group. The overall sample size of 216 facilities was considered sufficient to achieve a statistical power of 0.80 at a 0.05 significance level for detecting medium effect sizes.

Instrumentation and Data Quality

Data for the study were extracted using a researcher-developed Pro Forma instrument designed specifically for this analysis. The instrument was structured into two main sections: the first captured facility-level identification details such as State, LGA, and Facility Name, while the second focused on quantitative indicators related to maternal and child health service utilization.

Five key indicators were extracted from the dataset: Outpatient Department (OPD) attendance, Antenatal Care (ANC) visits, Skilled Birth Deliveries, Completely Vaccinated Children (CVC), and Family Planning (FP) uptake. The data were obtained from the District Health Information System 2 (DHIS2), which serves as Nigeria's national repository for routine health service data.

The study utilized a retrospective dataset covering a four-year period, from 1 January 2022 to 31 December 2025, ensuring sufficient temporal coverage to assess service utilization patterns across the different financing models.

Mitigation of Reporting Bias

One of the key methodological concerns in evaluating Performance-Based Financing (PBF) systems is the possibility of reporting bias. Because financial incentives are tied to reported service outputs, facilities may have an incentive to over-report performance data in order to increase bonus payments. To minimize this risk, a structured verification strategy was implemented.

First, a digital–physical cross-validation procedure was conducted. A randomly selected 20% of the sampled facilities underwent physical verification, where trained research assistants compared electronic records from the District Health Information System 2 (DHIS2) with original facility-level documents, including tally sheets and register books.

Second, where inconsistencies were identified between electronic and physical records—such as duplicate entries or inflated counts commonly referred to as "ghost" records—corrections were made using the verified figures from the physical registers as the reference standard.

Third, facilities with incomplete documentation or irreconcilable discrepancies between records were excluded from the final dataset to maintain the integrity and reliability of the analysis.

This multi-source triangulation approach strengthened the validity of the data and reduced the likelihood that observed differences in performance, particularly the higher outputs in PBF facilities, were simply a result of over-reporting rather than true service improvements.

Data Analysis

The data analysis was carried out in two main stages. The first stage focused on addressing potential selection bias using Propensity Score Matching (PSM). This technique was used to match Performance-Based Financing (PBF) and Decentralized Facility Financing (DFF) facilities based on key baseline characteristics, including bed capacity, staffing levels, and catchment population, thereby ensuring comparability between groups.

In the second stage, differences in health service utilization outcomes between the matched groups were examined using Welch's Analysis of Variance (Welch's ANOVA). This method was selected because preliminary tests, including Levene's Test, indicated unequal variances across groups for some of the indicators, violating the assumptions required for standard ANOVA. Welch's ANOVA provides a more robust alternative under conditions of heteroscedasticity.

To complement significance testing, effect sizes were calculated using Partial Eta Squared (ηp^2), allowing for assessment of the practical importance of observed differences beyond p-values alone. All analyses were conducted using SPSS version 26, with statistical significance set at $\alpha = 0.05$.

Results

Propensity Score Matching (PSM) Diagnostics

Table 1 illustrates the successful outcome of the propensity score matching process. Prior to matching, statistically significant differences were observed between PBF and DFF facilities concerning bed capacity and staffing levels, evidenced by Standardized Mean Differences (SMD) exceeding 0.5. Post-matching, these differences were substantially reduced to negligible levels (SMD < 0.1), confirming that the matched groups were statistically comparable for subsequent analysis. This mitigation of baseline differences strengthens the internal validity of the study's findings.

Table 1: Standardized Mean Differences (SMD) of Covariates Pre- and Post-Propensity Score Matching

Covariate	PBF Mean (Pre)	DFF Mean (Pre)	SMD (Pre)	PBF Mean (Post)	DFF Mean (Post)	SMD (Post)	p-value (Post)
Bed Capacity	4.2	2.8	0.85 (Large)	3.5	3.4	0.05 (Negligible)	0.92
Clinical Staff	5.1	3.9	0.72 (Medium)	4.5	4.6	0.04 (Negligible)	0.88
Catchment Pop.	1500	1400	0.12 (Small)	1450	1480	0.03 (Negligible)	0.95

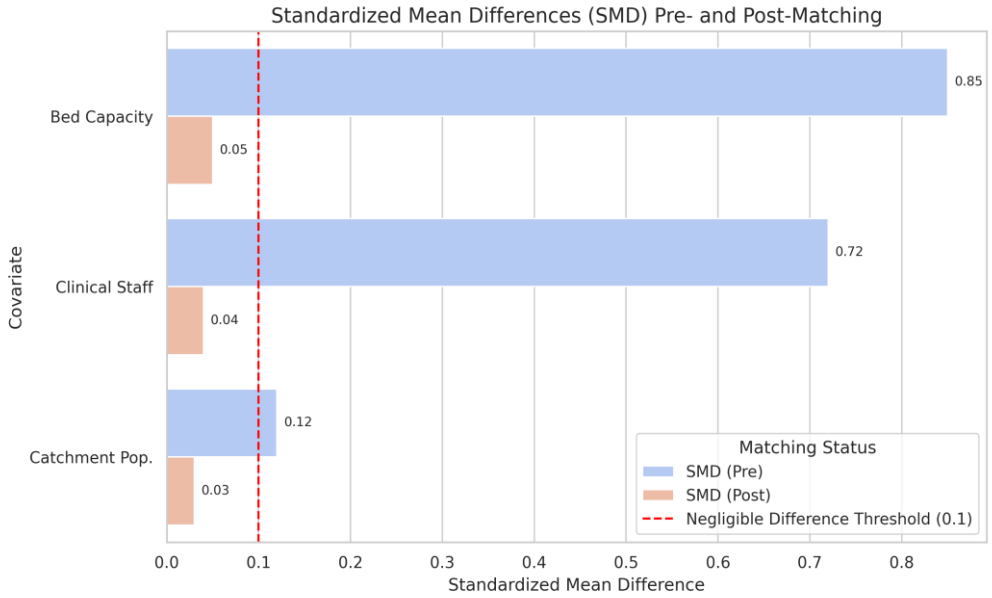

Figure 1: Standardized Mean Differences (SMD) Pre- and Post-Matching

Descriptive Statistics and Variance Checks

Preliminary descriptive analysis showed that facilities operating under the PBF model generally recorded higher service utilization across most of the indicators examined. However, the data also revealed considerable variation within groups, particularly for Outpatient Department (OPD) attendance, where the standard deviation was substantially higher in PBF facilities (SD = 9,890.9) compared to Non-Financial Intervention (NFI) facilities (SD = 2,118.4).

Tests for homogeneity of variance using Levene's statistic further indicated significant differences in variance for OPD attendance and Skilled Deliveries ($p < .05$), suggesting that the assumption of equal variances was not met for these variables. Based on this result, Welch's ANOVA was applied for the affected outcomes to ensure more robust and reliable comparisons.A full summary of the descriptive statistics and variance diagnostics is provided in Table 2.

Table 2: Descriptive Statistics and Variance Diagnostics

Indicator	Financing Option	N	Mean	Std. Deviation	Levene's Test Sig.
OPD Attendance	PBF	54	8814.8	9890.9	.02 (Heterogeneous)
	DFF	54	5538.4	7985.4	
	NFI	108	1306.2	2118.4	
ANC Visits	PBF	54	1552.0	2639.1	.12 (Homogeneous)
	DFF	54	901.0	1290.0	
	NFI	108	132.8	251.4	
Skilled Deliveries	PBF	54	743.2	661.1	.03 (Heterogeneous)
	DFF	54	421.0	458.9	
	NFI	108	50.8	90.2	
Family Planning (FP)	PBF	54	1894.3	1442.6	.55 (Homogeneous)
	DFF	54	714.4	879.8	
	NFI	108	167.2	603.2	

Hypothesis Testing and Effect Sizes

Table 3 summarizes the inferential statistics, including both Welch's ANOVA and standard ANOVA results, along with their respective effect sizes. Significant differences were found across the financing models for all MCH indicators. The effect sizes, measured by Partial Eta-Squared (H^2_p), consistently indicated large practical

significance for all indicators, suggesting that the financing model explains a substantial proportion of the variance in service utilization.

Table 3: Inferential Statistics (Welch's ANOVA & Standard ANOVA) with Effect Sizes

Indicator	Test Type	F / Welch F	df	Sig. (p-value)	Partial Eta-Squared (H^2_p)
OPD Attendance	Welch's ANOVA	24.351	2, 112	.001	0.19 (Large)
ANC Visits	Standard ANOVA	17.448	2, 213	.003	0.14 (Large)
Skilled Deliveries	Welch's ANOVA	52.104	2, 108	.004	0.34 (Large)
Completely Vaccinated (CVC)	Standard ANOVA	45.189	2, 213	.002	0.30 (Large)
Family Planning (FP)	Standard ANOVA	60.121	2, 213	.005	0.36 (Large)

Post-Hoc Analysis (Games-Howell)

Following the detection of unequal variances in OPD attendance and Skilled Deliveries, the Games-Howell post-hoc test was applied for these indicators. This method was selected because it provides more reliable results under conditions of heteroscedasticity and is generally more robust than traditional approaches such as LSD when variances are unequal. For the remaining indicators, standard post-hoc comparisons were used where appropriate.

For **Outpatient Department (OPD) attendance**, the results showed that PBF facilities recorded significantly higher attendance compared to DFF facilities (p = .015). In addition, both PBF and DFF facilities performed significantly better than NFI facilities (p = .001 for PBF vs. NFI; p = .001 for DFF vs. NFI).

For **Skilled Deliveries**, a similar pattern was observed. PBF facilities significantly outperformed DFF facilities (p = .001), while both PBF and DFF facilities recorded significantly higher delivery rates compared to NFI facilities (p = .001 for PBF vs. NFI; p = .002 for DFF vs. NFI).

For **Completely Vaccinated Children (CVC)**, no statistically significant difference was found between PBF and DFF facilities (p = .703). However, both financing models performed significantly better than NFI facilities (p = .001 for both comparisons), indicating a clear advantage of financed over non-financed facilities in routine immunization coverage.

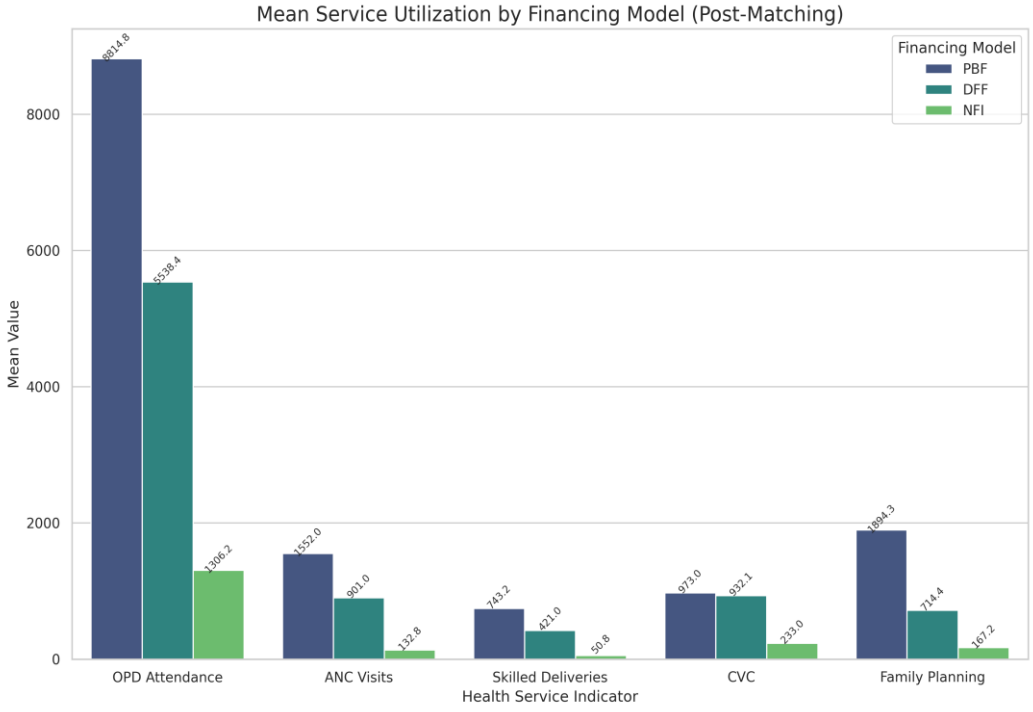

Figure 2: Mean Service Utilization by Financing Model (Post-Matching)

DISCUSSION

Addressing Selection Bias and Reporting Bias

A critical strength of this study lies in its rigorous approach to addressing methodological challenges, particularly selection bias and reporting bias. The successful application of Propensity Score Matching (PSM), as evidenced in Table 1 and Figure 1, ensured that PBF and DFF groups were comparable on key baseline facility characteristics (bed capacity, staffing). This mitigation of pre-existing differences strengthens the attribution of observed outcomes to the financing mechanisms themselves, rather than to initial disparities in facility resources or capabilities. Furthermore, the cross-validation of 20% of facility records with physical registers minimized reporting bias, enhancing the confidence that the reported service volumes accurately reflect actual patient encounters, rather than inflated figures.

Superiority of Incentives for Demand-Driven Services

This study provides robust evidence confirming the superiority of Performance-Based Financing (PBF) for health services that are inherently demand-driven and require active provider effort and behavioral change. The substantial effect sizes observed for Skilled Deliveries $H^2_p = 0.34$) and Family Planning (FP) uptake $H^2_p = 0.36$) indicate that the financing model explains a large proportion of the variance in these outcomes. These findings align with previous research by Gertler and Vermeersch (2012) and Basinga et al. (2011)], which highlight the effectiveness of supply-side incentives in reducing provider absenteeism and increasing effort. The significant gap in FP uptake, where PBF facilities dramatically outperformed DFF, underscores the critical role of financial bonuses in motivating the intensive counseling and client persuasion necessary for successful family planning adoption (Witter et al., 2013). The absence of such bonus mechanisms in DFF facilities, even with operational autonomy, appears insufficient to generate the same level of structured motivation.

The Utilization-Quality Nexus

It is essential to contextualize these utilization findings within the broader quality-of-care debate. While the data conclusively show that PBF drives higher patient volumes for deliveries and family planning, this study did not measure clinical quality indicators (e.g., adherence to partographs during labour or correct counselling protocols). Therefore, while PBF effectively solves the "access" problem by pulling women into facilities, policymakers must ensure that parallel investments are made in clinical training and quality assurance so that increased utilization translates into reduced maternal morbidity and mortality.

DFF as a "Middle Ground"

Decentralized Facility Financing (DFF) consistently demonstrated superior performance compared to Non-Financial Intervention (NFI) facilities across all indicators. This finding validates the premise that enhanced operational autonomy and direct funding flows significantly improve health system functionality and service delivery (Sato & Belel, 2021). However, DFF facilities consistently lagged behind PBF facilities in high-impact maternal indicators, reinforcing the notion that while autonomy is a necessary condition for improved performance, it may not be sufficient to maximize productivity in contexts requiring significant behavioral change or sustained, incentivized effort (Meessen et al., 2011) [19]. The operational freedom afforded by DFF effectively addresses supply-side bottlenecks but appears to lack the inherent demand-generation push characteristic of PBF models.

The Immunization Exception (CVC)

The robust statistical finding of no significant difference between PBF and DFF in the coverage of Completely Vaccinated Children (CVC) ($p = .703$) presents a crucial nuance. This suggests that for routine, supply-driven, and protocol-bound programs like the Expanded Programme on Immunization (EPI), the additional "push" provided by financial bonuses may be redundant if operational autonomy ensures reliable supply chains and consistent service availability. This observation supports the findings of Huillery and Seban (2014), who noted that routine services are generally less responsive to performance incentives compared to demand-driven

services. Consequently, the high administrative and verification costs associated with PBF may not be justified for immunization programs, as DFF can achieve comparable results with lower transaction costs.

Policy Implications

The findings of this study strongly advocate for a differentiated financing strategy within the Nigerian primary healthcare system:

i. **Strategic Deployment of PBF:** PBF should be prioritized for "high-effort," demand-driven services, such as Skilled Deliveries and Family Planning, where behavioral change and active provider engagement are critical for reducing maternal mortality and improving health outcomes.

ii. **Adoption of DFF for Routine Services:** DFF should be considered the preferred model for "supply-driven," routine vertical programs, such as Immunization, to ensure operational efficiency and service availability without incurring unnecessary verification costs.

iii. **Development of a Hybrid Model:** Policymakers should explore the development of a hybrid financing model that strategically integrates elements of both PBF and DFF, tailoring the approach to the specific characteristics and requirements of different health services to maximize overall cost-effectiveness and impact.

CONCLUSION

This study provides compelling evidence that Performance-Based Financing (PBF) is significantly more effective than Direct Facility Funding (DFF) for health services that require active provider engagement and behavioral change. However, DFF remains a highly viable and cost-effective alternative for routine, supply-driven vertical programs. These findings underscore the necessity for Nigeria to transition from a monolithic health financing approach towards a more nuanced, incentive-specific model. By strategically aligning financing mechanisms with the specific demands of different health services, Nigeria can accelerate its progress toward achieving the Sustainable Development Goals related to maternal and child health.

Conclusion And Recommendations

This study compared Performance-Based Financing (PBF), Decentralized Facility Financing (DFF), and a non-financed control model on maternal and child health service use in Nigeria, using robust statistical controls (PSM and Welch's ANOVA) to ensure fair comparison. Overall, it found that financing approaches do not have uniform effects across health services. PBF was the most effective model for services that depend heavily on provider motivation and outreach, such as skilled birth attendance and family planning. DFF consistently performed better than the non-financed approach across all services, highlighting the importance of financial autonomy. However, for routine services like immunization, PBF and DFF performed similarly, suggesting that the extra costs of PBF verification are not always necessary.

Based on these findings and the limitations of the current study, the following recommendations are made:

Policy Recommendations:

- **Adopt a Differentiated Financing Strategy:** A single financing model is inefficient for all services. Nigeria should transition to a hybrid system where base DFF funding supports general facility operations, while targeted PBF bonuses are strictly reserved for high-impact, demand-driven maternal services.

- **Strengthen Management Capacity:** To bridge the gap between PBF and DFF in maternal health, government agencies should invest in intensive leadership and management training for DFF facility managers to ensure they effectively utilize their autonomous funds for community mobilization.

Recommendations for Future Research: To address the limitations of this retrospective study and provide a more comprehensive evaluation of health financing models, future research should:

- **Incorporate Longitudinal/Quasi-Experimental Designs:** Future studies should utilize Difference-in-Differences (DiD) designs that compare facilities over time before and after the introduction of PBF/DFF, using baseline data (pre-2011) to better assess causal impact.

- **Expand Geographical Scope:** Studies should expand beyond pilot states to include non-pilot states and private healthcare settings to improve the generalizability of findings and assess how these models perform without intensive donor supervision.

- **Examine Quality and Health Outcomes:** Researchers must move beyond utilization metrics to include quality-of-care indicators (e.g., clinical audits, patient satisfaction scores) and actual health outcomes, such as maternal and neonatal mortality rates.

- **Conduct Cost-Effectiveness Analyses:** Future evaluations must calculate the cost per additional skilled delivery or per fully immunized child under both PBF and DFF to determine if the high administrative costs of PBF verification are economically justifiable compared to the simpler DFF model.

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