



## Socio-Demographic Determinants of Premature Child Mortality among Kumal Women in Gandaki Province, Nepal

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### Article Info

### Abstract

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*Premature child mortality remains a pressing public health issue in rural, economically disadvantaged areas of Nepal. This study explores socio-demographic determinants of child mortality in the Kumal community of Gandaki Province. A cross-sectional survey of 322 mothers aged 15-49 analyzed key factors such as maternal age, family size, parental education, food security, and father's employment status. Findings indicate that older maternal age (34-49 years) correlates with higher mortality rates ( $\chi^2 = 18.96$ ,  $p = 0.021$ ). Larger family size, particularly with three or more children, increases mortality ( $\chi^2 = 6.68$ ,  $p = 0.033$ ). Lower paternal education levels are also linked to higher mortality ( $\chi^2 = 15.37$ ,  $p = 0.002$ ). Food insecurity exacerbates risk, with insufficient food increasing death rates ( $\chi^2 = 4.319$ ,  $p = 0.028$ ). Additionally, the absence of fathers due to migration further raises mortality risks ( $\chi^2 = 12.719$ ,  $p = 0.049$ ). However, the sex of the last child and the household head did not significantly impact mortality. Qualitative data support these findings, emphasizing the need for improved prenatal care, educational programs, food security initiatives, and support for families affected by migration.*

**Keywords:** Family size, food security, maternal age, premature child mortality, socio-demographic factors

### Introduction

Premature child mortality, defined as the death of a child before the age of five, is a critical indicator of public health and socio-economic development (Wahl et al., 2023). Despite significant strides in reducing child mortality in Nepal over recent decades, this issue remains acute, particularly in rural and economically disadvantaged areas where access to healthcare, nutrition, and education is often limited (Subedi et al., 2024). Understanding the underlying factors contributing to these premature deaths is crucial for crafting effective interventions aimed at further reducing mortality rates and improving child health outcomes.

Globally, premature child mortality reflects the combined impact of socioeconomic conditions, healthcare access, and living environments (KC et al., 2024). The World Health Organization (WHO) reported that in 2022, approximately 5 million children under five died worldwide, with the majority of these deaths occurring in sub-Saharan Africa and South Asia (WHO, 2023). Socio-demographic determinants play a significant role in influencing these mortality rates. Higher levels of maternal education, for example, are strongly linked to lower child mortality rates, as educated mothers are more likely to access and use healthcare services effectively (Gakidou et al., 2017). Similarly, economic status affects child health through its impact on nutrition, living conditions, and the ability to afford healthcare (Hossain et al., 2020).

Significant disparities in income, education, and healthcare access across different regions and communities mark Nepal's socio-demographic landscape. The under-five mortality rate in Nepal was approximately 31 deaths per 1,000 live births in 2020, with preventable causes such as pneumonia, diarrhea, neonatal conditions, and malnutrition being significant contributors (WHO, 2021). The maternal mortality ratio, another critical health indicator, stood at 186 deaths per 100,000 live births, with leading causes including hemorrhage, hypertensive disorders, and sepsis. These figures underscore the interconnected nature of maternal and child health (Bhutta et al., 2014).

Gandaki Province, located in central Nepal, exemplifies a region with diverse ethnic communities and varied socio-economic conditions. Among these communities is the Kumal ethnic group, a traditionally marginalized population with unique cultural practices and socio-economic challenges. The Kumal people primarily engage in agriculture and often face significant barriers to accessing quality healthcare and educational resources (Subedi, 2018). Despite ongoing efforts to improve health outcomes, the Kumal community continues to experience high rates of premature child mortality. Research highlights that limited access to healthcare services, inadequate nutritional practices, and low levels of maternal education are key factors contributing to these elevated mortality rates (Malla & Thapa, 2019).

Additionally, maternal age has been consistently identified as a significant determinant of child mortality, with older maternal age linked to higher risks of pregnancy-related complications and adverse child health outcomes. Similarly, family size impacts child mortality, as larger families often struggle to provide adequate resources and care for each child, particularly in low-income settings (Save the Children, 2019). Parental education, especially maternal education, is crucial for improving child health outcomes, as educated mothers are more likely to seek timely medical intervention and ensure proper nutrition for their children (Shrestha et al., 2019). Furthermore, food security is fundamental to child health, with its absence often leading to malnutrition a leading cause of child mortality (Save the Children, 2019).

This study explores the relationship between various socio-demographic factors and premature child mortality in the Kumal community of Gandaki Province. Specifically, it examines the roles of maternal age, family size, parental education, food sufficiency, the husband's employment status, and the sex of the household head in influencing child mortality rates. Understanding these factors will provide valuable insights for developing targeted interventions to reduce child mortality and enhance health outcomes within this community.

### **Methodology**

This study employed a cross-sectional survey design to investigate the socio-demographic determinants of premature child mortality in the Kumal community of Gandaki Province, Nepal. The study population comprised mothers aged 15-49 years residing in the Kumal community Lamjung, Tanau and Gorkha districts. The study purposefully selected three sites with a larger number of Kumal settlements: Rainas 5 Lamjung, Palungtar 6 Gorkha, and Byas 6 Tanau. Mothers of children under five years of age living in these areas were then purposively chosen as respondents for the study. A total of 322 mothers with children aged five years or younger available in these three settlements were taken as respondents. The data were collected through face-to-face interviews using pre-tested semi-structured interview guidelines which included sections on maternal age, number of children, parental education, food sufficiency, the husband's employment status, and the sex of the household head. The pretest was conducted by administering the tool to a sample of participants representative of the target population. Participants were asked to complete the instrument, after which we gathered qualitative feedback through structured interviews to identify any ambiguities or difficulties encountered during the process. The validation process involved a series of statistical analyses, including content validity assessments by subject matter experts, who evaluated the relevance and clarity of each item. Additionally, we performed a pilot study to assess the tool's reliability, employing Cronbach's alpha to measure internal consistency. Factor analysis was conducted to examine the underlying structure of the instrument, ensuring that the dimensions aligned with theoretical expectations. Finally, test-retest reliability was evaluated by administering the tool to the same participants after a two-week interval, allowing us to confirm the stability of the results over time. This approach allowed for a comprehensive assessment of the influences on child mortality across different socio-demographic characteristics.

Data analysis was performed using statistical software to identify correlations and associations between socio-demographic factors and premature child mortality. To ensure robustness, the study employed data triangulation by cross-verifying quantitative findings with qualitative insights from focus group discussions with a subset of respondents. Six focused group discussions (FGDs) were conducted using established guidelines. The participants were recruited purposively, enhancing the results' validity and reliability. Thematically analyzed data obtained from the FGDs were triangulated with data collected from the interviews. This approach enhanced the robustness of our findings by providing multiple perspectives on the research questions.

## Results and Discussion

Table 1 presents various demographic and socio-economic factors related to the premature death of children among the respondents. The factors examined include maternal age, number of children, sex of the last child, maternal and paternal education levels, food sufficiency, whether the husband is abroad, and the sex of the household head. The chi-square values and p-values provided indicate the statistical significance of these factors about the experience of premature child death. This analysis aims to identify any significant associations between these variables and the occurrence of premature child death, offering insights into potential risk factors and areas for intervention.

**Table 1.** *Distribution of premature death of child (reported data)*

<b>Mother age group</b>	<b>No</b>	<b>Yes</b>	<b>Total</b>	<b>x<sup>2</sup> &amp; P-Value</b>
<20 yrs	2 (100%)	0.0%	2 (100%)	x <sup>2</sup> value=18.96 p=.021
20-29 yrs	223 (98%)	8 (2%)	231 (100%)	
30-34 yrs	77 (96 %)	3 (4%)	80 (100%)	
34-49 yrs	6 (66.7%)	3 (33.3%)	9 (100%)	
Total	308	14	322	
<b>No. of Children</b>				x <sup>2</sup> value=6.68 p=.033
1	156 (95.7%)	7 (4.3%)	163 (100%)	
2	146 (97.3%)	4 (2.7%)	150 (100%)	
3 +	6 (66.7%)	3 (33.3%)	9 (100%)	
Total	308	14	322	
<b>Sex of last-child</b>				x <sup>2</sup> value=8.20 p=.300
Male	136(94%	8(6%	144(100%	
Female	172(97%	6(5%	178(100%	
Total	308	14	322	
<b>Mother' education</b>				x <sup>2</sup> value=18.17 p=0.360
No	12(86%	2(14%	14(100%	
Basic	173(97%	5(3%	178(100%	
Secondary	109(95%	6(5%	115(100%	
Higher	14(93%	1(7%	15(100%	
Total	308	14	322	
<b>Husband Education</b>				x <sup>2</sup> value=15.37 p=0.002
No	14(100%	0(0.0%	14(100%	
Basic	111(90%	12(10%	123(100%	
Secondary	130(100%	0(0.0%	130(100%	
Higher	53(96%	2(4%	55(100%	
Total	308	14	322	
<b>Food Sufficiency</b>				x <sup>2</sup> value=4.319 p=0.028
Yes	247(97%	8(3%	255(100%	
No	61(91%	6(9%	67(100%	
Total	308	14	322	
<b>Husband Aboard</b>				x <sup>2</sup> value=12.719 p=0.049
Yes	51(89%	6(8%	57(100%	
No	257(97%	8(3%	265(100%	
Total	308	14	322	
<b>Sex of HH Head</b>				x <sup>2</sup> value=11.055 p=0.304
Male	201(96%	9 (4%	210 (100%	
Female	107 (97%	5 (3%	112(100%	
Total	308	14	322	

## Mental Age and Child Morality

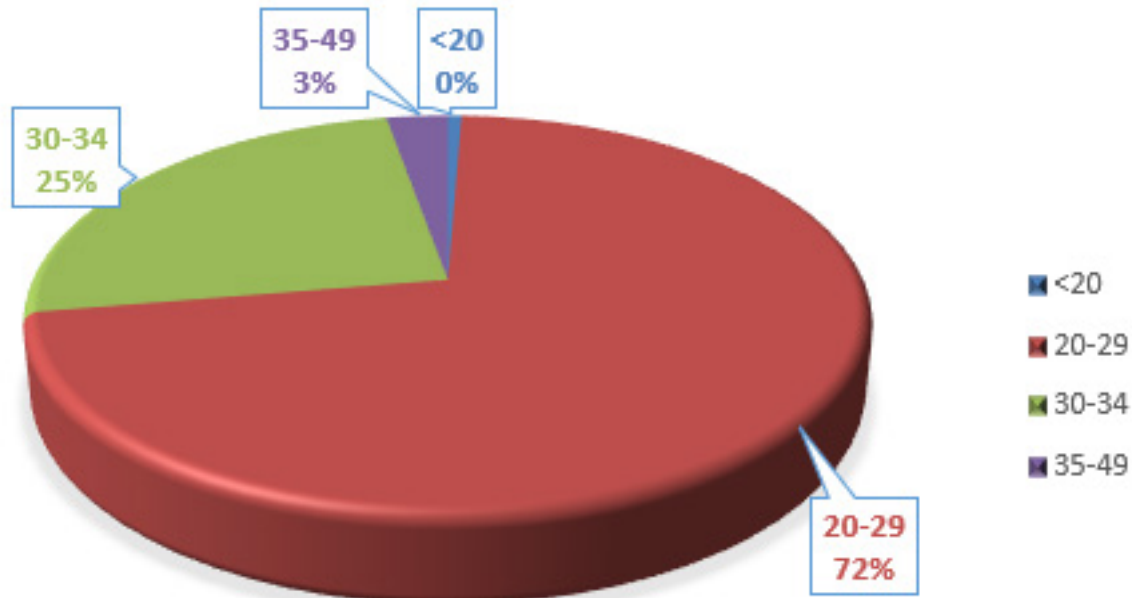


Figure 1: Mother's age composition

Maternal age is widely recognized as a critical factor influencing child health outcomes. Studies have consistently shown that both very young and older mothers face heightened risks during pregnancy and childbirth, which can lead to adverse consequences for both the mother and the child (Patel & Danziger, 2020). The data on mothers' age composition shows that most mothers fall within the 20-29 age group, comprising 72.0% (231 mothers), indicating that this is the most common age range for childbirth in this population. In contrast, very few mothers are under 20 years old (1.0%, or 2 mothers), and only 2.0% (9 mothers) are aged 35-49, suggesting that teenage and older motherhood is relatively rare. Additionally, 25.0% (80 mothers) are in the 30-34 age group, highlighting a significant portion of mothers also having children in their early 30s. The mean age for the under-20 group is reported as 26.81 years, though an overall mean age for all groups would provide a more comprehensive understanding of maternal age trends in this population. The study revealed several key factors significantly associated with premature child mortality. Maternal age emerged as a critical determinant, with older mothers (aged 34-49 years) facing a markedly higher risk of child death compared to younger mothers. This association, supported by a chi-square value of  $\chi^2 = 18.96$  ( $p = 0.021$ ), underscores the increased complications associated with advanced maternal age. In particular, older maternal age has been associated with increased risks of complications such as gestational diabetes, hypertension, and placental issues, all of which can contribute to higher rates of child mortality. In Nepal, where maternal health services may be less accessible in remote areas, these risks can be exacerbated, leading to a higher incidence of premature child death among older mothers.

Similarly, the result from the FGD shows that older mothers often face a lack of access to specialized prenatal care, which can exacerbate these risks. One participant of FGD stated, *"With my advanced age, I felt the medical staff was less attentive, and my pregnancy was marked by frequent complications that were not adequately addressed due to the lack of resources."* (Mother, aged 31)

In the context of Nepal, where access to maternal health services can be limited, these risks are compounded for older mothers. Research by Bhatta et al. (2014) in *"The Lancet"* highlights that maternal age significantly influences child mortality rates, with mothers over the age of 35 at greater risk of complications that can result in child death. The study suggests that targeted interventions for older mothers, including improved access to prenatal care and health education, are crucial for reducing these risks.

Maternal age significantly impacts child health outcomes, with both very young and older mothers experiencing elevated risks during pregnancy and childbirth. For instance, Bhutta et al. (2014) in *"The Lancet"* underscore that women over the age of 35 face increased risks of complications such as gestational diabetes and hypertension, which are linked to higher rates of child mortality.

### **Family size and child mortality**

Family size is another socio-demographic factor closely linked to child mortality (Ghimire et al., 2019). The quantitative data of this study reveals that larger family sizes contribute to higher mortality rates, reflecting the difficulties in managing resources and care ( $\chi^2 = 6.68, p = 0.033$ ). This finding reflects the difficulties in providing adequate care and resources in larger households.

Similarly, qualitative data corroborated these results, gathered from FGDs. It was found that larger families, particularly those with three or more children, often face significant challenges in providing adequate care and resources for all their children. The FGD participants highlighted these difficulties, stating, “In our large family, it’s hard for each child to get the attention and care they need. With so many of us, there’s always a struggle to ensure everyone is properly fed and receives medical attention.” (Mother aged 36 having 3 children)

*With more children, I feel overwhelmed. It’s hard to give each one the attention they need. I worry that I can’t get them the care they require in time. When I had fewer kids, I could focus on their health and well-being, which made a real difference. (Mother aged 35 having 3 children)*

Systematic reviews and meta-analyses based on low- and middle-income settings, witnessed that having more children can strain the family’s ability to ensure proper nutrition, healthcare, and education for each child. This can lead to higher mortality rates, especially among younger children who may receive less attention and care (Islam et al., 2022; Nguyen et al., 2019). A similar study on the relationship between family size and child mortality is well-documented in the literature. Studies have shown that as the number of children in a household increases, the likelihood of child mortality also rises, particularly in contexts where economic resources are scarce (Save the Children, 2019).

### **Parental education and child mortality**

The quantitative data obtained from the interview survey of this study shows that lower levels of paternal education correlate with higher child mortality, emphasizing the role of education in improving child health ( $\chi^2 = 15.37, p = 0.002$ ). Likewise, qualitative information gathered using FGDs reiterated that parental education, particularly maternal education, has long been recognized as a critical determinant of child health. An FGD participant in this study asserted, “My children are healthier now that I have more education and can make better decisions about their health and nutrition. My husband’s education also helps us make informed choices.” (Housewife/mother aged 42)

A similar study conducted in Nepal emphasizes the importance of both maternal and paternal education in improving child health outcomes in Nepal. The study found that higher parental education levels were associated with lower child mortality rates, underscoring the need for policies that promote education for both men and women (Shrestha et al., 2019). Educated mothers are more likely to access prenatal care, understand the importance of proper nutrition, and seek timely medical intervention for their children. This, in turn, leads to better health outcomes for their children and reduces the risk of premature death (Nguyen-Phung et al., 2024). However, in patriarchal societies like Nepal, paternal education also plays a significant role, as men often control household resources and decision-making

### **Food security and child mortality**

This study found that food security was a significant factor influencing child health and survival, with insufficient food linked to higher child mortality rates ( $\chi^2 = 4.319, p = 0.028$ ). Children in households with insufficient food are more likely to suffer from weakened immune systems, making them more susceptible to infections and diseases such as pneumonia, diarrhoea, and malaria.

The 2019 “State of the World’s Children” report by Save the Children highlights the impact of food security on child mortality, noting that malnutrition contributes to nearly half of all deaths in children under five globally. In Nepal, where food insecurity remains a significant challenge in many rural areas, addressing this issue is crucial for reducing child mortality rates.

Qualitative data from respondents emphasize this link, with one mother stating, “When there is not enough food, my children get sick more often, and it’s hard to find the strength to get them proper medical care.” (Mother aged 31)

## Husband's employment status and child mortality

The migration of husbands for work further exacerbated the situation, as households with absent fathers experienced higher child mortality, reflected by  $\chi^2 = 12.719$  ( $p=0.049$ ). Qualitative findings revealed that the absence of the father often placed an additional caregiving burden on mothers, making it harder to manage child health effectively. The husband's employment status, particularly in cases where husbands migrate abroad for work, has also been identified as a factor influencing child health. While remittances from abroad can improve household income and access to healthcare, the father's absence can place additional stress on the mother, who may have to take on additional caregiving and household responsibilities. This increased burden can lead to reduced attention to child health and well-being, particularly if the mother is also working or managing other children. The qualitative interviews reveal significant challenges mothers face when their husbands are abroad for work. One respondent described, *"When my husband was abroad, I had to manage everything on my own. The extra stress and lack of support made it harder to take care of my children's health."* (Mother having a child under one year of age).

This sentiment underscores the additional burdens and stress experienced by single caregivers in such situations. The father's absence often results in increased responsibilities for the mother, adversely affecting her ability to provide adequate care and resources for her children. These findings align with the quantitative data indicating that households with absent fathers, mainly due to migration, are at a higher risk of child mortality.

A study by the Central Bureau of Statistics (2021) found that households where the husband was working abroad were more likely to experience child mortality, notably if the mother lacked support from extended family or community networks. This finding suggests additional support for mothers, including access to childcare services and community-based health programs.

## Conclusion and Implications

In conclusion, this study underscores the intricate relationship between socio-demographic factors and premature child mortality within the Kumal community of Gandaki Province, Nepal. The findings highlight that maternal age, family size, parental education, food security, and the employment status of husbands significantly influence child health outcomes. Addressing these determinants through targeted interventions such as enhancing maternal education, promoting food security, and providing support for families with absent fathers can play a crucial role in reducing child mortality rates. Ultimately, a comprehensive approach that integrates health, education, and socio-economic support is essential to improving the overall health and well-being of children in marginalized communities like the Kumal.

The findings underscore the urgent need for targeted maternal health services, particularly for older mothers and those in remote areas. Improved prenatal care and health education can significantly mitigate risks associated with advanced maternal age and enhance outcomes during pregnancy and childbirth. Additionally, support for larger families is crucial; policies should focus on providing access to family planning services, nutritional support, and comprehensive healthcare to ensure that all children receive adequate care.

Furthermore, expanding educational opportunities for parents is essential, as higher levels of parental education are linked to better child health outcomes. Programs aimed at improving food security, especially in rural and low-income areas, will help ensure families have access to nutritious food. Finally, implementing support systems for families affected by absent fathers can alleviate the caregiving burden on mothers. Continuous research and monitoring will be vital to evaluate the effectiveness of these interventions and adapt strategies to further reduce child mortality rates.

## Authors' Contribution

This manuscript is a part of the first author's PhD research. The first author was responsible for the conception, data collection, data analysis, and preparation of the first draft of the manuscript. In contrast, the second author critically revised the manuscript to incorporate critical intellectual content.

## Conflict of Interests

The authors declare no conflicts of interest related to this study. The research was conducted honestly, and no financial or personal relationships influenced the results or conclusions.

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