

THE RELATIONSHIP BETWEEN EARLY MARRIAGE AND STUNTING IN POPAYATO DISTRICT, POHUWATO REGENCY

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ABSTRACT

Early marriage has been recognized as a potential social determinant of child malnutrition; however, evidence regarding its relationship with stunting remains inconsistent. This study aimed to examine the relationship between early marriage and stunting among children under five years of age in Popayato District, Pohuwato Regency, Indonesia. A quantitative analytical study with a cross-sectional design was conducted among 22 mothers of children with stunting using total sampling. Data were collected through structured interviews and anthropometric measurements. Maternal age at first marriage was categorized as ≤ 19 years (early marriage) and > 19 years (mature-age marriage). Children's nutritional status was assessed using the World Health Organization Child Growth Standards based on Weight-for-Age (WAZ) and Height-for-Age (HAZ) Z-scores. Data were analyzed descriptively, and the Chi-square test was used to determine the association between early marriage and stunting. Among the respondents, 63.6% were married at or before 19 years of age. Most mothers had junior high school education (45.5%) and were housewives (86.4%). Based on WAZ, 50.0% of children were severely underweight and 40.9% were underweight. No significant association was found between maternal age at marriage and children's nutritional status based on WAZ ($p = 0.117$) or HAZ ($p = 0.333$). Early marriage was common among respondents but was not significantly associated with stunting. These findings suggest that stunting is influenced by multiple interacting factors beyond maternal age at marriage, highlighting the need for comprehensive interventions targeting maternal education, nutrition, and healthcare access.

INTRODUCTION

Stunting remains one of the most critical public health and nutrition challenges worldwide, particularly in low- and middle-income countries. It is a chronic condition resulting from prolonged undernutrition during the first 1,000 days of life and is characterized by impaired linear growth, with children exhibiting a height-for-age below the World Health Organization (WHO) growth standard. Beyond its impact on physical growth, stunting has profound long-term consequences, including impaired cognitive development, reduced educational attainment, lower economic

productivity, and an increased risk of chronic diseases in adulthood [1]. Globally, approximately 144 million children under five years of age are affected by stunting, with the highest burden concentrated in South Asia and sub-Saharan Africa, where poverty, food insecurity, inadequate sanitation, and limited healthcare services continue to hinder child growth and development [2][3].

Indonesia continues to face a substantial burden of stunting despite notable improvements in recent years. According to the Indonesian Nutrition Status Survey (SSGI), the national

prevalence of stunting declined from 24.4% in 2021 to 21.6% in 2022. Nevertheless, this prevalence remains above the threshold established by the WHO, indicating that stunting continues to represent a major public health concern. Considerable regional disparities also exist across the country. In Gorontalo Province, the prevalence of stunting reached 23.8% in 2022, while Gorontalo Regency reported the highest prevalence (30.8%) and Pohuwato Regency the lowest (6.4%). Although these findings indicate encouraging progress, the persistence of stunting suggests that multiple underlying determinants remain inadequately addressed, requiring comprehensive interventions targeting both nutritional and social factors.

Stunting is a multifactorial condition influenced by inadequate maternal nutrition, poor infant feeding practices, recurrent infections, low birth weight, poor sanitation, limited access to healthcare, and unfavorable socioeconomic conditions [1]. Increasing evidence also identifies early marriage as an important social determinant that indirectly contributes to child malnutrition. Early marriage, commonly defined as marriage before 18 years of age, remains prevalent in many developing countries, including Indonesia, and is frequently associated with poverty, limited educational attainment, gender inequality, and restricted access to reproductive health services [4][5]. These circumstances often perpetuate intergenerational cycles of disadvantage that adversely affect maternal and child health outcomes.

The relationship between early marriage and stunting can be explained through interconnected biological and socioeconomic pathways. Biologically, girls who marry early are more likely to

experience adolescent pregnancy before achieving complete physical and reproductive maturity. Adolescent mothers are at greater risk of maternal undernutrition, anemia, pregnancy complications, preterm delivery, and low birth weight, all of which substantially increase the likelihood of growth failure and subsequent stunting among their children [6][7]. Furthermore, adolescent mothers generally have higher nutritional requirements due to their own ongoing growth, creating competition for nutrients between the mother and fetus and consequently increasing the risk of fetal growth restriction.

From a socioeconomic perspective, early marriage frequently interrupts formal education and reduces employment opportunities, limiting women's economic independence and household income [4][8]. Reduced educational attainment is associated with poorer maternal knowledge regarding nutrition, breastfeeding, complementary feeding, hygiene practices, and child healthcare utilization. Consequently, children born to mothers who married early often experience suboptimal childcare practices and inadequate nutritional intake, thereby increasing their vulnerability to stunting [9]. Previous qualitative research has also demonstrated that early-married women frequently encounter barriers in accessing maternal healthcare and nutritional information because of limited autonomy and decision-making power within households [10].

Several studies have reported a significant association between early marriage and impaired child growth. Efevbera et al. [11], demonstrated that child marriage is associated with poorer early childhood development and increased risk of stunting through

maternal, household, and socioeconomic mechanisms. Similarly, Wells et al. [7], found that younger maternal age at marriage and first pregnancy significantly increased the likelihood of infant undernutrition in rural Nepal. However, other studies have suggested that the association may diminish after controlling for household socioeconomic status, maternal education, and access to healthcare, indicating that the relationship between early marriage and stunting is complex and context dependent [6][10]. These inconsistent findings indicate that biological and socioeconomic pathways may interact differently across populations and cultural settings.

Despite growing evidence regarding the adverse consequences of early marriage, several research gaps remain. Most previous studies have primarily examined either maternal characteristics or household socioeconomic conditions without simultaneously considering the interconnected biological and socioeconomic mechanisms linking early marriage to child stunting. In addition, relatively few studies have explored this relationship within the Indonesian context, particularly in districts where the prevalence of early marriage remains relatively high despite declining stunting rates. Pohuwato Regency, Gorontalo Province, represents an important setting for such investigation because, although it reports one of the lowest stunting prevalences in the province, early marriage continues to occur in a considerable number of families. Understanding whether early marriage remains associated with child stunting within this context may provide valuable evidence for designing integrated maternal and child health interventions.

Therefore, this study aims to examine the relationship between early marriage and the incidence of stunting among children under five years of age in Popayato District, Pohuwato Regency, Gorontalo Province. By investigating this relationship, the study seeks to provide evidence supporting policies that integrate adolescent reproductive health, delayed age at marriage, maternal nutrition improvement, and child nutrition programs as complementary strategies to accelerate stunting reduction in Indonesia.

Literatur Review

Early Marriage and Stunting: Theoretical Perspectives

Stunting is a multifactorial public health problem resulting from chronic undernutrition during the first 1,000 days of life. Recent literature suggests that the relationship between early marriage and stunting can be explained through interconnected biological, socioeconomic, and cultural pathways. From a life-course perspective, women who marry during adolescence often enter pregnancy before achieving full physical and reproductive maturity, increasing the likelihood of adverse maternal and child health outcomes. Family-centered nursing theory further emphasizes that maternal education, reproductive preparedness, family planning, and parental caregiving collectively influence children's nutritional status. Gender-based perspectives also argue that limited female autonomy and decision-making capacity following early marriage reduce women's ability to access healthcare, nutrition, and childcare resources, thereby increasing children's vulnerability to stunting [12][9][13].

Biological Pathways Linking Early Marriage and Stunting

One of the primary mechanisms connecting early marriage with stunting is

adolescent pregnancy. Adolescents experience ongoing physical growth, creating competition for nutrients between maternal development and fetal growth. Consequently, pregnancies occurring during adolescence are associated with maternal undernutrition, anemia, inadequate gestational weight gain, preterm birth, fetal growth restriction, and low birth weight, which are recognized predictors of childhood stunting [14][15]. Furthermore, adolescent mothers are more likely to receive inadequate antenatal care and have limited knowledge regarding optimal maternal nutrition, breastfeeding, and complementary feeding practices, further increasing the risk of impaired child growth [6].

Evidence from Indonesia indicates that children born to adolescent mothers are substantially more likely to experience stunting than those born to adult mothers. Maknun et al. [14], reported that adolescent pregnancy increased the likelihood of stunting by approximately 3.4 times among children aged 12–24 months. Similarly, Simbolon and Riastuti [16], using Indonesian Family Life Survey data, found significantly higher stunting prevalence among children of mothers who married during adolescence compared with those who married at adulthood.

Socioeconomic Pathways

Beyond biological mechanisms, early marriage contributes to stunting through multiple socioeconomic pathways. Early marriage frequently interrupts formal education, restricts employment opportunities, and reduces household income. Women who marry early often possess lower educational attainment, resulting in limited health literacy and reduced awareness regarding nutrition, childcare, sanitation, and disease prevention. These conditions

increase children's exposure to inadequate dietary intake, infectious diseases, and poor caregiving practices, all of which contribute to chronic growth failure [17][13].

Economic disadvantage further limits access to nutritious food, quality healthcare, and essential maternal services. Studies consistently demonstrate that maternal education and household socioeconomic status are among the strongest protective factors against childhood stunting. Mothers with higher educational attainment are more likely to adopt appropriate infant feeding practices, utilize healthcare services, and maintain healthier household environments, thereby reducing children's risk of stunting [17].

Maternal and Child Nutrition

Maternal nutritional status before and during pregnancy plays a crucial role in determining fetal growth and subsequent child nutritional outcomes. Children born to adolescent mothers frequently experience inadequate breastfeeding practices, delayed complementary feeding, and poor dietary diversity because young mothers often lack sufficient nutritional knowledge and parenting experience [12]. Consequently, maternal malnutrition and inadequate infant feeding become important mediators between early marriage and childhood stunting.

Recent intervention studies emphasize that improving adolescent girls' nutritional status before pregnancy can substantially reduce future stunting. Strategies including micronutrient supplementation, balanced dietary intake, nutrition education, and reproductive health counseling have demonstrated considerable potential for improving maternal nutritional status and supporting optimal fetal growth [18]. Therefore,

nutritional interventions should begin during adolescence rather than only after pregnancy has occurred.

Adolescent Pregnancy as a Critical Determinant

Adolescent pregnancy represents one of the strongest mediating factors linking early marriage with stunting. Young mothers frequently experience psychological immaturity, limited parenting skills, and inadequate reproductive health knowledge, all of which negatively affect child feeding and caregiving behaviors. Pangaribuan et al. [19], reported a significant relationship between early marriage, adolescent pregnancy, and stunting among toddlers in Indonesia, suggesting that delaying pregnancy may substantially reduce childhood growth failure.

Comparative analyses from Tanzania similarly demonstrated that children born to adolescent mothers experienced higher risks of low birth weight and subsequent stunting than children born to older mothers, even after adjusting for several socioeconomic factors [15]. These findings reinforce the importance of preventing adolescent pregnancy as part of comprehensive stunting reduction strategies.

Determinants of Stunting Among Early-Married Women

The literature identifies several determinants that modify the relationship between early marriage and stunting. Maternal age at marriage, maternal education, household income, family planning utilization, parenting behavior, healthcare access, and women's decision-making autonomy consistently emerge as important predictors of child nutritional status [9][13]. Cultural practices may further influence these relationships. For example, Vishwakarma et al. [20] demonstrated that certain traditional

marriage practices were associated with increased childhood stunting through complex interactions involving poverty, maternal health, and household characteristics.

Family planning behavior also plays a significant role. Nur et al. [9], found that among early-married couples, effective family planning practices and appropriate infant care behaviors significantly reduced the likelihood of stunting, indicating that behavioral interventions may partially mitigate the adverse consequences of early marriage.

RESEARCH METHODS

Research Design

This study employed a quantitative analytical observational design using a cross-sectional approach to examine the relationship between early marriage and the incidence of stunting among children under five years of age [21].

Study Setting and Population

The study was conducted in Popayato District, Pohuwato Regency, Gorontalo Province, Indonesia. The study population consisted of mothers who had children identified as stunted and resided in the study area.

Sample and Sampling Technique

A total of 22 mothers participated in this study. Respondents were selected using a total sampling technique, in which all mothers who met the inclusion criteria during the study period were included as research participants.

Research Variables

The independent variable was early marriage, defined as maternal age at first marriage and categorized into:

1. Early marriage: ≤ 19 years.
2. Mature-age marriage: > 19 years.

The dependent variable was stunting status, determined through

anthropometric assessment based on the WHO Child Growth Standards.

Data Collection

Primary data were collected through structured interviews and anthropometric measurements.

Information obtained included:

1. Maternal characteristics (age, educational level, occupation, and number of children).
2. Maternal age at first marriage.
3. Child characteristics (age, body weight, and body length/height).

Body weight was measured using a calibrated digital weighing scale, while body length or height was measured using an infantometer or stadiometer according to the child's age.

Measurement of Nutritional Status

Children's nutritional status was assessed using the World Health Organization (WHO) Child Growth Standards by calculating:

1. Weight-for-Age Z-score (WAZ/BB-U), classified as severe underweight (<-3 SD), underweight (-3 SD to <-2 SD), normal (-2 SD to $+2$ SD), and overweight ($>+2$ SD).
2. Height-for-Age Z-score (HAZ/TB-U or PB-U), classified as very short (stunted) and normal according to WHO reference values.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics were used to summarize respondents' characteristics and study variables using frequencies and percentages. The relationship between maternal age at marriage and children's nutritional status based on Weight-for-Age (BB/U) and Height-for-Age (TB/U or PB/U) was analyzed using the Chi-square test. Statistical significance was established at

a 95% confidence level, with $p < 0.05$ indicating a statistically significant association.

RESEARCH RESULT

Respondent Characteristics

Table 1. Characteristics of Respondents

Variable	Category	n	%
Maternal age at marriage	Early adolescence (12–16 years)	0	0.0
	Late adolescence (17–25 years)	17	77.3
	Early adulthood (26–35 years)	5	22.7
Educational level	Elementary school	4	18.2
	Junior high school	10	45.5
	Senior high school	8	36.4
Occupation	Housewife	19	86.4
	Farmer	2	9.1
	Laundry worker	1	4.5
Number of children	One child	12	54.5
	Two children	9	40.9
	Three children	0	0.0
	Four children	1	4.5

Table 1 presents the demographic characteristics of the 22 participating mothers who had children identified as stunted. Most respondents were married during late adolescence (17–25 years), accounting for 17 respondents (77.3%), while 5 respondents (22.7%) married during early adulthood (26–35 years). None of the respondents were married during early adolescence (12–16 years).

Regarding educational attainment, junior high school was the most common level of education, representing 10 respondents (45.5%), followed by senior high school (8 respondents; 36.4%) and elementary school (4 respondents; 18.2%). In terms of occupation, the majority were housewives (19 respondents; 86.4%), while the remaining respondents worked as farmers (9.1%) and laundry workers (4.5%). More than half of

the respondents (54.5%) had one child, whereas 40.9% had two children and only 4.5% had four children.

Distribution of Early Marriage

Table 2. Distribution of Respondents Based on Age at Marriage

Age at Marriage	n	%	Category
≤19 years	14	63.6	Early marriage
>19 years	8	36.4	Mature-age marriage
Total	22	100.0	

Table 2 shows that 14 respondents (63.6%) were married at ≤19 years of age, which was categorized as early marriage, whereas 8 respondents (36.4%) married after the age of 19 years and were classified as having married at a mature age. These findings indicate that early marriage was relatively common among the mothers included in this study.

Distribution of Children by Age

Table 3. Distribution of Children by Age

Child's Age	n	%
0–24 months	5	22.7
25–60 months	17	77.3
Total	22	100.0

As presented in Table 3, the majority of children were aged 25–60 months, comprising 17 children (77.3%), while 5 children (22.7%) were aged 0–24 months. This finding indicates that most stunting cases were identified among children older than two years.

Distribution of Children by Height/Length

Table 4. Distribution of Children Based on Height/Length

Height/Length	n	%
0–50 cm	4	18.2
51–100 cm	18	81.8
>100 cm	0	0.0
Total	22	100.0

Table 4 demonstrates that 18 children (81.8%) had a body length/height ranging from 51–100 cm, whereas 4 children (18.2%) measured between 0–50

cm. No child had a body length or height exceeding 100 cm.

Distribution of Children by Body Weight

Table 5. Distribution of Children Based on Body Weight

Weight	n	%
0–5 kg	2	9.1
6–10 kg	17	77.3
11–15 kg	3	13.6
Total	22	100.0

Based on Table 5, the majority of children (17 respondents; 77.3%) had a body weight between 6 and 10 kg, followed by 3 children (13.6%) weighing 11–15 kg, and 2 children (9.1%) weighing 0–5 kg.

Nutritional Status Based on Weight-for-Age (WAZ)

Table 6. Nutritional Status Based on Weight-for-Age (WAZ/BB-U)

Nutritional Status	Z-score	n	%
Severely underweight	<-3 SD	11	50.0
Underweight	-3 SD to <-2 SD	9	40.9
Normal	-2 SD to +2 SD	2	9.1
Overweight	>+2 SD	0	0.0
Total		22	100.0

The nutritional status assessment based on the Weight-for-Age (WAZ/BB-U) Z-score revealed that 11 children (50.0%) were classified as severely underweight, while 9 children (40.9%) were categorized as underweight. Only 2 children (9.1%) had normal nutritional status, and none were classified as overweight. Overall, these findings indicate that the majority of children in the study experienced poor nutritional status.

Association Between Early Marriage and Stunting

Table 7. Association Between Early Marriage and Stunting

Age at Marriage	Severely Underweight	Underweight	Normal	p-value
≤19 years	8	2	1	

19 years	0	3	0	
>19 years	3	4	1	0.17

The relationship between maternal age at marriage and children's nutritional status was analyzed using nutritional indicators based on Weight-for-Age (WAZ/BB-U) and Height-for-Age (HAZ/TB-U or PB-U).

Based on the Weight-for-Age (WAZ) indicator, mothers who married before the age of 19 years had 8 severely underweight children, 2 underweight children, and 1 child with normal nutritional status. Meanwhile, among mothers who married after the age of 19 years, 3 children were severely underweight, 4 were underweight, and 1 had normal nutritional status. Statistical analysis showed no significant association between early marriage and nutritional status based on WAZ ($p = 0.117$).

Similarly, analysis using the Height-for-Age (HAZ/PB-U or TB-U) indicator demonstrated that most children were classified as very short (stunted) regardless of maternal age at marriage. Mothers who married before the age of 19 years had 9 stunted children and 2 children with normal stature, while mothers who married after the age of 19 years had 20 stunted children and 2 children with normal stature. The statistical test also indicated no significant relationship between early marriage and stunting based on HAZ ($p = 0.333$).

Overall, the findings suggest that maternal age at marriage was not significantly associated with the incidence of stunting among children in Popayato District, Puhwato Regency ($p > 0.05$). Although a relatively high proportion of respondents had experienced early marriage, the statistical analysis indicates that early marriage alone did not

significantly influence children's nutritional status or linear growth within the study population.

DISCUSSION

Respondent Characteristics and Their Potential Influence on Stunting

The present study found that most mothers were married during late adolescence (17–25 years), had junior high school education, were predominantly housewives, and had one child. These characteristics reflect a population with relatively limited educational attainment and economic productivity, both of which have consistently been identified as determinants of child nutritional status. Although educational level was not statistically analyzed as an independent variable in this study, previous research has demonstrated that mothers with lower educational attainment generally possess less knowledge regarding maternal nutrition, infant feeding practices, growth monitoring, and healthcare utilization, thereby increasing children's vulnerability to malnutrition and growth failure.

Socioeconomic limitations may further compound these risks. Women who marry at a young age frequently discontinue formal education, resulting in reduced employment opportunities and household income. Consequently, access to nutritious foods, quality antenatal services, and child healthcare may become restricted. Krisnana et al. [17], reported that maternal education and socioeconomic status were among the strongest predictors of stunting in children under five. Similarly, Efevbera et al. [11], argued that the adverse effects of child marriage on child growth are largely mediated through maternal education, household wealth, and women's

empowerment rather than chronological age alone.

Early Marriage Among Respondents

Approximately two-thirds (63.6%) of respondents experienced early marriage (≤ 19 years), indicating that early marriage remains relatively common in the study area. This finding is consistent with evidence from Indonesia showing that child marriage remains prevalent in several rural districts because of cultural norms, economic hardship, and limited educational opportunities.

From a biological perspective, adolescent marriage often leads to adolescent pregnancy before maternal physical growth has been completed. Competition for nutrients between the growing mother and fetus may increase the risks of low birth weight, preterm birth, and impaired fetal growth, all of which are recognized predictors of childhood stunting. Pangaribuan et al. [19], reported that adolescent pregnancy significantly increased the probability of stunting among toddlers, while Maknun et al. [14], found that children born to adolescent mothers were more than three times as likely to experience stunting compared with children born to adult mothers.

Nevertheless, biological vulnerability alone does not inevitably result in stunting. Adequate maternal nutrition, quality antenatal care, appropriate infant feeding practices, and supportive family environments can substantially reduce these risks, suggesting that early marriage functions primarily as an indirect risk factor rather than a direct determinant.

Nutritional Status of Children

The nutritional assessment revealed that half of the children were classified as severely underweight, while an additional 40.9% were underweight

according to the Weight-for-Age (WAZ) indicator. These findings indicate that poor nutritional status remains a considerable public health concern among children in the study area.

Poor nutritional outcomes during early childhood are generally multifactorial, involving inadequate dietary intake, repeated infectious diseases, poor sanitation, maternal undernutrition, and suboptimal caregiving practices. The World Health Organization recognizes that chronic nutritional deficiencies occurring during the first 1,000 days of life have irreversible consequences for linear growth and cognitive development. Recent reviews likewise emphasize that stunting rarely results from a single determinant but rather reflects cumulative biological and socioeconomic disadvantages experienced throughout pregnancy and early childhood.

Furthermore, the predominance of children aged 25–60 months among stunting cases supports previous evidence indicating that growth faltering becomes increasingly apparent after infancy when complementary feeding practices become inadequate or repeated infections occur. Renyoet et al. [18], highlighted that nutritional interventions should begin before pregnancy and continue throughout the first 8,000 days of life to effectively reduce future stunting.

Relationship Between Early Marriage and Stunting

The principal finding of this study was that maternal age at marriage was not significantly associated with children's nutritional status based on either Weight-for-Age (WAZ) ($p = 0.117$) or Height-for-Age (HAZ) ($p = 0.333$). These findings indicate that although early marriage was common among respondents, it was not an

independent predictor of stunting within this population.

This result contrasts with several previous studies reporting a positive association between adolescent marriage and childhood stunting. Pangaribuan et al. [19], demonstrated that adolescent pregnancy resulting from early marriage significantly increased stunting risk among toddlers. Similarly, Maknun et al. [14], reported substantially higher odds of stunting among children born to adolescent mothers. International evidence has likewise shown that child marriage contributes to poor child growth through biological immaturity, maternal undernutrition, and reduced access to healthcare.

However, the present findings are supported by other studies suggesting that the relationship becomes statistically insignificant after adjustment for confounding variables. Mtongwa et al. [15], found that maternal education, antenatal care utilization, household wealth, and birth weight exerted stronger influences on child nutritional outcomes than maternal age alone. Likewise, Devriany et al. [6], concluded that maternal nutritional status, pregnancy care, and infant feeding practices were more important determinants of stunting than maternal age at marriage.

One possible explanation is that early marriage may influence stunting indirectly through intermediate pathways rather than exerting a direct causal effect. Mothers who marry early may still provide adequate childcare if they receive sufficient family support, nutritional counseling, and healthcare services. Conversely, mothers marrying at mature ages may still have children with stunting if poverty, food insecurity, poor sanitation, or inadequate healthcare persist. Therefore, chronological age at

marriage alone cannot fully explain variations in child growth.

Another important consideration is the relatively small sample size ($n = 22$), which may have limited the statistical power to detect significant associations. Small samples increase the likelihood of Type II error, particularly when differences between comparison groups are modest. Consequently, the absence of statistical significance should not necessarily be interpreted as evidence that early marriage has no influence on child nutritional outcomes.

CONCLUSION

This study found that early marriage was not significantly associated with the incidence of stunting among children under five years of age in Popayato District, Pohuwato Regency. Although early marriage remained common among the respondents, the findings suggest that maternal age at marriage alone is insufficient to explain the occurrence of stunting. Rather, stunting is likely influenced by the interaction of multiple biological, socioeconomic, environmental, and behavioral factors, including maternal education, nutritional status, household conditions, childcare practices, and access to health services. These findings underscore the importance of implementing comprehensive and multisectoral strategies that integrate adolescent reproductive health, maternal and child nutrition, health education, family planning, and improved healthcare access to achieve sustainable reductions in stunting. Further studies with larger sample sizes and more robust analytical designs are recommended to better clarify the pathways linking early marriage and child nutritional outcomes.

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