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Gender and Regional Disparities in Child Malnutrition in Vietnam: Evidence from National Data

Trinh Thi Thu Trang[1*] and Nguyen Van Quynh[2]
[1]Faculty of Business Administration, Thai Nguyen University of Economic and Business Administration, Vietnam
[2]Faculty of Medicine, Dai Nam University, Hanoi, Vietnam

ABSTRACT

Child malnutrition remains a pressing public health concern in Vietnam, with notable disparities across genders and regions. This study aims to examine the trends and inequalities in malnutrition among children under five between 2017 and 2023. Using secondary data on three key malnutrition indicators—underweight, stunting, and wasting—this research applies descriptive analysis and multiple linear regression models to explore the effects of time, gender, and indicator type on malnutrition prevalence. The findings reveal a gradual decline in overall malnutrition rates over time; however, significant differences persist between male and female children, particularly in stunting and underweight rates. Regional disparities also contribute to the unequal distribution of malnutrition. Regression analysis confirms that indicator type has a statistically significant effect on malnutrition rates, while time and gender effects are less pronounced. These results highlight the need for more targeted, gender-sensitive, and region-specific nutrition interventions to promote equity in child health outcomes in Vietnam.

Keywords: Child malnutrition, Regional disparity, Stunting, Underweight, Wasting, Vietnam

INTRODUCTION

Malnutrition in early childhood remains a pressing public health issue in many low- and middle-income countries, including Vietnam. Despite considerable economic growth and improvements in child health indicators over the past decades, child malnutrition - particularly stunting, wasting, and underweight - continues to affect a significant proportion of children under five years old. These conditions not only impair physical growth and cognitive development but also perpetuate intergenerational cycles of poverty and inequality.

One critical dimension of malnutrition that has received growing attention globally is the role of gender and geographic disparities. Numerous studies have indicated that social and cultural norms, parental preferences, and access to health services can lead to unequal nutritional outcomes between boys and girls. Simultaneously, disparities across urban-rural settings and regions reflect structural inequalities in economic conditions, health infrastructure, and policy implementation. In Vietnam, while national averages on child nutrition have improved, there remains a lack of disaggregated analysis that explores how gender and regional inequalities intersect and influence child malnutrition at the local level.

This study aims to analyze subnational data to assess the extent and patterns of gender and regional disparities in malnutrition among children under five in Vietnam. By doing so, the paper contributes new empirical evidence to the discourse on health equity and offers critical policy implications for more inclusive and localized interventions in child nutrition.

* Corresponding Author

LITERATURE REVIEW

Child malnutrition remains a significant public health concern in Vietnam, despite notable economic advancements and overall improvements in health indicators. The prevalence of malnutrition among children under five has declined over the years; however, disparities persist, particularly along socioeconomic, regional, and ethnic lines.

Socioeconomic and Regional Disparities in Child Malnutrition

Researches indicates that socioeconomic status (SES) is a critical determinant of child malnutrition in Vietnam. Kien et al. (2016) analyzed data from the Multiple Indicator Cluster Surveys (2000–2011) found that while overall malnutrition rates decreased, inequality in child malnutrition increased during this period. The total differential decomposition showed that the biggest and second biggest contributors to the changes in underweight inequalities were age and socioeconomic status, respectively.

Regional disparities are also pronounced. Nguyen and Nguyen (2020) highlighted that the under-five mortality rate in the most disadvantaged regions was three times higher than in the wealthiest regions. The study attributed these disparities primarily to differences in SES and undernutrition rates. Similarly, the World Bank reported that ethnic minority children, particularly those in mountainous and rural areas, suffer disproportionately from undernutrition, with stunting rates among the highest globally.

Gender Disparities in Child Malnutrition

Gender-based differences in child malnutrition have been observed, though findings are mixed. Phuc et al. (2020) indicated that boys are more likely to be stunted or underweight compared to girls. However, Tu et al. (2018) showed that there were no significant differences in stunting by age groups and sex ($p > 0.05$). Some researches indicated that cultural norms and practices may lead to preferential treatment of male children, potentially disadvantaging females in certain contexts. This underscores the need for localized studies to understand gender dynamics in nutrition within specific communities.

Intersection of Gender and Regional Disparities

The interplay between gender and regional factors in child malnutrition is complex. While regional disparities often reflect structural inequalities such as access to healthcare and education, these factors can interact with gender norms to exacerbate malnutrition among specific groups. For example, in certain ethnic minority communities, traditional beliefs may influence feeding practices differently for boys and girls, contributing to gendered nutritional outcomes. However, comprehensive studies focusing explicitly on the intersection of gender and regional disparities in Vietnam are limited, indicating a gap in the current literature.

In summary, while Vietnam has made progress in reducing overall child malnutrition, significant gender and regional disparities persist. Further research is needed to explore the intersection of these factors to inform more nuanced and effective policy interventions.

METHODOLOGY

This study applied a quantitative research approach, employing descriptive statistics and inferential analysis to examine gender and regional disparities in child malnutrition in Vietnam.

Secondary data sources: reports from Vietnam General Statistics Office (GSO) and Ministry of Health reports, including the Vietnam National Nutrition Survey (2020), and Provincial Health Statistics from 2017 to 2023.

The dependent variable is the prevalence of undernutrition among children under five, measured by key indicators such as stunting (height-for-age), wasting (weight-for-height), and

underweight (weight-for-age). Independent variables include gender (male/female), region (urban/rural and by province), and socio-economic factors where available.

The analysis is structured in two main steps:

- Descriptive analysis is used to identify patterns and levels of child malnutrition across gender and geographical regions, highlighting disparities among provinces and between rural and urban settings.

- Assess the overall influence of time, gender, and indicator type on malnutrition rates, a multiple linear regression model was implemented using SPSS:

The dependent variable was VALUE (malnutrition rate), and the independent variables included:

- YEARNUM: a numerical representation of the year
- GENDER: binary coded (Male = 1, Female = 0)
- INDICATOR: categorical variable representing underweight, stunting, and wasting.

The linear regression was conducted using the Enter method in SPSS to include all variables simultaneously. Model diagnostics such as R-squared, ANOVA, and collinearity statistics were examined to assess model fit and multicollinearity.

Ethical approval was not required as the study uses public secondary data.

FINDINGS

Descriptive Analysis

Gender disparities in malnutrition

The analysis of malnutrition rates by gender from 2017 to 2021 reveals consistent disparities between male and female children under five across three key indicators: underweight (weight-for-age), stunting (height-for-age), and wasting (weight-for-height).

Table 1: Disparities in malnutrition by gender in Vietnam (2017-2021)

Year	Underweight		Stunting		Wasting	
	Male	Female	Male	Female	Male	Female
2017	13.7	13.0	24.9	22.6	6.9	5.8
2018	14.2	12.5	24.6	23.0	6.5	5.7
2019	12.5	12.0	21.6	23.1	4.7	5.4
2020	11.7	11.3	18.6	20.6	3.7	4.3
2021	11.3	11.0	18.3	20.1	3.4	4.0

Underweight:

From 2017 to 2021, male children consistently showed slightly higher underweight prevalence compared to females. For example, in 2017, the rate was 13.7% for males and 13.0% for females. This gap persisted across the years, with 11.3% of boys underweight in 2021 compared to 11.0% of girls. While the difference appears small (ranging 0.3%-1.2%), it was consistently in favor of girls, suggesting potential gender-based vulnerability in nutritional status for boys.

Stunting:

Stunting remains the most prevalent form of malnutrition and shows a mixed trend. Interestingly, in 2017 and 2018, stunting was higher among boys (24.9% and 24.6%, respectively) than girls (22.6% and 23.0%). However, in 2019, the trend reversed with 23.1% of girls stunted compared to 21.6% of boys. By 2021, the rate is 18.3% for males and 20.1% for females, indicating a rising trend among girls and a steady decline among boys. This shift

may point to differential access to nutrition or health care, or differences in social norms affecting feeding practices.

Wasting:

Wasting, an indicator of acute malnutrition, also shows a gender gap favoring females. In 2017, the prevalence was 6.9% for boys and 5.8% for girls, and this difference remained consistent over time. By 2021, the gap was also reversed, with 3.4% among males and 4.0% among females. The declining trend in wasting for both genders is promising, yet it highlights a continued need to address acute nutritional deficiencies, especially in female children.

Overall, boys appear to be more vulnerable to underweight in most years, while trends in stunting and wasting are more complex and show emerging disadvantages for girls in recent years. These findings point to the necessity of gender-sensitive interventions in Vietnam's child nutrition policies. Understanding the underlying causes—whether biological, social, or economic—will be essential for designing effective programs to close the gender gap in child malnutrition.

Between 2017 and 2022, the proportion of underweight male children remained consistently higher than females, with 11.3% of boys affected in 2022 compared to 11% of girls. Similarly, stunting prevalence among boys reached 20.6% in 2022, slightly higher than the 20.1% recorded for girls.

Wasting (weight-for-height), a key indicator of acute malnutrition, also exhibited a gender gap. In 2022, 3.7% of boys were wasted compared to 3.4% of girls. These gaps, although modest in numerical terms, were consistent across years and reflect systematic vulnerabilities among male children that may be influenced by biological, cultural, or care-related factors.

Regional disparities in malnutrition

The malnutrition situation among children under five in Vietnam continues to show considerable disparities between regions across all three forms of undernutrition: underweight, stunting, and wasting. The data from 2021 to 2023 indicated that the national average malnutrition tends to improve slightly but significant regional inequalities persist.

Table 2: Disparities in malnutrition by region in Vietnam (2021-2023)

Region	Underweight			Stunting			Wasting		
	2021	***2022***	***2023***	***2021***	***2022***	***2023***	***2021***	***2022***	***2023***
Whole Country	11.2	11.2	9.7	19.2	19.2	18.2	3.6	3.6	4.4
Red River Delta	8.5	8.5	8.8	18.0	18.0	16.8	5.0	5.0	4.4
Northern Midland and Mountain	15.4	15.4	14.0	25.3	25.3	24.8	7.1	7.1	5.8
North and Central Coast	12.6	12.6	12.7	22.4	22.4	20.8	6.1	6.1	5.9
Central Highlands	17.1	17.1	16.2	27.0	27.0	25.9	6.7	6.7	7.1
Mekong Delta	10.2	10.2	9.3	20.3	20.3	18.7	5.6	5.6	5.6

Underweight:

The national average of underweight prevalence decreased from 11.2% in 2021 and 2022 to 9.7% in 2023. However, regional variation remains stark. The Central Highlands and the Northern Midland and Mountainous region consistently recorded the highest underweight rates throughout the period, with 17.1% and 15.4% in 2022 respectively, and 16.2% and 14.0% in 2023 - both above the national average.

Conversely, the Red River Delta maintained the lowest underweight prevalence, at 8.5% in 2021-2022, rising slightly to 8.8% in 2023, still lower than the national mean. The

Mekong Delta also remained relatively stable and low, improving from 10.2% to 9.3% over the period.

Stunting:

Stunting, a reflection of chronic malnutrition, remains the most prevalent and persistent issue. The national average slightly improved from 19.2% in 2021–2022 to 18.2% in 2023. Nonetheless, Central Highlands and Northern Midland and Mountainous areas continued to show alarmingly high rates: around 25.3–27.0% between 2021 and 2023.

In contrast, the Red River Delta again performed the best, with stunting rates stable at 18.0%, slightly improving to 16.8% in 2023. These figures suggested better long-term nutritional support in lowland and urbanized areas compared to highland, remote regions.

Wasting:

Wasting prevalence—often linked to acute food shortages or illness—showed a concerning trend. Although the national average rose from 3.6% (2021–2022) to 4.4% in 2023, many regions saw a sharper increase. Most notably, the Central Highlands rose to 7.1% in 2023, and the North and Central Coast reached 5.9%, both significantly higher than the national rate.

While Northern Midland and Mountainous areas showed a slight decline in wasting from 7.1% (2021–2022) to 5.8% in 2023, the prevalence remains among the highest in the country, highlighting continued vulnerabilities.

Table 3: Summary of regional patterns in malnutrition in Vietnam

Region	Consistently High Risks	Improving Trends
Central Highlands	High in all three forms (esp. stunting and wasting)	Slight reduction in underweight
Northern Midland & Mountain	High stunting & underweight	Small improvement in wasting
North and Central Coast	Moderately high in 3 forms (esp. stunting and wasting)	Slight increase in underweight
Red River Delta	Lowest across all indicators	Continued improvement
Mekong Delta	Moderate levels; stable trend	Improvement in stunting

These patterns confirm that malnutrition in Vietnam is not evenly distributed, and policy interventions must prioritize highland, remote, and socio-economically disadvantaged areas to close the nutrition gap. Regional nutrition programs, integrated with healthcare access and education for parents, especially mothers, should be customized to tackle persistent disparities.

Regression Analysis

The linear regression analysis examined the influence of year, gender, and malnutrition indicator type on child malnutrition rates in Vietnam from 2017 to 2021.

Table 4: Linear regression results for child malnutrition rates in Vietnam (2017-2021)

Predictor	Unstandardized Coefficient (B)	Std. Error	Standardized Coefficient (Beta)	t-value	Sig. (p-value)
(Constant)	23.228	5.521	–	4.207	.000
Year (YEARNUM)	-0.898	0.862	-0.181	-1.042	.307
Gender	-0.147	2.439	-0.010	-0.060	.953
Indicator Type	-3.640	1.493	-0.424	-2.437	.022*

The model accounted for approximately 21.3% of the variation in malnutrition rates (R^2 = 0.213). Among the predictors, only the type of malnutrition indicator showed a statistically significant effect (p = 0.022), indicating notable differences between underweight, stunting, and wasting. Specifically, stunting and wasting had significantly lower prevalence compared to underweight, controlling for time and gender. The year variable indicated a decreasing trend in malnutrition over time (B = -0.898), though this trend was not statistically significant (p = 0.307). Gender differences were negligible (p = 0.953). These results suggest that while overall malnutrition shows a downward tendency, targeted strategies should focus on addressing specific types of malnutrition, especially underweight, which remains comparatively higher.

DISCUSSION

The study provides updated insights into the gender and regional disparities in child malnutrition in Vietnam from 2021 to 2023. Despite moderate national progress in reducing malnutrition indicators, significant inequalities persist, especially among highland regions and between genders. These findings are consistent with and extend previous research on malnutrition in Vietnam, while also revealing emerging patterns that deserve further attention.

Gender Disparities

Our findings indicate that male children consistently experienced higher rates of underweight and wasting compared to females, aligning with earlier studies such as UNICEF (2020), which reported that boys are biologically more vulnerable to infections and growth faltering in early childhood. This vulnerability may stem from higher energy requirements and susceptibility to inflammatory diseases, which directly affect weight-related indicators.

Interestingly, our analysis shows a reversal in stunting trends: while boys had higher stunting rates in earlier years (2017–2018), by 2021, girls began to surpass boys in this indicator. This shift contradicts some previous reports (e.g., Nguyen & Kam, 2020), which consistently found stunting to be more prevalent among boys. The recent trend may reflect underlying socio-cultural norms, where gender-biased caregiving or unequal intra-household food allocation could be contributing to rising stunting among girls. This calls for more qualitative and ethnographic research to explore gender dynamics in child feeding and care practices in different regions of Vietnam.

Regional Disparities

The pronounced disparities between regions mirror patterns observed in past literature. For instance, studies by Tran et al. (2018) and the World Bank (2019) emphasized that children in Northern Midland and Mountainous areas and the Central Highlands consistently face higher malnutrition rates due to limited access to healthcare, lower maternal education levels, and ethnic minority status. Our results reaffirm these findings, as these two regions recorded the highest prevalence of underweight, stunting, and wasting across all years.

Meanwhile, the Red River Delta and Mekong Delta continue to show relatively better outcomes, which is consistent with the findings of UNICEF (2020). These regions benefit from better infrastructure, economic opportunities, and health service coverage, demonstrating how socio-economic development directly influences nutritional outcomes.

Moreover, our study provides updated evidence of positive trends in certain areas, such as the reduction in wasting in the Northern Midland and Mountainous region from 7.1% in 2021–2022 to 5.8% in 2023. This improvement may reflect the impact of targeted interventions under the National Nutrition Strategy 2011–2020 and its extension to 2030, which prioritized high-risk areas. However, the increasing wasting rates in the Central Highlands (up to 7.1% in 2023) are concerning and suggest new forms of acute food insecurity or disease outbreaks,

possibly linked to climate variability, migration, or healthcare disruptions during the COVID-19 period.

Policy Implications

The persistence of regional and gender disparities suggests that "one-size-fits-all" national nutrition policies are insufficient. Instead, there is a pressing need for localized, equity-focused interventions that consider the unique socio-economic, cultural, and geographic characteristics of vulnerable populations. These may include:

- Community-based nutrition education programs tailored for ethnic minorities and rural populations.
- Increased investment in maternal and child health services in remote and highland areas.
- Monitoring and early warning systems for acute malnutrition (wasting), especially in disaster-prone or food-insecure regions.
- Moreover, integrating nutrition efforts with poverty alleviation, food security, and women's empowerment strategies will be essential to sustainably reduce malnutrition disparities in the long term.

CONCLUSION

This study highlights persistent gender and regional disparities in child malnutrition in Vietnam. While overall malnutrition rates have declined slightly, boys remain more vulnerable to underweight and wasting, and recent trends show a concerning rise in stunting among girls. Regionally, children in the Central Highlands and Northern Midland and Mountainous areas continue to face the highest levels of undernutrition, in contrast to more favorable outcomes in the Red River and Mekong Deltas.

These findings underscore the need for targeted nutrition interventions that are both gender-sensitive and region-specific. Policymakers should prioritize resource allocation to disadvantaged regions and integrate nutrition support with maternal education and healthcare access to effectively reduce inequalities in child health.

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