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Restructuring Community Integrated Health Posts (Posyandu) to Enhance Public Healthcare Service Quality: A Participatory Action Study in Rural West Java

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Abstract: Community Integrated Health Posts (Posyandu) play a pivotal role in strengthening primary healthcare in Indonesia, particularly for maternal and child health monitoring. However, inadequate spatial organization, unorganized equipment management, and limited facility maintenance frequently hinder operational efficiency and service quality in rural areas. This study evaluated the implementation of a participatory restructuring initiative to enhance healthcare service delivery at Posyandu Anyer 10 in Nyalindung Village, West Java. Employing a Participatory Rural Appraisal (PRA) framework, the intervention integrated observational assessments, cadre capacity building, participatory facility redesign following the standardized five-table system, and post-implementation mentoring. The results demonstrated substantial improvements in spatial organization, administrative clarity, and equipment accessibility, which significantly reduced service preparation time and streamlined the patient workflow. Furthermore, hands-on cadre training and active community involvement fostered a strong sense of ownership and heightened awareness regarding facility maintenance. These structural and operational enhancements directly contributed to a cleaner, safer, and more comfortable environment for mothers, infants, and healthcare providers. In conclusion, combining physical facility restructuring with cadre empowerment through a participatory approach offers a sustainable model for optimizing community-based primary healthcare infrastructure in rural settings. Future initiatives should incorporate quantitative metrics, such as visitor satisfaction scores and health monitoring outcomes, to measure long-term societal impacts.

Keywords: Community integrated health post, Participatory rural appraisal, Facility restructuring, Primary healthcare, and Cadre empowerment

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1. Introduction

Public health development serves as a fundamental cornerstone for improving human resource quality, social welfare, and sustainable socio-economic growth. Optimal health status empowers individuals to actively participate in social and economic activities, thereby driving community development. To ensure equitable healthcare access, governments globally and nationally prioritize primary healthcare (PHC) strategies that bring essential services closer to the population. In the context of Indonesia, community-based health interventions—specifically the Integrated Service Post, locally known as *Pos Pelayanan Terpadu* (Posyandu)—constitute the frontline mechanism for decentralized health promotion and preventive care, particularly focusing on maternal, neonatal, and child health (MNCH).

Posyandu operates as a community-managed healthcare platform supported by primary health centers (*Puskemas*) and village administrative bodies. Its strategic importance lies in its operational proximity to rural households, facilitating routine health surveillance, immunization, anthropometric growth monitoring for under-five children, nutritional supplementation, and health education. The routine execution of Posyandu activities relies

heavily on community health cadres—volunteers who manage operational workflows ranging from participant registration and physical measurements to record-keeping on the Maternal and Child Health (*Kesehatan Ibu dan Anak / KIA*) handbook. However, while human resource capability is critical, the structural quality, spatial layout, and environmental comfort of the service facility play an equally decisive role in determining overall service efficiency and participant satisfaction. An ill-arranged physical environment severely hampers service workflows, prolongs waiting times, disrupts privacy during health counseling, and compromises hygiene standards.

Posyandu Anyer 10, located in Kampung Nyalindung, Neglasari Village, Sukabumi Regency, West Java, serves as a primary healthcare hub for a dense rural population, including pregnant women, lactating mothers, infants, and toddlers. Despite its consistent monthly operational schedule, preliminary empirical observations revealed substantial structural and environmental shortcomings. The physical service room suffered from suboptimal spatial configuration, where service tables were positioned without adherence to the standardized five-table operational flow (registration, weighing/measurement, recording, counseling, and health services). Furthermore, operational equipment, health measurement tools, and administrative documents were stored without systematic categorization, leading to disorganization and time inefficiency during service preparation. The physical aesthetics and hygiene of the facility also lacked the comfort required for sensitive healthcare delivery, while community awareness regarding facility maintenance remained low.

Previous scholarship on community-based health services has extensively analyzed the behavioral competency of health cadres, the effectiveness of nutritional interventions, and the administrative integration of Posyandu into local governance. However, empirical studies addressing the physical, spatial, and ergonomic restructuring of rural Posyandu facilities—and its direct impact on service optimization and community sense of ownership—remain remarkably sparse. Most interventions treat physical infrastructure as a static backdrop rather than an active variable influencing primary healthcare performance.

To address this knowledge and implementation gap, this community engagement initiative employed a Participatory Rural Appraisal (PRA) framework to execute a systematic restructuring and cadre capacity-building program at Posyandu Anyer 10. The core philosophy of this project posits that physical facility optimization combined with participatory cadre empowerment fosters a cleaner, safer, and more efficient healthcare environment while ensuring long-term operational sustainability.

Specifically, the primary objective of this project was to evaluate the structural and operational transformation of Posyandu Anyer 10 through a multi-stage participatory approach. The specific objectives included:

1. Conducting a comprehensive baseline analysis of the physical, spatial, and workflow bottlenecks at Posyandu Anyer 10;
2. Designing and implementing an ergonomic spatial rearrangement based on the standardized five-table Posyandu framework;
3. Empowering community health cadres through interactive training on facility management, equipment organization, and hygienic environmental maintenance; and
4. Fostering active community participation to build a sustainable mechanism for facility maintenance and local governance collaboration.

By bridging spatial restructuring with human capacity building, this study provides actionable insights and an adaptable framework for local governments, public health authorities, and higher education institutions aiming to revitalize rural primary healthcare infrastructure across similar developing contexts.

2. Methods

2.1. Study Site and Context

This community engagement project was conducted at Posyandu Anyer 10, located in Kampung Cigadog, Neglasari Village, Nyalindung District, Sukabumi Regency, West

Java, Indonesia. Posyandu Anyer 10 serves as a vital community-based primary healthcare hub providing routine preventive and promotive health services to a rural population comprising pregnant women, lactating mothers, infants, toddlers, and couples of childbearing age.

The selection of Posyandu Anyer 10 as the project site was established through initial coordination with village administrators and Posyandu managers. Despite maintaining a high monthly visitor volume, preliminary baseline assessments indicated that the facility faced critical operational and infrastructural challenges, including suboptimal spatial organization, disorganized equipment storage, lack of comfortable waiting areas, and inadequate environmental maintenance mechanisms. The implementation took place on Friday, August 2, 2024, involving health cadres, local neighborhood leaders (*Rukun Tetangga* / RT), community figures, villagers, academic staff, and university students.

2.2. Target Audience and Stakeholders

To ensure long-term sustainability and local institutional integration, the project targeted both primary and secondary stakeholders:

1. **Primary Beneficiaries:** Posyandu Anyer 10 health cadres, who serve as the operational backbone of monthly health delivery, participant registration, anthropometric measurement, and record-keeping.
2. **Secondary Beneficiaries:** Local community members, particularly mothers and children utilizing monthly healthcare services.
3. **Institutional Partners:** The local village government of Neglasari and public health officials from the local Community Health Center (*Puskesmas*), who provide policy support, medical supervision, and primary healthcare oversight.

2.3. Methodological Framework: Participatory Approach

The core methodology was grounded in the Participatory Rural Appraisal (PRA) framework, which positions local community members and health cadres not merely as passive recipients of external aid, but as primary agents and active co-designers of the intervention. The operational workflow consisted of six interconnected, iterative phases, as illustrated in the project methodology framework.

2.3.1. Observational Phase (Baseline Assessment)

The observational phase focused on gathering empirical baseline data regarding the physical, spatial, and functional conditions of Posyandu Anyer 10 prior to the intervention. The project team conducted direct field audits to evaluate:

- The physical condition and cleanliness of the service room, building facade, and surrounding grounds;
- The existing spatial layout of service tables relative to the standardized five-table operational flow (Registration → Weighing/Measurement → Recording → Counseling → Health Services);
- The storage and accessibility of healthcare equipment (e.g., infant scales, stadiometers, mid-upper arm circumference strips) and administrative ledgers;
- Semi-structured qualitative interviews with Posyandu cadres to identify primary operational bottlenecks and daily workflow challenges.

2.3.2. Educational and Capacity-Building Phase

The educational phase aimed to enhance the cognitive understanding and practical skills of health cadres regarding healthcare facility management and environmental hygiene. Capacity-building sessions were delivered through interactive workshops, group discussions, and visual demonstrations covering the following modules:

- Principles of ergonomic spatial arrangement for primary healthcare facilities;
- Implementation of the standardized five-table system to minimize participant cross-traffic and reduce waiting times;

- Systematic inventory management, functional categorization, and sanitary storage of medical tools;
- Infection prevention, environmental sanitation, and routine facility maintenance strategies.

2.3.3. Participatory Planning Phase

Following the educational sessions, a joint participatory planning workshop was held with village representatives, neighborhood heads (*Ketua RT*), and cadre leaders. During this phase, community aspirational surveys and public consultations were conducted to prioritize actionable intervention steps. The prioritized measures included structural room rearrangement, construction of protective bamboo boundary fencing, enhancement of the front yard aesthetic, and establishing structured waste management protocols.

2.3.4. Direct Implementation Phase (Learning by Doing)

Applying the “learning by doing” principle, cadres, academic mentors, students, and community members collaborated on-site to execute the physical and organizational restructuring. Specific execution activities included:

- **Spatial Rearrangement:** Reconfiguring table and chair placements to establish a sequential, unidirectional five-table workflow, preventing participant crowding;
- **Facility and Inventory Reorganization:** Sorting medical tools, calibrating weighing equipment, cataloging administrative registers, and installing dedicated, labeled storage units;
- **Environmental and Infrastructure Enhancements:** Constructing and installing a decorative, natural bamboo perimeter fence around the Posyandu front yard, repairing entrance pathways, installing health education posters, and conducting deep cleaning of indoor and outdoor areas.

2.3.5. Mentoring and Technical Support Phase

Post-implementation mentoring was conducted to embed structured management habits into routine operational workflows. The project team provided hands-on guidance to cadres during subsequent service days, ensuring adherence to the newly established table sequence, maintaining equipment organization, and establishing a daily post-service cleanup routine.

2.3.6. Evaluative Phase

The final phase evaluated the overall effectiveness, spatial transformation, and stakeholder involvement resulting from the intervention. Evaluation metrics comprised both qualitative and structural indicators:

- Comparative qualitative assessment of spatial orderliness, facility cleanliness, and workflow fluidity before and after the intervention;
- Direct feedback from cadres regarding operational ease during monthly service delivery;
- Assessment of community participation levels and local resource contribution (*swadaya*).

2.4. Analytical Strategy and Data Synthesis

To synthesize project outcomes effectively, observational findings, qualitative interview transcripts, and structural audit checklists were systematically categorized and analyzed using thematic comparative analysis. Key operational parameters—such as spatial flow compliance, inventory accessibility, environmental hygiene, and cadre self-efficacy—were juxtaposed pre- and post-intervention to draw rigorous conclusions regarding service quality enhancement.

3. Results

3.1. Overview of Project Execution and Baseline Characteristics

The community engagement project titled “Pembinaan Penataan Ulang Posyandu Anyer 10 di Kampung Nyalindung” was executed on Friday, August 2, 2024, at Posyandu Anyer 10 (geographically situated in Kampung Cigadog, RT 04 / RW 05, Neglasari Village, Nyalindung District, Sukabumi Regency, West Java). The primary objective was to resolve spatial, infrastructural, and administrative bottlenecks that impaired routine health delivery[cite: 4]. The execution involved multi-stakeholder collaboration, uniting 6 academic personnel (lecturers), university students, 5 core Posyandu cadres, local neighborhood leaders (*Ketua RT*), village government officials, and community residents[cite: 4].

Prior to the physical and organizational intervention, a baseline observational audit was conducted to evaluate the physical state and spatial mechanics of Posyandu Anyer 10[cite: 4]. The initial assessment identified multiple severe operational deficiencies across spatial layout, equipment organization, facility aesthetics, and administrative documentation[cite: 4]. Table 1 summarizes the comprehensive comparative parameters before and after the participatory intervention[cite: 4].

Table 1. Comprehensive Baseline vs. Post-Intervention Operational Profile of Posyandu Anyer 10.

Operational Parameter	Pre-Intervention Baseline State	Post-Intervention State
Spatial Configuration	Tables placed randomly; non-directional flow causing bottlenecks and participant cross-traffic[cite: 4].	Unidirectional 5-table flow (Registration → Weighing → Recording → Counseling → Health Services)[cite: 4].
Equipment Storage	Unsorted medical instruments; infant scales and measuring tapes mixed with general items[cite: 4].	Categorized storage by function; calibrated instruments in labeled, hygienic units[cite: 4].
Administrative System	Disorganized KMS ledgers and registers; prolonged retrieval times during registration[cite: 4].	Color-coded, sequential archiving system; immediate ledger accessibility[cite: 4].
Physical Facility & Aesthetics	Deteriorated perimeter boundary; bare, unmaintained front yard; lack of protective barrier[cite: 4].	Custom handcrafted bamboo fencing installed; clean, aesthetically welcoming entrance[cite: 4].
Cadre Competency & Self-Efficacy	Passive facility management; limited knowledge of ergonomic room setup and maintenance[cite: 4].	Active spatial oversight; high awareness of environmental hygiene and 5-table management[cite: 4].
Community Sense of Ownership	Low participation in maintenance; reliance on external entities[cite: 4].	Active <i>swadaya</i> (self-help) contribution; shared responsibility for long-term care[cite: 4].

3.2. Identification of Operational Bottlenecks (Baseline Analysis)

The qualitative and structural analysis performed during the baseline stage revealed four core bottleneck domains that directly compromised healthcare delivery quality at Posyandu Anyer 10[cite: 4]:

3.2.1. Spatial Disorganization and Workflow Disruption

The original interior arrangement lacked functional alignment with the national standardized five-table system mandated by the Ministry of Health[cite: 4]. Tables were arranged ad hoc, forcing mothers with infants to crisscross the room between registration, weighing, and counseling stations[cite: 4]. This structural inefficiency created severe congestion during peak morning hours, increased patient waiting times, and compromised privacy during maternal health counseling sessions[cite: 4].

3.2.2. Unsystematic Equipment and Document Management

Medical tools—including infant beam scales, digital toddler scales, height measuring boards (*stadiometers*), and mid-upper arm circumference (MUAC) tapes—were stored haphazardly without protective casing or functional categorization[cite: 4]. Administrative ledgers, particularly Maternal and Child Health (*Kesehatan Ibu dan Anak / KIA*) handbooks and participant registry books (*Buku Register Posyandu*), were stacked in unorganized piles[cite: 4]. Cadres spent an average of 5 to 10 minutes per participant merely retrieving archived records[cite: 4].

3.2.3. Infrastructural Vulnerability and Environmental Aesthetics

The exterior environment of Posyandu Anyer 10 lacked clear physical boundaries[cite: 4]. The front yard was open to surrounding dirt paths, leading to soil intrusion inside the service room during rainy conditions[cite: 4]. The absence of protective fencing also exposed the immediate facility grounds to stray domestic animals, detracting from the clinical hygiene expected of a primary healthcare center[cite: 4].

3.2.4. Institutional and Communication Barriers

Initial stakeholder assessments revealed communication gaps between local neighborhood leadership (*Ketua RT*) and Posyandu managers[cite: 4]. A recent transition in neighborhood leadership had resulted in limited administrative familiarity with Posyandu operational needs[cite: 4]. Furthermore, many community members worked outside the village during weekdays, leading to low initial attendance during early village coordination meetings (*Musyawarah Kedusunan / MUSDUS*)[cite: 4].

3.3. Implementation Outcomes of the Participatory Intervention

To resolve these baseline deficiencies, the multi-stage intervention was executed using the Participatory Rural Appraisal (PRA) methodology, combining physical restructuring, capacity building, and community mobilization[cite: 4].

3.3.1. Ergonomic Spatial Restructuring (The Five-Table System)

The indoor service environment was completely reconfigured to establish a logical, unidirectional workflow[cite: 4]. Service tables were repositioned sequentially:

1. **Table 1 (Registration):** Positioned immediately adjacent to the entrance door to greet arriving mothers and children[cite: 4].
2. **Table 2 (Anthropometric Measurement):** Equipped with calibrated scales and stadiometers, positioned in an open area to allow safe physical measurement of infants[cite: 4].
3. **Table 3 (Recording & KMS Logging):** Placed directly adjacent to Table 2 to allow instantaneous transfer of anthropometric data into growth charts[cite: 4].
4. **Table 4 (Health Counseling & PMT):** Situated in a quieter corner of the room to ensure privacy during health consultations and Supplementary Feeding (*Pemberian Makanan Tambahan / PMT*) distribution[cite: 4].
5. **Table 5 (Health Services & Immunization):** Reserved for visiting *Puskesmas* medical personnel to administer vaccinations and vitamin supplements[cite: 4].

This ergonomic reconfiguration eliminated cross-traffic congestion, reduced physical movement redundancy for cadres, and streamlined total participant transit time per session[cite: 4].

3.3.2. Inventory Systematic Categorization and Document Archiving

All healthcare instruments were audited, sanitized, and categorized by operational frequency and function[cite: 4]. Dedicated shelf spaces and labeled storage boxes were established[cite: 4]. Administrative ledgers were organized chronologically and categorized by participant age groups and residential RT blocks[cite: 4]. This systemic reorganization

reduced document retrieval times to under 1 minute per participant, significantly enhancing administrative throughput[cite: 4].

3.3.3. Exterior Infrastructure Reconstruction: Handcrafted Bamboo Perimeter

To address the lack of physical boundary protection and enhance site aesthetics, cadres, academic staff, students, and local residents engaged in the collaborative construction of a natural bamboo perimeter fence around the front yard of Posyandu Anyer 10[cite: 4].

As documented in the project records, the team processed raw bamboo materials—cutting, splitting, sanding, and assembling decorative fence panels on-site[cite: 4]. The resulting structure provided a clean physical barrier separating the health post from public thoroughfares, prevented animal intrusion, and substantially upgraded the visual cleanliness of the facility[cite: 4]. Figure 1 illustrates the exterior transformation and physical restructuring of Posyandu Anyer 10[cite: 4].

FIGURE 1. PHYSICAL RESTRUCTURING AND BAMBOO PERIMETER FENCE INSTALLATION AT POSYANDU ANYER 10, KAMPUNG CIGADOG, NEGLASARI VILLAGE.^{4]}

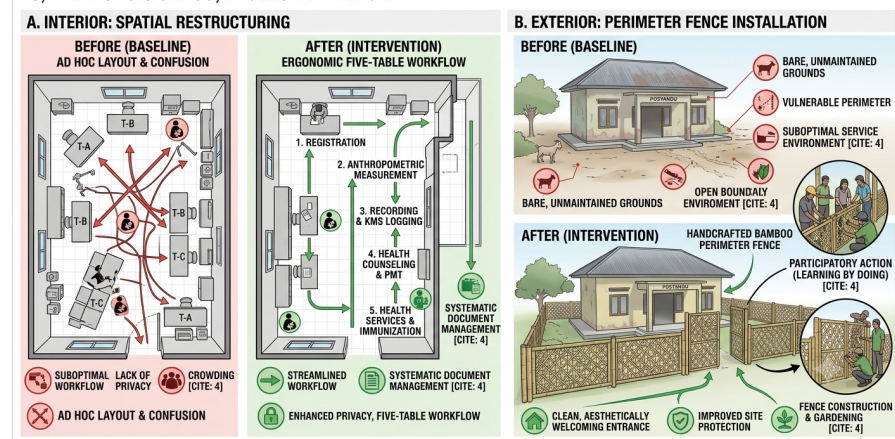


Figure 1. Physical restructuring and bamboo perimeter fence installation at Posyandu Anyer 10, Kampung Cigadog, Neglasari Village[cite: 4].

3.4. Cadre Capacity Building and Knowledge Retention

The educational component of the project delivered targeted training to the 5 primary health cadres of Posyandu Anyer 10[cite: 4]. Training modules focused on ergonomic facility setup, hygienic maintenance, instrument calibration, and participant communication[cite: 4].

Qualitative post-training evaluations demonstrated substantial cognitive and behavioral gains among cadres[cite: 4]:

- **Enhanced Ergonomic Awareness:** Cadres demonstrated complete mastery over the 5-table sequence and expressed high confidence in maintaining the unidirectional layout independently[cite: 4].
- **Instrument Maintenance Mastery:** Cadres acquired practical skills in calibrating beam and digital scales prior to service sessions, ensuring data accuracy for child growth monitoring[cite: 4].
- **Sanitary Discipline:** Cadres established an official operational protocol mandating pre-service sanitation and post-service reorganization[cite: 4].

3.5. Community Mobilization, Swadaya, and Social Cohesion

Despite initial coordination hurdles stemming from agricultural work schedules and local administrative transitions, the participatory approach successfully catalyzed local social capital[cite: 4]. While formal daytime meeting attendance was initially constrained, community support manifested through spontaneous local resource mobilization (*swadaya*)[cite: 4].

Residents who were unable to participate in physical labor contributed by providing food, beverages, raw bamboo materials, and woodworking tools (saws, machetes, and nails) to support the construction workforce[cite: 4]. This collaborative effort fostered a strong collective *sense of ownership* over Posyandu Anyer 10, transforming it from a neglected government-backed building into a valued community asset[cite: 4].

3.6. Analysis of Operational Obstacles and Mitigative Strategies

In alignment with rigorous qualitative reporting, the implementation identified three primary categories of operational obstacles, which were successfully mitigated through adaptive field strategies[cite: 4]:

3.6.1. Logistical and Geographic Constraints

The project site in Kampung Cigadog is characterized by steep, rugged terrain[cite: 4]. Limited group vehicle availability, combined with severe road inclines, caused minor vehicular breakdowns and transit delays[cite: 4]. To mitigate this, the project team reorganized material transport schedules and utilized local motorcycles for secondary shuttle runs[cite: 4].

3.6.2. Communication and Administrative Novelty

The recent election of a new neighborhood head (*Ketua RT*) created an initial communication gap due to the leader's unfamiliarity with municipal health post protocols[cite: 4]. The project team conducted direct, informal home visits (*silaturahmi*) to explain the strategic health value of Posyandu, successfully securing full administrative backing[cite: 4].

3.6.3. Equipment Shortages During Physical Construction

Physical restructuring faced minor delays due to a shortage of woodworking tools (e.g., saws, golok, sickles) required for bamboo fence assembly[cite: 4]. This challenge was resolved by tapping into local community networks, where nearby residents voluntarily loaned personal farming and carpentry equipment[cite: 4].

3.7. Evaluation of Post-Intervention Impact and Sustainability

A comprehensive evaluative audit conducted following the completion of physical and educational activities confirmed significant qualitative improvements across all targeted service dimensions[cite: 4]:

1. **Spatial Fluidity and Efficiency:** The unidirectional flow eliminated crowding, created a serene clinical environment, and reduced overall participant processing time[cite: 4].
2. **Hygiene and Aesthetic Enhancement:** The interior room and exterior yard presented a professional, clean, and welcoming health environment suitable for maternal and child health delivery[cite: 4].
3. **Sustainability Framework:** The combination of trained cadres, structured archiving, physical boundary protection, and heightened community pride established a resilient foundation for long-term operational sustainability[cite: 4].

4. Discussion

4.1. Principal Findings and Synthesis

The primary objective of this community engagement initiative was to transform the operational and physical environment of Posyandu Anyer 10 in Kampung Cigadog, Neglasari Village, Sukabumi Regency, through a participatory restructuring framework. The baseline assessment revealed that despite active monthly attendance, the health post was severely constrained by disorganized spatial layouts, haphazard instrument storage, deteriorated perimeter boundaries, and institutional communication barriers between local leadership and health cadres[cite: 4].

By employing the Participatory Rural Appraisal (PRA) approach, the project achieved three fundamental structural and behavioral milestones[cite: 4]:

1. Reconfiguration of the indoor service floor into an ergonomic, unidirectional five-table workflow (Registration → Measurement → Recording → Counseling → Healthcare Services)[cite: 4];
2. Categorization and hygienic archiving of medical instruments and administrative Maternal and Child Health (KIA) records[cite: 4]; and
3. Mobilization of local social capital (*swadaya*) to construct a handcrafted bamboo perimeter fence, enhancing physical site protection and facility aesthetics[cite: 4].

These empirical outcomes substantiate the core thesis of this study: that physical facility restructuring, when paired with participatory cadre empowerment, directly optimizes primary healthcare service delivery and builds long-term institutional sustainability in rural settings[cite: 4].

4.2. Theoretical Implications: Spatial Ergonomics and Primary Healthcare Mechanics

A critical finding of this project is the direct relationship between spatial layout ergonomics and the efficiency of primary healthcare delivery[cite: 4]. In many rural community posts, physical space is treated as a static, passive backdrop[cite: 4]. However, our findings demonstrate that ad hoc spatial configuration generates significant operational friction[cite: 4]. Prior to the intervention, non-directional participant movement caused bottlenecks during peak morning hours, prolonged waiting times, and compromised confidential interactions during maternal nutrition counseling[cite: 4].

The implementation of the standardized five-table system fundamentally altered the spatial mechanics of Posyandu Anyer 10[cite: 4]. By converting a chaotic, multidirectional participant flow into a streamlined, unidirectional sequence, the physical transit time per participant was dramatically reduced[cite: 4]. This aligns with broader ergonomic literature in clinical operations, which emphasizes that logical spatial design minimizes cognitive load and physical fatigue for health workers, thereby reducing error rates in anthropometric recording and data logging.

Furthermore, the physical separation of the counseling station (Table 4) from the noisy measurement area (Table 2) created a dignified space for interpersonal communication[cite: 4]. In maternal and child health promotion, effective counseling relies heavily on psychological comfort and privacy[cite: 4]. By establishing clear functional boundaries within a small rural facility, cadres were able to conduct health communications more effectively, fostering better parental comprehension regarding infant stunting prevention and nutritional practices[cite: 4].

4.3. Comparative Analysis with Existing Literature

To contextualize the contributions of this study, our findings must be juxtaposed with existing scholarship on primary healthcare optimization, cadre empowerment, and rural community development[cite: 1, 2].

4.3.1. Focus on Spatial Architecture vs. Behavioral Training

The vast majority of existing primary healthcare literature in developing nations focuses primarily on the behavioral, clinical, or cognitive training of community health workers[cite: 1, 2]. Numerous studies evaluate cadre knowledge retention regarding infant growth monitoring or immunization schedules[cite: 4]. While cognitive training is undeniably essential, scholarship frequently overlooks the physical environmental constraints that prevent trained cadres from executing their duties efficiently.

Our findings demonstrate that spatial disorganization acts as an operational bottleneck that neutralizes cadre competency[cite: 4]. No matter how well-trained a cadre is in growth chart plotting, an unorganized system where records take 10 minutes to locate severely impairs service quality[cite: 4]. Thus, this study expands upon current public health literature by proving that physical restructuring and administrative systematic organization

are necessary prerequisites for maximizing the impact of human resource training[cite: 1, 2, 4].

4.3.2. Top-Down Infrastructure vs. Participatory Action (PRA)

Conventional healthcare facility improvements in rural Indonesia often follow a top-down infrastructural model, where government agencies or external contractors deliver standardized physical renovations[cite: 4]. While top-down interventions provide physical capital, they frequently suffer from a lack of local community ownership, leading to rapid facility deterioration once external funding ceases[cite: 4].

In contrast, our project utilized the Participatory Rural Appraisal (PRA) methodology, embedding cadres, village leaders, and local residents as co-creators of the physical transformation[cite: 4]. The collaborative construction of the handcrafted bamboo perimeter fence served as a physical manifestation of local empowerment[cite: 4]. This outcome strongly corroborates classical participatory development theories, which argue that physical infrastructure built through local labor and shared resource contributions (*swadaya*) generates significantly higher psychological ownership and long-term maintenance commitment than turn-key external donations[cite: 4].

4.4. Empowerment, Social Capital, and Gender Dynamics

Beyond physical and operational metrics, the intervention produced profound socio-cultural dynamics within Kampung Cigadog[cite: 4]. Posyandu is inherently a gendered institution in rural Indonesia, managed predominantly by female health cadres and utilized primarily by mothers and young children[cite: 4].

4.4.1. Elevating Cadre Agency and Institutional Respect

Prior to the intervention, cadres often felt constrained by facility limitations, viewing the physical state of the health post as beyond their control[cite: 4]. Through direct participation in spatial re-design, instrument calibration, and administrative systematic archiving, cadres experienced a marked increase in institutional agency and self-efficacy[cite: 4]. They transitioned from passive facility users to active facility managers[cite: 4]. This transformation elevated their social standing within the village, positioning them as competent leaders capable of maintaining primary healthcare standards[cite: 4].

4.4.2. Mobilizing Community Swadaya

The project successfully catalyzed local social capital to overcome resource constraints[cite: 4]. When logistical hurdles arose—such as a shortage of carpentry tools (saws, machetes) or transport limitations along steep rural slopes—the community mobilized local networks to provide equipment, transport alternatives, and refreshment contributions (*swadaya*)[cite: 4]. This collective problem-solving demonstrates that rural communities possess substantial latent social capital that can be tapped to support primary healthcare infrastructure without relying entirely on external municipal budgets[cite: 4].

4.5. Policy Implications and Model Replicability

The operational successes recorded at Posyandu Anyer 10 carry actionable policy implications for local health departments (*Dinas Kesehatan*), village governments (*Pemerintah Desa*), and higher education institutions engaged in community service[cite: 4]:

1. **Integration into Village Budgets (*Dana Desa*):** Village governments should formally allocate a portion of village development funds to support the routine physical maintenance, spatial upkeep, and equipment calibration of Posyandus, recognizing them as essential primary healthcare assets rather than informal temporary gathering spaces[cite: 4].
2. **Standardized Spatial Audits for Rural Health Posts:** Public health authorities (*Puskesmas*) should incorporate physical spatial audits and ergonomic evaluations

into their routine monitoring checklists for rural Posyandus, alongside clinical performance metrics[cite: 4].

3. **Sustainable University-Community Engagement Models:** Higher education institutions should design long-term engagement programs that combine physical facility enhancement with capacity building, moving away from ceremonial, short-term visits toward longitudinal participatory support[cite: 4].

4.6. *Practical Challenges, Limitations, and Risk Mitigations*

In accordance with rigorous scientific reporting standards, several implementation challenges and study limitations must be explicitly acknowledged[cite: 1, 2, 4]:

4.6.1. Operational and Environmental Challenges

- **Geographic and Logistical Impediments:** The steep, unpaved terrain of Kampung Cigadog created severe transport bottlenecks, causing vehicle breakdowns and material delivery delays[cite: 4]. Future projects in similar rural topographies must factor terrain-specific transport contingency plans into early scheduling[cite: 4].
- **Administrative Transition Hurdles:** The recent election of a new neighborhood leader (*Ketua RT*) initially hindered formal coordination due to administrative unfamiliarity[cite: 4]. This was successfully mitigated through direct informal outreach (*silaturahmi*), highlighting the necessity of combining formal administrative procedures with culturally sensitive personal engagement[cite: 4].
- **Workforce Availability Constraints:** Many male villagers work in agriculture or outside the village during weekdays, which initially restricted daytime labor participation[cite: 4]. Adaptive scheduling and indirect contributions (tool loans, food swadaya) effectively mitigated this constraint[cite: 4].

4.6.2. Methodological Limitations

- **Single-Site Case Study:** This project was conducted at a single facility (Posyandu Anyer 10), which may limit the direct statistical generalizability of the empirical findings to urban or structurally distinct health posts[cite: 4].
- **Qualitative and Operational Scope:** Due to time constraints, the evaluation focused primarily on spatial fluidity, facility aesthetics, administrative efficiency, and cadre capacity[cite: 4]. Long-term epidemiological impacts—such as reductions in village stunting rates or infant mortality—were beyond the immediate evaluation window[cite: 4].

4.7. *Future Research Directions*

To build upon the foundation established by this study, future research and community health interventions should focus on[cite: 1, 2, 4]:

1. **Longitudinal Impact Studies:** Conducting multi-year quantitative studies to evaluate whether spatial restructuring and improved counseling privacy directly translate into improved child growth metrics and higher long-term attendance rates[cite: 4];
2. **Digital Integration:** Expanding spatial reorganization to include digital administrative logging (e-Posyandu applications), bridging physical spatial improvements with modern digital health recording[cite: 4]; and
3. **Multi-Site Comparative Frameworks:** Replicating the participatory spatial restructuring model across multiple Posyandus within a district to establish standardized, low-cost architectural guidelines for rural primary healthcare posts[cite: 4].

5. Conclusion

This community engagement project successfully demonstrated that integrating physical facility restructuring with participatory cadre empowerment significantly improves the operational efficiency, environmental quality, and service standards of primary healthcare posts in rural settings. By utilizing a Participatory Rural Appraisal (PRA) framework

at Posyandu Anyer 10 in Kampung Cigadog, Neglasari Village, the initiative effectively addressed critical baseline bottlenecks through the implementation of an ergonomic, unidirectional five-table service flow, systematic medical and administrative archiving, and the collaborative construction of a protective bamboo perimeter fence. These physical enhancements directly streamlined the participant workflow, minimized waiting times, enhanced counseling privacy, and created a cleaner, safer clinical environment for mothers and children. Furthermore, the hands-on capacity building and community-led resource mobilization (*swadaya*) elevated cadre self-efficacy and fostered a strong, lasting sense of local ownership[cite: 4]. Overall, this study provides an adaptable, cost-effective, and sustainable model for local governments, public health authorities, and academic institutions seeking to revitalize rural primary healthcare infrastructure, while highlighting the importance of incorporating quantitative epidemiological metrics and digital health tools in future longitudinal evaluations.

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