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From Routine to Results: How Digitalizing Posyandu and Cross-Sector Convergence Accelerate Stunting Reduction in Rural Indonesia (Evidence from Peniti Village)

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Abstract

Indonesia has prioritized stunting reduction through convergence and community-based frontline services, formalized under Presidential Regulation No. 72/2021. Yet stunting progress across villages is uneven, and in some areas prevalence fluctuates sharply, signaling instability in implementation. Peniti Village (Sekadau Hilir District, West Kalimantan) presents a high-variance pattern: stunting prevalence decreased from 15.82% (2021) to 13% (2022), rose dramatically to 36.96% (2023), then fell to 10.42% (2024). This study, adapted from the original thesis, reassesses the effectiveness of Posyandu (Integrated Health Service Posts) in accelerating stunting reduction using Subagyo's applied effectiveness framework (as operationalized by Budiani, 2007): accuracy of targets, program socialization, goal achievement, and monitoring. A descriptive qualitative design (Danim, 2002; Moleong, 2004; Sugiyono, 2020; Yusuf, 2019) was applied through observation, in-depth interviews with cadres, village officials, Puskesmas staff, and mothers of toddlers, as well as program document review. Findings show Posyandu in Peniti is generally effective and capable of driving rapid improvements when convergence intensifies. However, sustainability is threatened by incomplete targeting of high-risk households, weak cross-sector evaluation routines, and partial digitalization of nutrition surveillance (e-PPGBM). Recent studies increasingly confirm that stable stunting reduction depends on accurate digital growth monitoring, continuous cadre capacity building, and village-level convergence governance rather than routine services alone (Sufri et al., 2024; Syafly et al., 2024; UNICEF Indonesia, 2023). This article contributes a variance-focused effectiveness perspective and a digital-convergence pathway aligned with national policy.

INTRODUCTION

Stunting is a chronic nutritional condition reflecting long-term deprivation that affects children's physical growth, cognitive development, future productivity, and vulnerability to degenerative disease. In Indonesia, stunting is recognized not merely as a health issue but as a national development constraint, because it reduces human capital quality and deepens intergenerational inequality. National monitoring indicates overall decline toward the 14% target, yet prevalence remains above WHO benchmarks and continues to show wide inter-provincial and inter-village gaps. The SSGI-based national prevalence decline has not been uniformly mirrored by routine community data, and many districts report divergence between survey figures and e-PPGBM administrative records (WHO, 2021; UN Global Pulse, 2023).

To consolidate acceleration efforts, the Government of Indonesia enacted Presidential Regulation No. 72/2021 on the Acceleration of Stunting Reduction. This regulation mandates a

five-pillar strategy emphasizing leadership commitment, national communication and behavior change, convergence at central and local levels, food and nutrition security, and monitoring and evaluation. Perpres 72/2021 explicitly frames stunting reduction as a cross-sectoral responsibility executed holistically, integratively, and with quality at village and household levels (Perpres No. 72/2021; BKKBN, 2021; Kemenkes RI, 2023). UNICEF's formative evaluation of Indonesia's strategy similarly underlines that village-level convergence quality, frontline service reach, and timely data use are decisive for sustaining reductions, especially in rural and resource-constrained settings (UNICEF Indonesia, 2023).

Posyandu is positioned as Indonesia's most grassroots institutional mechanism to operationalize nutrition-specific interventions: periodic growth monitoring, immunization support, maternal health counseling, supplementary feeding, and early referral for at-risk children. In theory, Posyandu should act as a stabilizing structure against stunting recurrence, because it combines preventive monitoring and community empowerment. Yet effectiveness depends on how well Posyandu translates policy into consistent practice. Steers (1985) and Siagian (2002, 2015) argue that organizational effectiveness requires not only achieving goals but also maintaining system sustainability through management quality, efficiency, and adaptive capacity in changing contexts. In community health programs, those changing contexts include pandemic disruptions, mobility patterns, poverty shocks, or seasonal food insecurity—factors that can create sudden stunting surges if frontline response is weak (Steers, 1985; Siagian, 2002; Dunn, 2003).

Peniti Village offers a striking case to examine effectiveness under stress. After a gradual decline from 2021–2022, Peniti experienced a sharp stunting spike in 2023 (36.96%) before rapidly decreasing again in 2024 (10.42). Such high variance challenges the notion that Posyandu impact is linear or automatically cumulative. Contemporary evidence increasingly interprets village-level fluctuation as a governance and implementation signal: either coverage fell temporarily, monitoring failed to detect early risks, or convergence actors did not respond quickly enough to emergent determinants (Sufri et al., 2024; Muatiara, 2024; Rusdianti et al., 2025).

Research gap

Existing Indonesian studies on Posyandu typically emphasize its supportive role in nutrition improvement and stunting prevention, while noting constraints such as limited resources, uneven cadre competence, and varying community participation. For example, Aditya and Purnaweni (2017) highlight implementation gaps in nutrition-improvement programs at Puskesmas level; Norsanti (2021) finds Posyandu contributes to stunting reduction but is hindered by participation and inter-institutional coordination issues; and Pratiwi and Yulian (2023) show Posyandu everywhere remains pivotal but requires systematic strengthening. However, two gaps remain visible.

First, few studies explain sharp stunting fluctuations through a structured effectiveness-of-implementation lens. Most evaluate Posyandu on service presence or routine performance, not on whether effectiveness is stable enough to prevent spikes. Second, digital surveillance integration is still weak in many Posyandu analyses. Recent national and district studies show that e-PPGBM can drastically enhance early detection and coordination when used consistently, but it often suffers from delayed entry, equipment mismatch, and user-experience barriers (Syafly et al., 2024; UN Global Pulse, 2023). The result is that routine Posyandu work may continue, yet risk detection and convergence feedback loops may fail at critical times.

Innovation and contribution

This article builds directly on the original thesis but enriches its contribution in three ways.

1. Variance-focused effectiveness framing. Instead of treating Peniti's prevalence as a simple trend, the study uses variance as an empirical clue to evaluate whether Posyandu effectiveness remains resilient over time.
2. Digital-convergence linkage. Subagyo's effectiveness dimensions are interpreted alongside e-PPGBM routines and convergence governance, clarifying how data systems strengthen or weaken each effectiveness pillar.
3. Policy-relevant pathway. The paper offers a practical strengthening route aligned with Perpres 72/2021: digital monitoring completion, cadre upgrading, and cross-sector evaluation institutionalization.

Research questions

1. How effective is Posyandu in Peniti Village across target accuracy, socialization, goal achievement, and monitoring?
2. What implementation bottlenecks plausibly explain the 2023 spike and 2024 decline?
3. How can digitalization (e-PPGBM/e-Posyandu) and cross-sector convergence strengthen sustainability?

Literature Review

Stunting reduction and convergence governance

Perpres 72/2021 situates stunting reduction within a convergence model—nutrition-specific interventions delivered by health actors must synchronize with nutrition-sensitive interventions delivered by non-health sectors (water-sanitation, food security, social protection, poverty alleviation, education, and women's empowerment). The World Bank and UNICEF argue that convergence is effective when there is shared targeting, integrated funding cycles, joint monitoring, and data-driven correction (UNICEF Indonesia, 2023; World Bank, 2023/2024). Recent qualitative and mixed-method studies confirm that convergence success is strongly mediated by local governance capacity. Sufri et al. (2024) show that convergence outcomes improve when local actors clarify roles, share household risk lists, and conduct routine joint reviews, but fragment when coordination is treated as administrative formality. A district-level convergence analysis in Grobogan (2025) further emphasizes that discrepancies between survey and e-PPGBM data can disrupt planning and weaken convergence prioritization, producing patchy stunting results across villages (Sufri et al., 2024; Sujatmiko et al., 2025).

Posyandu effectiveness: Subagyo's applied framework

Effectiveness theories in public policy and organizational management (e.g., Siagian, 2002; Steers, 1985; Rosyidin, 2014; Dunn, 2003) view effectiveness as the extent to which a program achieves its intended results through correct targeting, efficient delivery, and adaptive monitoring. Subagyo's applied effectiveness framework (as articulated in Budiani, 2007 and used by Lestari & Murti, 2015) translates this concept into four operational indicators: accuracy of targets, program socialization, goal achievement, and monitoring. This framework is well-suited for Posyandu because Posyandu's outputs (attendance, counseling, weighing) are only meaningful if they stabilize risk detection and household behavior (Budiani, 2007; Lestari & Murti, 2015).

Cadre capacity and anthropometric accuracy

Posyandu cadres are frontline implementers. Their ability to measure height/length and weight correctly is critical; even small measurement errors can misclassify risk and delay referrals. Post-2021 studies consistently show that structured training and mentoring improve cadres' precision and accuracy. Suyatno et al. (2024) found multilevel anthropometry training significantly reduced inter-observer variability among cadres. Similar 2025 studies report that refresher modules and supervised practice increase cadre skill and confidence, supporting more reliable stunting detection (Suyatno et al., 2024; Fitrianingsih et al., 2025; Aisyah et al., 2025; Nur et al., 2025).

Digital nutrition surveillance (e-PPGBM)

e-PPGBM system is Indonesia's official electronic community-based nutrition recording and reporting tool for toddlers. It links Posyandu-level measurements to Puskesmas dashboards used for risk mapping and response planning. In principle, e-PPGBM strengthens monitoring and targeting; in practice, system quality depends on user-friendliness, timeliness, equipment adequacy, and data synchronization. A user-satisfaction study in Payakumbuh found that ease of use and timeliness strongly shaped whether health workers used e-PPGBM effectively (Syafly et al., 2024). UN Global Pulse's national assessment similarly notes that e-PPGBM's potential is undermined by inconsistent entry, weak interoperability, and uneven local support, producing gaps between administrative and survey realities (UN Global Pulse, 2023).

METHODS

This research employs a descriptive qualitative approach, consistent with the original thesis framing (Danim, 2002; Moleong, 2004, 2008; Sugiyono, 2020; Yusuf, 2019). The design aims to capture lived implementation processes rather than to measure causal effects statistically.

The study was conducted in Peniti Village, Sekadau Hilir District. Informants were selected purposively based on direct involvement in Posyandu and stunting programs: village government officials, Posyandu cadres, Puskesmas nutrition and midwifery staff, PKK and BKB representatives, and mothers of toddlers/pregnant women.

Three techniques were used: observation of Posyandu sessions; in-depth interviews focused on Subagyo's four effectiveness indicators, stunting trend explanations, and implementation experience; and document review of Posyandu registries, e-PPGBM outputs, village stunting reports, and convergence meeting notes.

Data were coded iteratively, then categorized under the four effectiveness dimensions. Triangulation across informants, observation, and documents improved credibility. The analysis aligned emerging themes with recent convergence and digital-surveillance literature to enrich interpretation without altering the thesis' core logic.

RESULTS AND DISCUSSION

Accuracy of targets (Ketepatan Sasaran Program)

Posyandu in Peniti targets pregnant women, breastfeeding mothers, toddlers, and households identified as stunting risk groups. Monthly sessions provide weighing, height/length measurement, immunization coordination, vitamin supplementation, supplementary feeding, and counseling. Cadres and Puskesmas staff maintain KMS and Posyandu logs and enter data into e-PPGBM when possible. Targeting is therefore substantively present. However, accuracy is not fully optimal because several high-risk households still intermittently miss Posyandu services,

especially families in dispersed hamlets, poor households with unstable livelihoods, and parents who assume monitoring is unnecessary when children appear healthy. In high-variance villages, temporary drops in reach can generate delayed detection, delayed referral, and rapid accumulation of undetected faltering growth, which aligns with wider convergence evidence (Sufri et al., 2024). Peniti's e-PPGBM updating is not always timely and is not systematically synchronized with DTKS/PKH or P3KE registries, weakening risk stratification. Similar issues are documented elsewhere, where administrative data mismatch produces targeting leakage and uneven outcomes (Sujatmiko et al., 2025; UN Global Pulse, 2023). Therefore, Peniti's 2023 spike can plausibly be linked to a period of weakened vulnerable-household reach and slower data-driven follow-up despite routine Posyandu sessions. Strengthening requires risk-mapping via integrated registries and proactive digital-triggered home visits (Pranaka et al., 2025; Larasati et al., 2025).

Program socialization (Ketepatan Sosialisasi Program)

Socialization is conducted through neighborhood leaders, PKK/BKB networks, WhatsApp reminders, and direct cadre mobilization. Mothers generally know schedules and basic services. Yet awareness does not always translate to durable commitment: some households attend sporadically, especially during livelihood pressures, and others disengage from counseling content. Recent studies show reminder-based socialization increases attendance, but dialogue-based and context-tailored counseling is required for behavior change and shock-resistance (Yuliani et al., 2025; Aisyah et al., 2025). In high-variance contexts, socialization quality stabilizes monitoring, because weakly internalized households drop attendance first during shocks. Digital reminders and simple growth-curve messaging could strengthen adherence, but only if e-PPGBM lists are timely and usable (Syafly et al., 2024).

Goal achievement (Pencapaian Tujuan Program)

Posyandu aims to improve child nutrition, prevent stunting, raise maternal knowledge, and ensure early referral of faltering growth. The fall from 36.96% (2023) to 10.42% (2024) indicates Posyandu, paired with intensified convergence actions, can achieve rapid outcomes. Mothers report greater PMT access, more active counseling, and more frequent follow-ups in 2024. However, the earlier spike indicates fragile goal achievement without sustained system reinforcement. Recent convergence studies find that Posyandu outcomes stabilize only when embedded within continuous sensitive-intervention support (sanitation, food security, social protection) and operational convergence reviews, not isolated health services (Siregar et al., 2024; Arieffiani et al., 2024). Thus, Peniti's surge likely reflects a temporary weakening of convergence intensity and data-based correction in 2023, while the decline reflects restored alignment in 2024. Digital dashboards and timely e-PPGBM feedback can prevent such surges by making risk visible early (Syafly et al., 2024; UN Global Pulse, 2023).

Monitoring and follow-up (Pemantauan Program)

Peniti Posyandu conducts monthly weighing and measurement, maintains KMS cards, and submits data to Puskesmas. Monitoring is active, supported by cadre dedication and midwife presence. Nonetheless, monitoring quality and speed gaps persist: some cadres still show inconsistent anthropometry precision, calibration and tool distribution across hamlets are uneven, and e-PPGBM entry is sometimes delayed due to workload or connectivity. This shifts monitoring into record-keeping rather than early-warning signaling. Post-2021 evidence shows

cadre measurement precision is a strong predictor of stunting prevention effectiveness and improves markedly after tiered training and supervision (Suyatno et al., 2024; Fitrianingsih et al., 2025; Nur et al., 2025). Digital assessments further show delayed e-PPGBM entry reduces follow-up sensitivity and weakens convergence response (Syafly et al., 2024; UN Global Pulse, 2023). Using a variance lens, monitoring sensitivity decline in 2023 is the most direct pathway to explain Peniti's spike, while intensified monitoring and follow-up in 2024 plausibly enabled rapid correction.

Supporting and inhibiting factors

Supporting factors include cadre commitment, positive trust relationships, routine Puskesmas assistance, and strengthened village leadership after the spike, consistent with convergence leadership evidence (UNICEF Indonesia, 2023; Rusdianti et al., 2025). Inhibiting factors include uncertain reach to dispersed vulnerable households, socialization that is awareness-strong but commitment-weak, discontinuous cadre training, partial digitalization, and cross-sector evaluation that is not yet fully dashboard-driven. These inhibitors replicate national patterns where convergence weakness and data-quality gaps produce uneven outcomes (Sufri et al., 2024; Sujatmiko et al., 2025; Muatiara, 2024).

CONCLUSION

Posyandu in Peniti Village is generally effective and can support rapid stunting reduction when convergence aligns, but effectiveness is not yet resilient over time, as shown by the 2023 spike. Under Subagyo's indicators, Posyandu performs well in routine delivery and community mobilization, yet sustainability is constrained by targeting leakage, fragile adherence, monitoring sensitivity gaps, incomplete e-PPGBM digitalization, and weakly institutionalized cross-sector evaluation. Priority recommendations include: (1) completing and disciplining e-PPGBM use with same-day entry and synchronization with poverty/WASH registries; (2) institutionalizing quarterly convergence evaluations using shared indicators and dashboards; and (3) scaling continuous cadre anthropometry training and equipment calibration. Evidence from 2021–2025 consistently indicates these levers stabilize village-level declines and prevent recurrence spikes (Suyatno et al., 2024; Syafly et al., 2024; Sufri et al., 2024; UNICEF Indonesia, 2023).

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