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# A situational analysis of model holistic-comprehensive and integrated approaches to handling stunting in Buleleng Regency, Bali, Indonesia

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## A B S T R A C T

**Background:** Policies and strategies for handling stunting cases effectively and efficiently vary in different regions, depending on their situation and conditions. There has yet to be an empirical study of stunting management with a holistic-comprehensive and integrated approach in Indonesia, especially in Buleleng Regency, Bali. Thus, conducting initial research to analyze the policy and determine the right stunting management strategy to implement is essential.

**Purpose:** This study aims to map stunting cases, explore their causal factors, analyze the suitable policy model for overcoming stunting and describe the effective and efficient stunting management strategy in Buleleng Regency based on a holistic, comprehensive, and integrated approach.

**Methods:** This is a situation analysis case study. Respondents were stunted children and related governmental agencies in Buleleng Regency, Bali. The incidence of stunting, risk factors suspected as the cause, policy models and appropriate stunting handling strategies were analyzed in depth using qualitative and quantitative methods.

**Results:** There were 1040 cases of stunting in the regency, with the highest cases in Banjar District. Significant risk factors influencing the stunting incidence in the region include the lack of good complementary feeding (OR: 2.6722; $p < 0.05$) and low family income (OR: 7.6667; $p < 0.0001$). The results of the analysis of stunting handling policies, based on a holistic-comprehensive and integrated approach model by regional needs, are categorized into two policy areas: Policies in the Medical and Non-Medical fields. In contrast, the handling strategy is divided into two stages: the screening and the handling stages.

***Conclusion:*** Poor-quality complementary foods and low family income are the main risk factors for high stunting rates in Buleleng Regency, Bali. These factors must be considered in an effective and efficient policy and strategy model for handling stunting cases in the regency.

## INTRODUCTION

In 2020, more than 149 million (22%) toddlers worldwide experienced stunting, 6.3 million of whom were Indonesian toddlers.[1] The prevalence of stunting in Bali Province in 2021 was around 21.9%, in 2022 around 22.7%, and in 2023 around 23.8%. Buleleng is the regency with the second highest cases after Jemberana Regency, with a figure of 14.2%.[2] Stunting can have an impact on children's physical and mental development.[3,4] It can also affect the economy and productivity, increase morbidity and mortality and hamper economic development.[5,6]

In Indonesia, handling stunting is a priority. The government has taken various steps, including child growth monitoring programs, providing additional food, nutrition education and other programs. However, these efforts have

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not significantly reduced the incidence of stunting.[7–9] Currently, the government is encouraging the implementation of stunting reduction acceleration activities to be carried out holistically, integratively, and with quality through coordination and synchronization between ministries/institutions, provincial governments, district/city governments, village governments, and stakeholders.[10] However, it should be noted that policies and strategies for handling stunting cases vary from region to region, depending on the situation and conditions.

There has yet to be an empirical study of stunting management with a holistic-comprehensive and integrated approach conducted in Indonesia, especially in Buleleng Regency, Bali. Thus, it is essential to conduct initial research to analyze the policy situation and stunting management strategies in the regency based on the holistic-comprehensive and integrated approach. Similar research on stunting management has been conducted on improving the nutrition sector, poverty alleviation, food access, preventing child marriage, sanitation, education, and increasing knowledge.[11] In addition, there is another research related to the village fund program for stunting prevention, although the results are not very impactful.[12]

This study aims to map stunting cases, explore their causal factors, analyze the suitable policy model in stunting management, and describe the effective handling strategies in the region based on a holistic, comprehensive, and integrated approach. The results of this study are expected to be helpful for the regency and surrounding areas, which share the same characteristics, in making policies to overcome stunting cases according to their needs.

## METHOD

### *Study Design*

This study's design is a case study of situation analysis, which explores the suitable policy model for overcoming stunting in Buleleng Regency, Bali. It was conducted using a holistic, comprehensive, and integrated approach.[13]

### *Settings and Respondents*

This study was conducted in Buleleng Regency, Bali. All children with stunting cases, as recorded in the Health Office of the regency, were sampled for its prevalence analysis. Meanwhile, to analyze the risk factors suspected as the cause, 100 children (70 stunted children and 30 non-stunted children) were sampled.[14] The sampling technique used the cluster sampling system,[15] in which the samples were taken from villages with high, medium and low prevalence rates of stunting cases. Related agencies (Health Office, Population Control, Family Planning, Women's Empowerment and Child Protection Office, Social Office, Public Works and Spatial Planning Office, Community and Village Empowerment Office and Education, Youth and Sports Office) were also included to be the respondents to assess the policy model and stunting management strategy carried out in the regency.

### *The Variable, Instrument, and Measurement*

The incidence of stunting, risk factors suspected as causes, policy models and stunting management strategies in the regency were all variables assessed in this study. The research instruments in this study included observation guidelines, interview guidelines, document study guidelines, questionnaires and focus group discussion guidelines developed by the researcher. Data was collected through direct observation, interviews, document studies, and focus group discussions.[16,17]

### *Data Analysis*

The data analysis was carried out using qualitative and quantitative techniques. Quantitative techniques were used to analyze cases of stunting and factors suspected to be the cause. Meanwhile, qualitative techniques were undertaken to determine the policy model and stunting management strategy.

### *Ethical Consideration*

This study obtained research ethics permission from the Research Ethics Committee in Education University of Ganesha, number: 085/UN48.24.11/LT/2023.

## RESULTS

### *Stunting Case in Buleleng Regency, Bali*

The number of stunted children in Buleleng Regency, Bali based on data obtained from the Health Office in 2023, reached 1040. The highest number of cases was in Banjar Subdistrict, while the lowest was in Gerogak (Figure 1). The mapping of stunting cases in each village of the regency was carried out using a clustering system divided into five categories (High category ≥41; Quite high category 31-40; Moderate category 21-30; Quite low category 11-20; and Low category 0-10 cases). Based on the mapping, four villages (Tigawasa, Temukus, Kaliasem, and Tejakula village) are included in the high cluster category, three villages (Cempaga, Sangsit and Les village) are in the quite high cluster category, and seven villages (Patemon, Pangkung Paruk, Banjar, Dencarik, Pegayaman, Sambirenteng, Penuktukan village) are in the moderate cluster category while the rest are in the quite low/low cluster category (Figure 2).

### *The Risk Factors of Stunting in Buleleng Regency, Bali*

In the category of food access, significant variables as risk factors for stunting are the provision of poor quality complementary foods (OR: 2.6722; $p<0.05$) and family income (OR: 7.6667; $p<0.0001$). Home sanitation (the presence of

animal cages near the house, ownership of healthy toilets, and sources of drinking water) and access to health services (ownership of health insurance and history of birth attendants) do not significantly affect the incidence of stunting in the region (p>0.05) (Table 1).

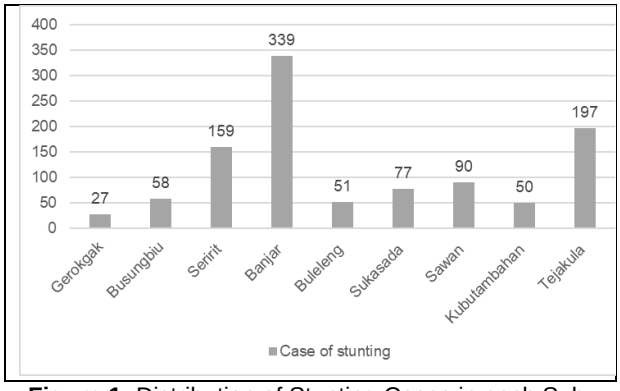


**Figure 1.** Distribution of Stunting Cases in each Sub-district in Buleleng Regency, Bali Province.

### *Model of Policy for Stunting Handling*

The results of the analysis of stunting handling policies in the Buleleng Regency, Bali, based on a holistic-comprehensive and integrated approach model by regional needs, are categorized into two policy areas, i.e., Medical Policy and Non-Medical policy. The former includes placement of nutritionists in all health centers, procurement of health cadres at integrated health posts, provision of integrated health post facilities in villages and regulation of procurement of medical devices. Meanwhile, the latter covers the provision of clean water facilities and infrastructure, simplification of regulations related to the provision of healthy toilets, and policy on providing road infrastructure for health services. The roles and functions of related parties in the holistic-comprehensive and integrated approach model for handling stunting in the region are shown in Figure 3.

### *Handling Strategies for Stunting*

The stunting handling strategies in Buleleng are divided into two stages, i.e., the screening and the handling stages. In the screening stage, the strategies are: 1) Ensuring that all health centers must have at least one nutritionist; 2) Ensuring that all integrated health service centers must have anthropometric measurement tools; 3) Recording all children aged 0-59 months in each village. The data are updated for every birth, death, population movement and age data updating; 4) Recording children attending the activities in each integrated health post. They must have their weight, height and head circumference measured and input all the data into the development curve in the visit book of the integrated health post; 5) Identify children who do not present the health posts. This group must receive a monthly home visit for anthropometric measurements (height and weight). This activity is carried out by the family support team in collaboration with health center officers. Indicators, specific findings, and handling strategies that are recognized as indicators of stunting are displayed in Table 2.

## DISCUSSION

### *Risk Factors of Stunting in Buleleng, Bali*

This study found that children not fed good-quality complementary foods are at risk of stunting 2.6722 times higher than others. Many mothers provide only poor quality complementary foods, like those with carbohydrate content and no protein element. This practice will increase the risk of stunting. Health promotion efforts based on integrated health centers need to be carried out to increase mothers' knowledge of the importance of quality complementary foods in addition to breastfeeding. Health centers' must be trained to provide education about this matter. In addition, home visits can include educational programs, especially for those who do not attend the health centers.[18–21]

The poor quality of complementary foods is related to family income, below the minimum standard. This is proven by the results of this study, which shows that children with family incomes below the minimum wage standard are at risk of stunting 7.6667 times higher than children with a good income in the family. Income levels significantly affect the family economy. A low-income family economy will reduce access to good-quality food, health services, and environmental sanitation. Sustainable efforts to improve the community's economy are urgently needed to overcome stunting problems.[18]

Socio-cultural aspects also play a role in providing nutrition to pregnant women and babies. For example, beliefs or cultures in certain areas that do not allow certain foods for pregnant women or children (food taboos).[22] Research in Central Java found that pregnant women are prohibited from consuming fried rice, durian, jackfruit, pineapple, sugar cane, leafy vegetables, fish, and eggs. This tradition indeed makes their children hyperactive and easily inflicted by disease.[23] Another study found that people have a habit of choosing food based on affordability, preference, or traditional appropriateness for specific stages of life (pregnancy, breastfeeding, and non-breastfeeding).[19]

The situation analysis results in the Buleleng communities showed that most respondents believed that certain traditional foods/drinks, such as herbal medicine and other traditional herbal formulas, could help a healthy pregnancy. However, their effectiveness and their risks still need to be re-examined. For example, ginger and turmeric are known as safe herbal plants. However, a well-known pharmaceutical study found that they can increase the risk of miscarriage or congenital disabilities.[24]

**Table 1.** Risk Factors of Stunting in Buleleng Regency, Bali (n=100)

| Category | Variable | Stunting | | OR | p-value |
|---|---|---|---|---|---|
| | | Yes (n=70) | No (= 30) | | |
| **Access to food** | **Exclusive Breastfeeding** | | | | |
| | Yes | 21 (30%) | 5 (16.7%) | 2.1429 | 0.1697 |
| | No | 49 (70%) | 25 (83.3%) | | |
| | **Quality of Complementary Foods** | | | | |
| | Good | 47 (67.1%) | 13 (43.3%) | 2.6722 | 0.0282 |
| | Poor | 23 (32.9%) | 17 (56.7%) | | |
| | **Family Income** | | | | |
| | Below standard | 49 (70%) | 7 (23.3%) | 7.6667 | 0.0001 |
| | On standard | 21 (30%) | 23 (76.7) | | |
| **Home Sanitation** | **Animal Pens Near the House** | | | | |
| | Yes | 32 (45.7% | 8 (26.7%) | 2.3158 | 0.0786 |
| | No | 38 (54.3%) | 22 (73.3%) | | |
| | **Healthy Toilet in the House** | | | | |
| | Yes | 9 (12.9%) | 0 (0%) | 9.4228 | 0.1264 |
| | No | 61 (87.1%) | 30 (100%) | | |
| | **Source of Drinking Water** | | | | |
| | Water Supply Utility | 33 (47.1%) | 14 (46.7%) | 1.0193 | 0.9651 |
| | Well | 37 (52.9%) | 16 (53.3%) | | |
| **Access to Health Services** | **Health Insurance** | | | | |
| | Yes | 21 (30%) | 9 (30%) | 1.0000 | 1.0000 |
| | No | 49 (70%) | 21 (70%) | | |
| | **History of Birth Attendant** | | | | |
| | Medical worker | 70 (100%) | 30 (100%) | 2.3115 | 0.6770 |
| | Non-medical worker | 0 (0%) | 0 (0%) | | |

**Table 2.** Handling Strategies of Stunting in Buleleng Regency, Bali

| Indicators | Specific Findings | Handling Strategies |
|---|---|---|
| Weight-for-age | If the child's weight is on the dark green band (normal) | Education for monthly visits to health by cadres/midwives/nutritionists<br>Give rewards to mothers with healthy children (healthy child stickers) |
| | If the child's weight on the light green band is below the center line (mild malnutrition) | Give nutrition education using leaflets by health-integrated post cadres/midwives/nutritionists.<br>Provide additional high-calorie, high-protein biscuits until their weights are standard. As it succeeds, give a reward of the stickers. |
| | If the child's weight is on the yellow band (moderate malnutrition) | Giving an education to a nutritionist<br>Provide with additional high-calorie, high-protein biscuits for a month<br>If body weight does not enter the light green band within one month, refer to the hospital with a diagnosis of malnutrition, 1) Therapy by a pediatrician; 2) Enlist in the unique monitoring of the family support team. If the child's weight gets to the light green band, give an award to the mother (healthy child sticker). |
| | The following steps are taken if the child's weight is on the red line or below (severe malnutrition) | Refer to the hospital to get therapy from a paediatrician<br>Enlist in the special monitoring of the family support team<br>If the weight gets to the light green band, reward the mother (healthy child sticker) |
| Body length/height by age | If it is included in short or very short group | Refer to the hospital to get therapy from a pediatrician<br>Enlist in the unique monitoring of the family support team<br>As their bodies grow to standard height, reward a healthy child sticker. |

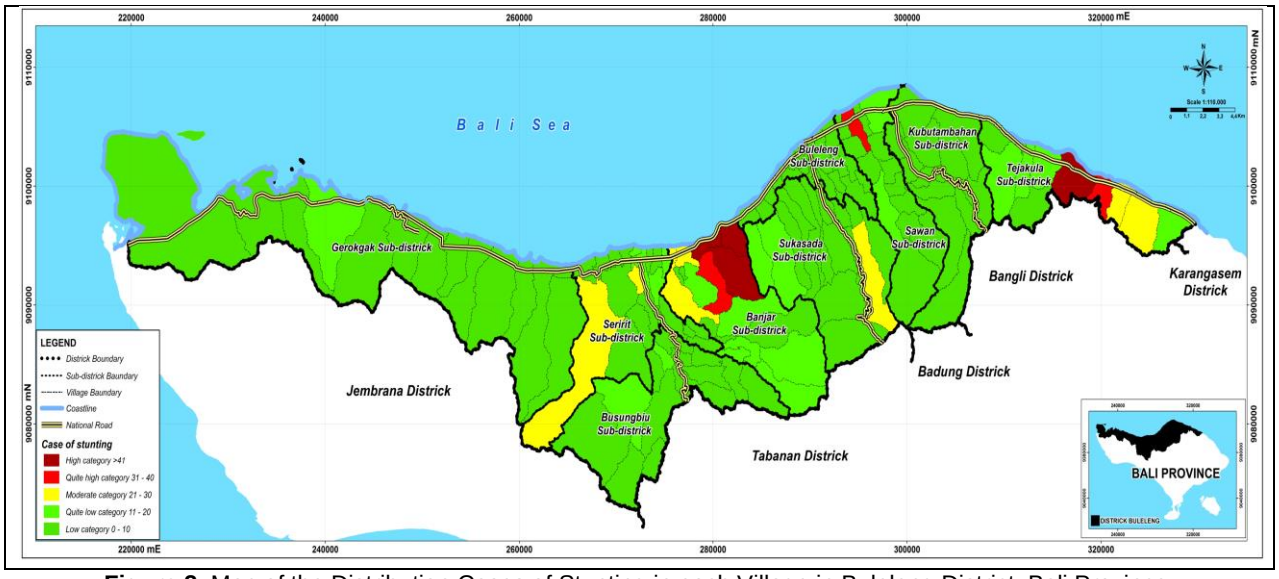


**Figure 2.** Map of the Distribution Cases of Stunting in each Village in Buleleng District, Bali Province.

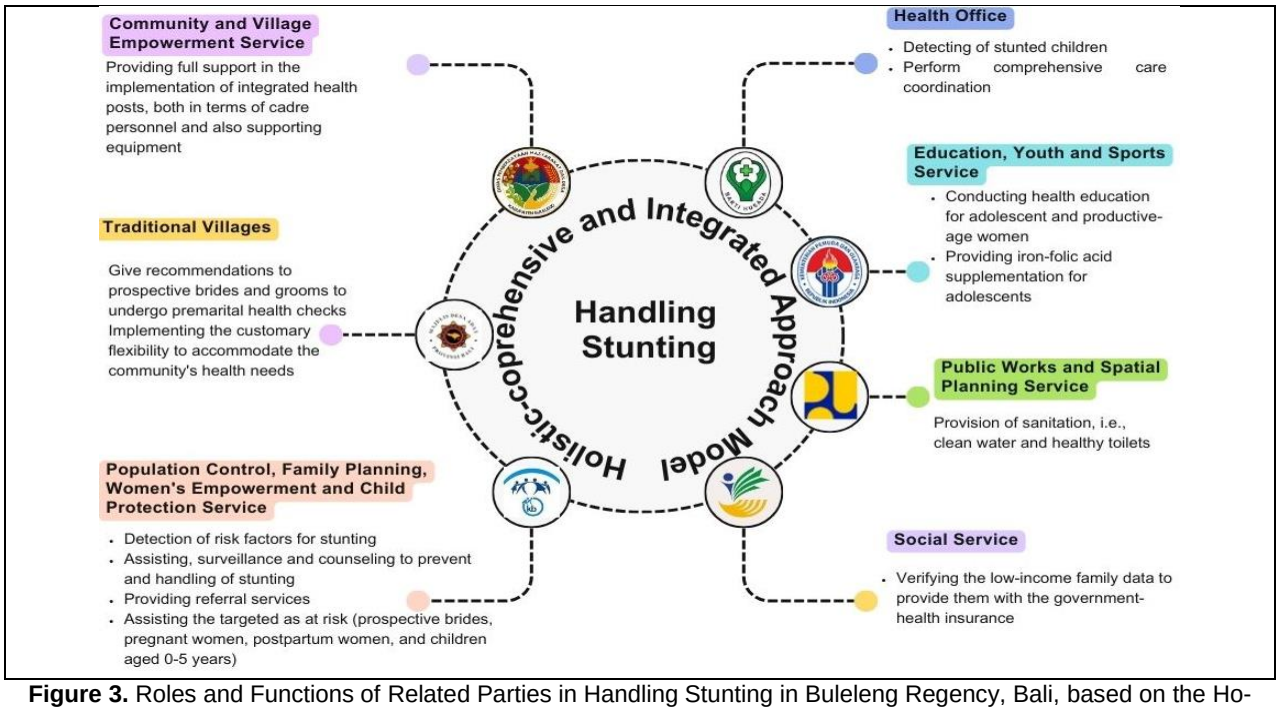


**Figure 3.** Roles and Functions of Related Parties in Handling Stunting in Buleleng Regency, Bali, based on the Holistic-comprehensive and Integrated Approach Model

Other factors in this study (exclusive breastfeeding, sanitation, and access to health services) were not significant in influencing the incidence of stunting (p>0.05). Breastfeeding can reduce the risk of stunting in children.[25] The insignificant factor of exclusive breastfeeding in this study is likely because the coverage in the community has been excellent. The number of animal pens near the house must be considered in terms of home sanitation. This study found that 45.7% of families with stunted children also have animal pens too close (less than 5 meters away) to their houses. In addition to food intake, infection is a direct cause of stunting. One of the causes of recurrent infection is environmental hygiene. A house with a too-close animal cage will increase the infection. For this reason, educating the community, especially those with toddlers, is necessary to put animal cages away to reduce the infection risk.[26]

### *Policies and Strategies for Handling Stunting in Buleleng Regency, Bali*

The policies for handling stunting in the region are divided into two types: the medical field and the non-medical field policies. The first includes policies on the placement of nutritionists in all health centers, the provision of health cadres in all integrated health posts, the provision of

integrated health post facilities in villages, and the provision of medical devices. Non-medical policies include providing clean water facilities and infrastructure, healthy toilets, and road infrastructure to access health services.

The data show that not all health centers have nutritionists. Nutritionists in each health center are very important in implementing stunting reduction programs. Nutritionists provide information regarding nutritional needs, fulfillment, and nutritional acquisition. This information is very important for the community to understand the food ingredients available in their environment. The fulfillment of nutrition for children depends entirely on expensive costs but can also be fulfilled by using accessible ingredients around their place. It just requires sufficient knowledge about the nutritional content of these ingredients and how to process them. The policy of recruiting or transferring nutritionists from health centers with more than one nutritionist to others without them must be carried out to cover the need for them.[27]

Health cadres have an essential role in the running of integrated health posts. They can provide counseling on toddler parenting patterns and help provide consultation services. Based on the results of studies on several integrated health posts, changes in personnel health cadres occur in a relatively short time. This situation makes it hard for the personnel of health cadres to improve their competence, as there are always new persons who need to be educated from the start. The policy of carrying out mutations, rotations, and replacements of health cadres needs to be considered. Supporting facilities and infrastructure for integrated health posts and complete health equipment is also vital to help implement integrated health posts. A good building, with the eligibility standards, completeness, and adequate capacity, will also help the process. Therefore, a policy of fulfilling the standards of facilities, infrastructure, and health equipment for integrated health posts for the smooth implementation of integrated health posts in handling stunting is needed.

The situation analysis results show that some people in Buleleng have no access to clean water and their houses do not have healthy toilets. Clean water is a necessity to meet healthy living standards. In its position as a basic need, public policy concerning providing clean water is a priority. Likewise, healthy toilets have various significant benefits for the health and welfare of the community. Clean toilets help prevent spreading diseases transmitted through feces, such as diarrhea, cholera, and typhus. If not appropriately managed, feces can contaminate water and food, which can cause disease in children and cause a risk of stunting. The government needs to implement policies to provide clean water and healthy toilets to minimize the incidence of stunting in the region.[21,28]

In addition, other non-medical policies include the provision of road infrastructure to health facilities. Roads are an indirect factor determining the number of community stunts. Access to health requires roads, especially for people who live in remote areas. As with the geographical conditions of Buleleng, there are some villages on hilly contours. For those living in the area, the road is the main obstacle to their mobilization. In some cases, families are reluctant to attend the integrated health post due to the difficulty of getting to the location of the integrated health post. Hence, it is essential to make road procurement a part of the policy.[29,30]

### *Strategy for Handling Stunting in Buleleng Regency, Bali, Based on the Principle of the Holistic-comprehensive and Integrated Approach*

The holistic-comprehensive and integrated approach is used to understand and handle a problem or situation by considering all relevant aspects in a comprehensive, complete, and integrated manner. This approach ensures that all elements related to the problem are considered and managed synergistically.[28] In this case, the problem that needs to be addressed in the community is the high number of cases of stunting in children. The results of the situation analysis, the related parties that need to be involved in overcoming the problem of stunting in Buleleng are the Health Office, Population Control, Family Planning, Women's Empowerment and Child Protection Office, Social Service, Public Works, and Spatial Planning Office, Community and Village Empowerment Office, Education, Youth and Sports Office and Traditional Village.

The Health Office has a vital role in the policy of handling stunting in Buleleng. Stunting is an issue in the Health sector, which is the task and responsibility of the Health Office. Structurally, the health centers in each sub-district are subordinate to the Health Office. The health center is the party that organizes the integrated health post that coordinates with the village government. The role and contribution of the Health Office is to detect the number of stunted children. After obtaining valid data on the number of stunted children, the next role and contribution is to coordinate treatment actions with the Buleleng District Hospital. If handled at the right time, stunting handling will show positive results.[31]

In stunting handling, the Population Control, Family Planning, Women's Empowerment and Child Protection Service has sufficient room to contribute. The family assistance team/Parenting functioning through this office is coordinated and directed. Parenting functioning is one of the critical teams in efforts to resolve the problem of stunting. The main task of the parenting functioning is to conduct early detection of stunting risk factors, provide assistance and surveillance related to the prevention and handling of stunting, facilitate referral services, and

facilitate the provision of assistance to families at risk of having stunted children. Various activities are carried out by the parenting functioning target parties, such as prospective brides and grooms, pregnant women, postpartum women, and children aged 0-5 years.[32]

To handle stunting, the Social Service contributes to verifying the data submitted by the community to obtain health insurance cards. For families at risk of stunting, generally underprivileged, this is very important. Following several cases of stunting, access to health care for medical treatment is often hampered because they do not have a government health insurance card. Children with stunting cannot be referred to the hospital because they do not have the card. Social services can play a role in conducting verification, especially if the person meets the criteria for receiving social health insurance funded by the government. Thus, the health of underprivileged residents can be guaranteed.[33]

The role of the Public Works and Spatial Planning Service in handling stunting is related to providing sanitation, namely clean water and healthy toilets. Many Buleleng residents still need help obtaining clean water and toilets in their houses. Meanwhile, basic needs are essential indicators in handling stunting. Through priorities the Public Works and Spatial Planning Service can set, the problem of clean water and ownership of healthy toilets can be resolved.[28] The Community and Village Empowerment Service can direct the priority agenda in handling stunting, primarily related to full support in implementing integrated health posts from the personnel of integrated health post cadres and the supporting equipment. Thus, the integrated health post can be implemented optimally.[34] To participate in handling stunting, Education, Youth and Sports Service can contribute to providing health education for adolescent women and those of childbearing age and providing blood-boosting tablets in the menstruation period for adolescents, particularly those of school age. Their health as future mothers is the key to preventing stunting in children.[35]

Traditional villages have a vital position in legalizing marriages in Balinese society. This role can be used as a basis for the success of the stunting reduction program. It can be recommended that prospective brides and grooms undergo premarital health checks to ensure that the prospective bride and groom have good health for marriage.[36] Thus, they are expected to live their marriage healthy, including their children. In exceptional cases, the traditional village is the party directly engaged in stunting prevention efforts, like the ones related to providing healthy toilets. In certain customs, wedding ceremonies require a fairly big budget. As a result, they need more money to build healthy toilets. By applying the principle of customary flexibility, the traditional village can help efforts of good stunting prevention.[12,37]

## CONCLUSIONS AND RECOMMENDATION

In Buleleng, four villages are included in the high stunting cluster. The poor provision of good-quality complementary foods and low family income influence many stunting cases there. The situation analysis results have detailed each party's roles and functions according to the regional needs to overcome the stunting problem in the regency. As stated in the policy strategy section, standard operating procedures must be prepared to produce clarity of the flow and stages to be used as a guideline in handling stunting. Further research needs to evaluate the implementation of stunting handling in the regency, by the regional needs based on the Holistic-comprehensive and Integrated Approach Model, to determine the program's effectiveness.

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