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The Role of Quality Statistics in Designing and Evaluating Faith-Based Nutrition Interventions

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ABSTRACT
Stunting remains a major public health concern in Indonesia, particularly in rural communities where nutritional knowledge and access to health services are limited. This community service program, conducted in October 2024 at HKBP Hutaraja Dolok, aimed to address this issue by integrating quality statistical education with faith-based engagement to empower local communities in monitoring and reducing stunting. The program introduced basic statistical tools—including Z-scores, growth chart interpretation, and prevalence analysis—through interactive workshops targeting caregivers, youth, and church leaders. Religious leaders supported the intervention by embedding health messages within spiritual teachings to promote behavioural change. As a result, participants demonstrated improved understanding of child growth indicators, initiated independent height monitoring, and committed to sustained community involvement. The combination of data literacy and religious motivation proved effective in promoting evidence-based practices, reinforcing the value of statistical empowerment within culturally rooted health programs. This model offers a scalable approach to community-driven stunting interventions in faith-based settings.

Keyword: Statistical Literacy, Child Nutrition, Public Health Statistics

1. Introduction

In recent years, the persistent issue of child stunting has remained one of the most critical public health challenges in Indonesia. According to the Indonesian Ministry of Health's 2022 data, the national prevalence of stunting among children under five stood at approximately 21.6%, still above the WHO-recommended threshold of 20%, indicating a public health concern. This condition is particularly acute in rural and socioeconomically disadvantaged communities, where access to nutritious food, health services, and early education remains limited. Stunting is not merely a reflection of chronic undernutrition [1]. It is a multifaceted condition influenced by prolonged nutritional deprivation, repeated infections, inadequate maternal and child care, and environmental factors. Beyond physical growth retardation, stunting has profound implications for a child's cognitive development, school performance, economic productivity, and even their long-term contribution to national development. Consequently, tackling stunting is vital not only for individual well-being but also for the realization of Indonesia Emas 2045, the country's long-term vision of a healthy, productive, and globally competitive generation [2].

Efforts to address stunting must go beyond conventional health and nutrition programs. Increasingly, scholars and policymakers emphasize the need for holistic, community-based interventions that incorporate local wisdom, cultural identity, and religious values. Faith-based organizations, particularly in rural Indonesia, possess significant social capital and moral authority that can influence health behaviors and parenting practices at the grassroots level. Religious institutions are not only spiritual centers but also function as platforms for education, social mobilization, and behavioral transformation [3]. This community service initiative represents such an integrative approach, implemented in alignment with the strategic goals of the Ministry of Religious Affairs of Indonesia, which envisions a "Healthy Indonesia through Religious Moderation and Science-Based Policies". The program embraces the ministry's commitment to promoting religious harmony, human dignity, and social justice while also supporting the national stunting reduction roadmap outlined in the National Medium-Term Development Plan (RPJMN).

The program was carried out in October 2024 at HKBP Hutaraja Dolok, a rural and predominantly Christian community in North Sumatra where the prevalence of child stunting remains considerably high. Local health authorities and community surveys have indicated that stunting in this village is fueled by low nutritional literacy, food insecurity, early marriage, poor sanitation, and a limited understanding of child growth monitoring. Despite these challenges, the strong religious structure and community cohesion presented an opportunity to use faith-based platforms as a catalyst for behavioral change [4].

Figure 1. Community Service Activities at HKBP Hutaraja Dolok

In this context, quality statistics were positioned not only as a technical tool but also as a means of empowerment. The intervention integrated religious messages with statistical training to foster both spiritual and data literacy among caregivers, youth, and religious leaders. Workshops focused on understanding growth charts, interpreting health indicators, and using simple statistical concepts to track nutrition outcomes. Church leaders also incorporated messages of child care, stewardship, and compassion into their sermons and activities, reinforcing the importance of nutrition as a moral and communal responsibility [5]. This community service highlights how quality statistics are applied to design, implement, and evaluate a faith-based nutrition intervention, demonstrating a scalable model for future public health efforts in communities vulnerable to stunting. By combining evidence-based methods with faith engagement, the program not only addresses a pressing nutrition issue but also builds long-term capacity for data-driven decision-making at the community level.

2. Methods

This community service program employed a participatory and data-driven approach to empower local religious communities in addressing child stunting. The activity was held at HKBP Hutaraja Dolok in October 2024 and involved collaboration between academic statisticians, church leaders, local health workers, and caregivers. The methods implemented in this program included:

1. Preliminary Data Collection and Mapping
   A baseline survey was conducted to collect data on child height, weight, and dietary habits within the church community. The data were used to calculate Z-scores and determine stunting prevalence based on WHO standards [6]. Basic household socioeconomic data were also gathered.
2. Statistical Training and Data Literacy Workshop
   Community members, especially youth and mothers, participated in a workshop focused on:
   a. Understanding stunting indicators and growth charts
   b. Basic statistical concepts (mean, median, prevalence)
   c. Interpreting simple graphs and tables to monitor health status
3. Integration of Faith-Based Messaging
   Religious leaders were involved in delivering sermons and community discussions that emphasized the importance of child health and nutrition as a moral and spiritual responsibility, using scriptural references to support behavioral change.
4. Monitoring and Evaluation through Statistical Tools
   Follow-up data were collected post-intervention to measure changes in knowledge, attitudes, and practices (KAP) regarding child nutrition. Descriptive and comparative statistics were applied to evaluate the effectiveness of the intervention.
5. Feedback and Community Involvement
   A community feedback session was held to validate findings and discuss sustainability. Local stakeholders were encouraged to continue data collection and monitoring efforts beyond the program period.

This method ensures that statistical insight becomes a core element in faith-based public health initiatives, enhancing both the credibility and the impact of the interventions.

3. Result and Discussion

The implementation of this community service initiative at HKBP Hutaraja Dolok in October 2024 successfully combined statistical literacy and faith-based community engagement to address the persistent problem of child stunting in the region. This section outlines the outcomes of the program and discusses its implications, particularly through the lens of statistical understanding and local empowerment.

3.1. Statistical Mapping and Stunting Prevalence

Before the intervention began, a rapid nutritional survey was conducted involving 46 children under five years old from families attending HKBP Hutaraja Dolok. Height-for-age Z-scores (HAZ) were calculated based on WHO child growth standards. The results revealed that approximately:

- 32.6% of the children were categorized as stunted (HAZ < -2 SD)
- 10.9% were severely stunted (HAZ < -3 SD)

These figures are significantly higher than both the national average (21.6% in 2022) and the North Sumatra provincial average, which was reported at 25.8% according to the Ministry of Health. Such findings indicate an urgent need for community-level action to combat chronic undernutrition. However, it was also discovered during pre-program interviews that over 75% of caregivers were unfamiliar with the term "stunting" and could not interpret basic child growth charts. Most parents relied on visual assessments or anecdotal comparisons with neighbouring children to judge growth progress.

In response, the program delivered a Seminar and Training on Basic Statistical Tools for Nutrition Monitoring, which was attended by a cross-section of the community including youth, parents, Sunday school teachers, and church leaders. The objectives of the seminar were:

a. To introduce basic statistical terms such as mean, percentage, and Z-score
b. To demonstrate how height-for-age indicators are calculated and interpreted

c. To show how simple graphs (bar charts, growth curves) can communicate health risks clearly

During the training, participants were equipped with template worksheets designed to help them manually record child growth data, convert these measurements into percentiles, and plot Z-scores over time. Facilitators guided the participants through practical exercises that involved identifying nutritional status from growth charts and understanding how deviations from standard growth curves could indicate malnutrition. Additionally, participants were introduced to the use of simple statistical summaries, such as group averages and prevalence rates, to support targeted community interventions—ranging from meal supplementation programs to focused parenting education sessions.

At the end of the session, participants completed a brief evaluation to assess their comprehension and confidence in applying the material. The results were encouraging: 91% of participants were able to correctly interpret a standard child growth chart, 84% could explain the significance of a Z-score falling below -2 (indicating moderate stunting), and 69% expressed confidence in independently monitoring child height and reporting the data to local health cadres or community health volunteers. These outcomes demonstrate that even basic exposure to statistical tools, when delivered in a culturally relevant and faith-integrated context, can significantly enhance the community's capacity to engage in evidence-based health monitoring.

Figure 1. Seminar on Basic Statistics for Community Nutrition at HKBP Hutaraja Dolok

3.2. Visualization of Stunting Prevalence

A distinctive aspect of this program was its integration of faith-based values with scientific learning. Church leaders were involved from the beginning of the design process and helped deliver messages during worship services linking the care of children to spiritual teachings on stewardship, compassion, and justice. For instance, sermons emphasized that safeguarding child health was a form of honoring God's creation, and that parents had both a moral and spiritual obligation to ensure proper nutrition and growth.

The blending of data and doctrine throughout the program fostered a receptive and respectful atmosphere, where scientific understanding and religious values could coexist and reinforce one another. This integrative approach promoted positive behavior change without resistance, as health messages were framed within familiar spiritual teachings. As a result of the intervention, several notable developments were observed within the community. Many parents began initiating monthly height measurements for their children as part of their household routines. At the same time, local youth groups expressed enthusiasm to assist in future data collection initiatives, showing growing ownership of community health efforts. Furthermore, church leaders committed to incorporating growth monitoring education into Sunday school curricula and women's fellowship discussions, ensuring that awareness of child nutrition would continue to be sustained through regular faith-based gatherings. These outcomes underscore the value of positioning health interventions within culturally resonant and spiritually guided spaces.

Figure 2. Group Photo with Community Members after the Faith-Based Nutrition Intervention

To support the statistical training and community awareness process, a bar chart was created to illustrate the distribution of nutritional status among children in HKBP Hutaraja Dolok based on their height-for-age Z-scores. This visualization, derived from pre-intervention survey data, served as a concrete reference during the seminar to help participants better understand the classification of stunting and its severity levels.

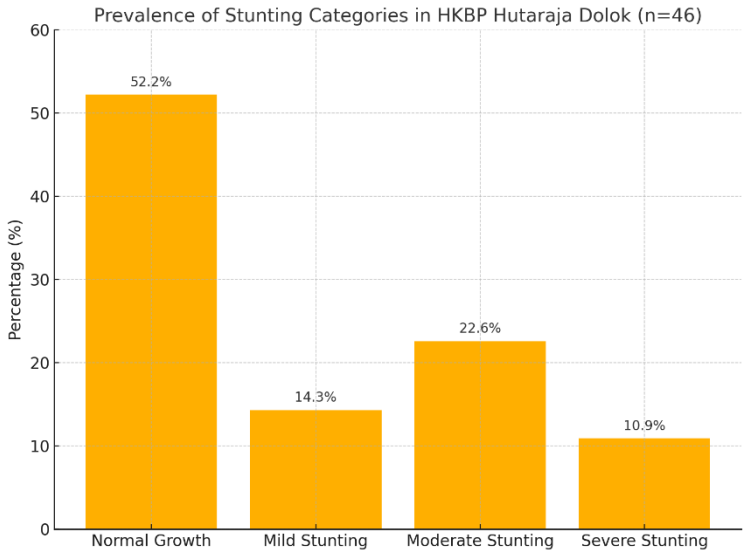

Figure 3. Distribution of Child Growth Categories Based on Z-Scores in HKBP Hutaraja Dolok (n = 46)

As shown in Figure 1, only 52.2% of children were categorized as having normal growth, while 14.3% experienced mild stunting, 22.6% moderate stunting, and 10.9% were identified as severely stunted (HAZ < -3). This means that nearly half (47.8%) of the children in the community experienced some degree of growth faltering, exceeding both national and provincial averages. This graphic was used not only as a data presentation tool but also as an educational instrument during the training. Facilitators explained how Z-score classifications are derived and interpreted, emphasizing the implications of each level of stunting on child development. Participants engaged in discussions about the contributing factors to stunting and proposed local actions to reduce these numbers, such as improved feeding practices and better hygiene.

This program serves as an example of how statistical tools can be democratized to empower non-expert community members in evidence-based health action. By translating complex concepts into visual and faith-relevant narratives, the project not only improved statistical understanding but also promoted grassroots data ownership. Furthermore, the experience at HKBP Hutaraja Dolok underscores the following key findings:

- Community-driven statistics build trust and agency, especially when validated by local moral leaders
- Visual and hands-on tools (growth charts, mapping prevalence) are effective for low-literacy populations
- Combining religious legitimacy with numerical evidence can strengthen adherence to public health recommendations

This integrative approach may be replicated in other rural or faith-based communities facing similar challenges. Moving forward, the use of simple digital dashboards and continuous participatory monitoring can further enhance the sustainability of this model.

4. Conclusion

This community service program at HKBP Hutaraja Dolok shows that integrating basic statistical literacy with faith-based engagement can effectively support stunting reduction efforts in rural areas. By teaching caregivers and local leaders how to interpret growth charts and understand key indicators like Z-scores, the program increased awareness and encouraged evidence-based decision-making. Religious messages helped reinforce the importance of child nutrition as both a health and moral responsibility, making statistical concepts more relatable. The active participation of church leaders and community members highlights the value of combining data and doctrine in public health efforts.

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