

Healthy mothers, nourished children: investigating the links between maternal factors, hygiene, sanitation, and stunting in indigenous Sundanese families

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Abstract. Indigenous home practices are shaped by family and community cultural values. Therefore, each family has a distinct approach to raising their children. Indonesia is home to thousands of ethnic groups that are distributed across the provinces. The Sundanese are one of the most common ethnicities and reside in West Java Province. The Sundanese indigenous villages represent Indonesia's traditional communities that uphold Sundanese cultural norms. This study was conducted in two indigenous villages, Kampung Naga (Tasikmalaya Regency) and Kampung Pasir (Garut Regency) involving 100 families with children under five years old. Findings revealed gaps in health practices: 30% of mothers washed hands irregularly, 74% did not brush teeth before sleep, and 65% reported irregular physical activity for children. When children were ill, 21% of families relied on spells (jampean) that had been passed down through generations. Breastfeeding practices were also limited: only 35.1% initiated breastfeeding early, and 24.3% did not continue breastfeeding for up to two years. Nutritional outcomes indicated that 34% of children experienced stunting. Overall, Pearson correlation test showed that family income was significantly associated with hygiene and sanitation, and that maternal education was linked to the stunting status of children in Sundanese Indigenous Villages.

1 Introduction

The Sundanese are one of the largest ethnic groups in Indonesia, predominantly residing on Java Island, particularly in West Java Province. While the majority live in urban areas, some Sundanese communities inhabit indigenous villages, such as Naga and Pasir. Previous research has shown that health and nutrition practices in Indonesian indigenous villages are generally lower compared to non-indigenous populations [1] and malnutrition among indigenous groups carries a higher risk of mortality compared to non-indigenous groups [2]. Although 97% of Indonesian households report having at least one toilet, 24% do not use a septic tank or a similar system, and only 12% have access to safe sanitation [3]. In Naga

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Village, studies have identified environmental health and sanitation challenges, including open defecation in public places (such as ponds and plunge toilets), which may contribute to soil and water pollution and limit access to clean water [4]. In Pasir, sanitation problems are largely attributed to difficulties in accessing clean water due to topographical conditions [5, 6]. Beyond sanitation, other factors influencing child nutrition in indigenous groups include socioeconomic status, parental characteristics, and child-related factors [7]. Maternal breastfeeding practices, such as early initiation and continued breastfeeding for up to two years, have been shown to provide substantial benefits for child health and development, particularly in terms of nutrition [8]. In Indonesian indigenous communities, maternal breastfeeding practices are often culturally embedded and passed down across generations. Traditional breastfeeding practices have been documented in several Indonesia indigenous villages in Indonesia [9]. Examining these variables is essential to address the research gap, as there remains limited research investigating the relationship between maternal socioeconomic status, caregiving, and health factors with child stunting within the Sundanese indigenous community. Such research also highlights the importance of culturally grounded approaches to educating indigenous communities, given that traditional healing practices, such as the use of spells (*dijampean*), persist as part of their culture. Therefore, this study aims to examine maternal socioeconomic status, caregiving practices, health and sanitation conditions, and child nutritional status in these communities.

2 Materials and methods

This research was conducted in two indigenous villages in West Java Province, Indonesia (Naga and Pasir). The study sites were purposively selected due to their distinctive cultural contexts. Data collection was carried out between May and August 2025. A total of 100 families with U-5 children (74 from Naga and 26 from Pasir) were recruited using purposive sampling, identified through *Posyandu* (Integrated Services Post) records. Selection of samples was determined by the *Posyandu* cadres at the site, with the inclusion criterion being mothers with U-5 children. The unequal sample sizes were due to the smaller number of mothers with children under five years of age in Pasir compared to Naga Village. Prior to data collection, ethical clearance was obtained from Universitas Muhammadiyah Semarang (Ref. 105/KE/02/2025). Data were collected through household interviews, direct observations, and anthropometric measurements after obtaining respondents' verbal and written consents. The instruments employed included the *Pola Asah, Asih, Asuh Questionnaire* developed by Hastuti and Alfiasari (2020) to examine the nutrition and health practice of mothers ($\alpha=.812$) [10]. The Breastfeeding Practices assessed exclusive breastfeeding (6 months) and 2-years breastfeeding practice (0= no; 1=yes), while Hygiene and Sanitation measurement was developed by the authors using Likert scale, through questions and observations ($\alpha=.707$). Sample queries and statements included: "What is the main water source for the household?", "How does the water smell?", and "Where are the toilet facilities?", each assessed using a Likert scale. Data on maternal nutrition and health practices, breastfeeding practices, and hygiene and sanitation were analysed by converting responses into indices or percentages. The index was calculated as the difference between the final and minimum scores, divided by the difference between the maximum and minimum scores, and then multiplied by 100. The resulting values were categorized as low (<60), moderate (60–80), or high (>80). Stunting was assessed using WHO anthropometric standards by measuring height with board/stadiometer, with height-for-age z-scores applied to classify the stunting status of children (Stunted = Z-score<-2 SD; Severe Stunting = Z-score<-3 SD). Data were processed using Excel and SPSS. Analyses included descriptive statistics and Pearson correlation tests.

3 Results and discussion

The average age of mothers in Pasir ($M=33.5$ years) was higher than in Naga ($M=31.9$ years). Families in Pasir were also larger ($M = 4.5$ members) compared to those in Naga ($M=3.9$ members). The total family income in Pasir (IDR 2,665,592 $\pm$ 1,661,257) was higher than in Naga (IDR 2,210,945 $\pm$ 1,246,894). Most mothers in Naga Village had completed elementary school (54.1%), with only a few attaining higher education (6.8%), whereas mothers in Pasir Village were more likely to have completed junior high (46.2%) or senior high school (19.2%). Overall, educational attainment was slightly higher in Pasir. The majority of mothers in both Naga (80.8%) and Pasir (70.3%) were homemakers. In Naga, 35.1% of mothers initiated early breastfeeding, while 73.1% of mothers in Pasir did not initiate breastfeeding. Early initiation of breastfeeding was generally low, with 67% of mothers not initiating. Exclusive breastfeeding was practiced by 52% of mothers, and was more common in Naga (55.4%). Most children (69%) were breastfed until at least two years of age, although the continuation rate was lower in Pasir.

In Naga, most parents consistently practiced handwashing after defecation or urination (70%), nail cutting (74%), hair washing (85%), and footwear use (88%). However, bedtime toothbrushing was less consistently enforced (26%). Caregiving practices included spoon-feeding children who lacked appetite (60%), while physical activity levels were moderate (40%). Reliance on traditional healing (jampean) persisted (52%). According to interviews, residents stated that jampean is part of their cultural values and generational traditions, and is also considered economically beneficial. The community believed that if children are healed through traditional methods, visiting healthcare facilities becomes unnecessary. Naga and Pasir villages differ notably in health, environment, water, and sanitation. Most households in both villages had medium environmental conditions, but Pasir had a higher proportion in the high category (50% vs. 35.1%). Water access showed the greatest disparity: 85.1% of Naga households were categorized as low, while 65.4% of Pasir households were in the medium category. Sanitation was better in Pasir (61.5% high, 38.5% low) compared to Naga (40.5% high, 56.8% low). Overall, Pasir demonstrated superior sanitation and environmental conditions, while Naga faced greater challenges with water access and hygiene. The improved sanitation in Pasir Village can be attributed to the use of concrete in building construction, as well as the presence of bathrooms and toilets inside the houses. Conversely, in Naga Village, houses are constructed from bamboo, wood, and palm, are built on stilts, and bathrooms and toilets are located at a considerable distance from the main living area and are not integrated within the house. In terms of nutritional status, 34.6% of children in Pasir were stunted (11.5% severely stunted, 23.1% stunted), while Naga Village had a slightly lower prevalence at 33.7% (10.8% severely stunted, 23% stunted). The mean height-for-age z-score was -1.36 ± 1.57 in Pasir Village and -1.79 ± 0.99 in Naga Village, with an overall mean of -1.71 ± 1.11 . Findings indicate that approximately one-third of the study population experienced impaired linear growth, with comparable stunting proportions observed between the two villages, although the slightly lower mean z-score in Naga suggests marginally poorer overall growth status in this community. Previous studies have identified poverty as a risk factor for stunting [11]. Supplementary tables and figures supporting these findings are available at doi.org/10.17632/4b6wcg86ng.1.

A Pearson correlation test revealed a significant positive relationship between maternal education and hygiene and sanitation ($r(98)=.288$, $p<.01$). Furthermore, maternal education was significantly associated with child stunting status ($r(98)=.246$, $p<.05$). Family income also demonstrated a significant, albeit weak, positive relationship with hygiene and sanitation ($r(98)=.223$, $p<.05$; see Table 1). These findings suggest that maternal knowledge and family resources play a critical role in improving caregiving conditions and child health outcomes. Thus, to improve mothers' nutritional knowledge, attitudes, and skills, and to prevent

stunting in indigenous communities, various scientifically proven methods can be applied, such as community-based nutrition education programs [12], the distribution of booklets, guidebooks, and leaflets, or through brainstorming sessions and demonstrations for mothers [13], all adapted to cultural values. For instance, communal decision-making, the involvement of village leaders and religious figures—particularly those who practice jampean—the use of local languages, and the acknowledgment of local beliefs in food preparation should be incorporated to achieve sustained behaviour change. In terms of sanitation improvement, WASH interventions should be implemented [14]. Under Government Regulation No. 185/2014, national, provincial, and district governments must accelerate public infrastructure development to ensure universal access to safe drinking water, sanitation, and hygiene [15].

Table 1. Pearson correlation statistics between variables.

Variables	Nutrition and Health Practices	Hygiene and Sanitation	Breastfeed-ing Practices	Stunting Status
Mother’s age (years)	-.020	.007	-.072	-.094
Mother’s occupational status ^a	.078	-.140	.153	-.099
Mother’s education ^b	.011	.288**	-.036	.246*
Family Size (person)	-.056	.135	.002	-.152
Family Income (IDR)	-.016	.223*	-.108	.029
Nutrition and Health Practices	1	-.005	.018	.102
Hygiene and Sanitation	-	1	-.064	.090
Breastfeeding Practices	-	-	-	-.064

^aMother’s occupational status (0=homemaker; 1= employed)
^bMother’s Education Status (1=Never went to school; 2= Did not graduate from primary school; 3=Primary school graduate; 4=Junior high school graduate; 5=Senior high school graduate; 6=Diploma/Bachelor/Masters/Doctoral graduate
*p<.05; **p<.01

4 Conclusion

Approximately one-third of children in both villages were stunted, with Naga exhibiting slightly poorer growth outcomes. Despite higher socioeconomic status and improved sanitation in Pasir, stunting rates remained similar between the two communities. Early initiation of breastfeeding was suboptimal, and prelacteal feeding remained common, potentially compromising optimal infant nutrition. Although hygiene practices were frequently reported, limited access to water and sanitation in Naga increased vulnerability. Maternal education and family income were strongly associated with better hygiene, sanitation, and reduced stunting. Therefore, nutritional education programs for mothers and WASH interventions are essential to prevent stunting among children, particularly in indigenous communities. However, the use of purposive sampling and reliance on structured

questionnaires, rather than direct observation of practices, represent limitations of this study; thus, the results cannot be generalized.

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