

*THE 8TH INTERNATIONAL SYMPOSIUM OF PUBLIC HEALTH 2024***CLUSTERING ANALYSIS OF FAMILIES BASED ON RAPID EVALUATION OF FAMILY COUNSELING PROGRAM FOR STUNTING RISK IN KELURAHAN X, SAMARINDA CITY**

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ABSTRACT

Introduction. Stunting prevalence in East Kalimantan has decreased to 22.8%, although it has not yet reached the WHO target. However, in 2022, the stunting rate increased to 23.9%. Based on the results of the 2021 Indonesian Toddler Nutritional Status Survey (SSGBI), there are 4 regencies/cities that have an average lower than the provincial average, namely West Kutai (15.8%), Balikpapan City (17.6%), Mahakam Ulu Regency (20.3%), and Samarinda City (21.6%). The objective of this study is to measure the indicators in accordance with the Family Counseling Implementation Guidelines, whether or not they have been achieved, and to cluster families based on their understanding of stunting. **Methods.** A rapid survey was conducted in this study with the following stages: (1) Determining the survey problem and objectives clearly and concisely, (2) Determining the sample size and sampling method, (3) Developing survey instruments, (4) Organizing and implementing the survey, and (5) Analysis, interpretation, and reporting. The population was 207 with a sample of 69, categorized as pre-pregnancy (5 samples), pregnant women (29 samples), and postpartum (32 samples). **Results and Discussion.** The results of the study inform that 34.78% of respondents do not know the definition of stunting, 49.27% of respondents know the impact of stunting, 31.88% stated that the cause of stunting is lack of nutritional intake during pregnancy, 33% stated that they do not know the characteristics of babies born at risk of stunting, and 22.97% stated that the characteristics of stunted toddlers are slow growth. The cluster results are divided into 3, namely cluster 0, which is families with a high level of awareness and knowledge about stunting prevention, cluster 1 with a moderate level of awareness and knowledge, and cluster 2, which is families that are less aware and less involved in stunting prevention efforts. **Conclusion.** Different approaches are needed for each cluster, such as an education approach related to basic information for cluster 2 families and involvement in stunting prevention programs for families with high awareness.

Keywords: awareness; stunting; families; cluster analysis

1. Introduction

Malnutrition and stunting are among the challenges in building quality human resources in Indonesia. The short-term impacts of stunting include brain development issues, intelligence deficits, physical growth disturbances, and disrupted metabolism, while the long-term effects involve reduced growth, cognitive development issues in children, learning difficulties, and poor immunity, leading to frequent illnesses and a high risk of metabolic diseases (Tim Negeri et al., 2021). In this regard, accelerating the reduction of stunting requires new, more collaborative, and sustainable strategies and methods from upstream to downstream. One of the updates to the stunting reduction acceleration strategy is a family approach through the assistance of families at risk of stunting to reach targeted groups, including prospective brides and grooms (catin)/prospective couples of childbearing age (PUS), pregnant and breastfeeding mothers, and children aged 0 to 59 months.

In implementing the assistance for families at risk of stunting, collaboration at the field level is necessary, involving midwives, cadres from the Family Empowerment and Welfare Team, and Family Planning cadres to provide support for families at risk of stunting. The family assistance team will serve as the spearhead in accelerating the reduction of stunting. They will oversee the stunting reduction process from upstream, particularly in prevention, starting from the incubation process to implementing other preventive measures against the direct causes of stunting. The Family Assistance Team consists of a group of personnel formed from midwives, TP PKK cadres, and family planning cadres to provide assistance, including counseling, facilitating referral services, and facilitating access to social assistance programs for prospective brides and grooms, pregnant women, postpartum mothers, and children aged 0 to 59 months, as well as conducting surveillance of families at risk of stunting to detect risk factors early. In various conditions, the composition of the family assistance team can be adjusted by collaborating with midwives from other villages or involving nurses or other health personnel (Novrizaldi, 2022).

Based on the prevalence data of stunted children collected by WHO, in 2020, 22% or approximately 149.2 million children worldwide experienced stunting (World Health Organization, 2021). Indonesia ranks as the second country in Southeast Asia with the highest prevalence of stunting at 31.8% (source). The latest data from the Indonesian Toddler Nutritional Status Survey (diskominfo, 2022) indicates that the stunting rate in Indonesia decreased to 24.4% in 2021. Nevertheless, this figure is still above the target set by WHO, which is a maximum of 20%.

In the same year, the stunting rate in East Kalimantan also decreased to 22.8% (SSGI, 2021), yet it has not reached the WHO target. However, in 2022, the stunting rate rose to 23.9%. According to the results of the Indonesian Toddler Nutritional Status Survey (SSGBI) in 2021, there were four districts/cities with averages lower than the provincial average: West Kutai (15.8%), Balikpapan City (17.6%), Mahakam Ulu Regency (20.3%), and Samarinda City (21.6%). Palaran is the second sub-district with the highest prevalence of stunting in Samarinda City. The evaluation of the program in Palaran was chosen due to the presence of many families at risk of stunting. The area's background, which is predominantly composed of migrant settlers, contributes to this issue, as the diversity of cultures and beliefs influences community mindsets and behaviors. Additionally, the area's accessibility highlights the need for an evaluation of the family assistance program, particularly in the X sub-district.

In 2021, children suffering from stunting were divided into two categories: 94 children classified as very short and 279 children classified as short (Health Office of Samarinda City, 2021). In the Palaran sub-district, there is a village with a family assistance program for those at risk of stunting, specifically X village. In X, there are 8 assistance teams, each responsible for 4-8 neighborhood units (RT). The categories targeted by these assistance teams include prospective brides and grooms, pregnant women, and postpartum mothers. In 2022, the total population identified was 207, consisting of 15 prospective brides and grooms, 92 pregnant women, and 100 postpartum mothers. Based on observations and interviews conducted with the P2KB of X village, there were 27 cases of stunting in 2021, 12 cases in 2022, and 11 cases in 2023, indicating a decrease in the stunting rate over the past three years.

The primary responsibility of the Family Assistance Team is to support families that are vulnerable to stunting. Family assistance is understood as a series of activities that include counseling, facilitating referral services, and providing social assistance aimed at improving access to information and services for families and/or

those at risk of stunting, such as pregnant women, postpartum mothers, and children aged 0 to 59 months, as well as all prospective brides and grooms of childbearing age. This assistance includes a three-month premarital program as part of marriage services to detect early risk factors for stunting and to implement efforts to minimize or prevent the impacts of these risk factors.

2. Literature Review

The issue of malnutrition and stunting in Indonesia has garnered significant attention due to its profound impact on child development and public health. According to the World Health Organization (2021), approximately 149.2 million children worldwide experienced stunting in 2020, with Indonesia reporting a prevalence rate of 31.8%. This alarming statistic highlights the necessity for effective interventions and strategies to combat stunting. Previous research has established a strong correlation between socio-economic factors and the prevalence of stunting. For instance, studies have shown that families with lower income levels are more susceptible to malnutrition, which in turn affects children's growth and cognitive development (Tim Negeri et al., 2021). Additionally, cultural diversity and varying beliefs among migrant communities can influence dietary practices and health-seeking behaviors, further contributing to the stunting crisis (Novrizaldi, 2022).

The role of family assistance programs in mitigating stunting has also been emphasized in the literature. Family support initiatives, which include counseling, health education, and access to social services, have been found to significantly improve the nutritional status of children at risk of stunting. These programs aim to empower families by providing essential information and resources, enabling them to make informed decisions regarding their health and nutrition (Dinas Kesehatan Kota Samarinda, 2021). Furthermore, a review of local government interventions reveals that targeted programs focused on pregnant women and children under five are critical in reducing stunting rates. Reports indicate that districts with active family assistance teams have experienced a decrease in stunting cases over recent years, suggesting that community-based approaches are effective in addressing this issue (SSGI, 2021).

This study aims to explore the following research questions:

- a. What is the level of knowledge among families regarding stunting prevention?
- b. What behaviors do families exhibit in relation to the prevention of stunting?
- c. How can cluster analysis be employed to categorize families based on their knowledge and behaviors regarding stunting prevention?

Based on the existing literature, the following hypotheses are proposed:

H_0 : Families with higher knowledge levels about stunting prevention will exhibit more positive behaviors in preventing stunting.

H_1 : There will be distinct clusters of families based on their knowledge and behaviors related to stunting prevention, indicating varying levels of risk and resource needs.

The theoretical framework for this study is grounded in the Health Belief Model (HBM) and Social Cognitive Theory (SCT). Health Belief Model (HBM): This model posits that an individual's beliefs about health problems, perceived benefits of action, and barriers to action can predict health-related behaviors. In the context of stunting, families' knowledge about the risks and prevention strategies will influence their behaviors. Social Cognitive Theory (SCT): SCT emphasizes the importance of observational learning, imitation, and modeling in behavior change. It suggests that families can learn effective stunting prevention behaviors through community programs and support networks.

3. Research Method

The evaluation method used in this study is a Rapid Survey, which involves collecting information from a sample that represents the population. The procedure follows five stages: (1) clearly defining the problem and objectives, (2) determining sample size and sampling method, (3) developing the survey instrument, (4) organizing and conducting the survey, and (5) analyzing, interpreting, and reporting the results. The survey population consists of 207 individuals, including prospective brides and grooms (4), pregnant women (92), and

postpartum mothers (100). The sample size was determined using simple random sampling with stratified methods, resulting in a total sample of 66 individuals: 5 prospective brides and grooms, 29 pregnant women, and 32 postpartum mothers.

Data will be analyzed using statistical software such as R Studio and Python 3.11.4. Nominal and ordinal data will be presented in graphical format, while interval and ratio data will be displayed in tables. Variables will be analyzed from univariate to multivariate levels.

4. Results and Discussion

This research has been conducted in two stages. The first stage involved providing knowledge instruments to families, while the second stage focused on the preventive behaviors against stunting that have been implemented. Initially, the target sample was 66, but due to the enthusiasm of families to participate, the sample size increased to 74 families. In the second stage, some families encountered circumstances that prevented them from participating again, resulting in a final sample size of 69. Below are the descriptive results.

Table 1. The characteristics of the respondents involved in the study

Variables	category	frequency	Percentage (%)
Status within the family	Mother	73	98,6%
	Sibling	1	1,35%
ages	20 – 24	13	17,56%
	25 – 29	18	24,32%
	30 – 34	22	29,72%
	35 – 39	18	24,32%
	40 - 44	3	4,05%
Education	D3	2	2,70%
	S1	12	16,22%
	SD/ Sederajat	5	6,76%
	SMA/ sederajat	43	58,11%
	SMP/ sederajat	11	14,86%
	Tidak tamat SMA	1	1,35%
occupation	Housewife	63	86,3%
	Civil servant	1	1,37%
	Contract worker	3	4,11%
	Unemployed	2	2,74%
	Entrepreneur	3	4,11%
	Government Employee with a contract	1	1,37%
Group	Children aged 0 – 59 months	27	36,49%
	Prospective bride	2	2,70%
	Pregnant woman	30	40,54%
	Postpartum woman	15	20,27%

The majority of respondents interviewed were mothers (98.6%), with the age range being 30 to 34 years (29.72%). Most of them had a last education level of high school or equivalent (58.11%), and a large portion were housewives (86.3%). Based on the groups that were divided (this division is from P2KB and local cadres), 40.54% of them were pregnant women.

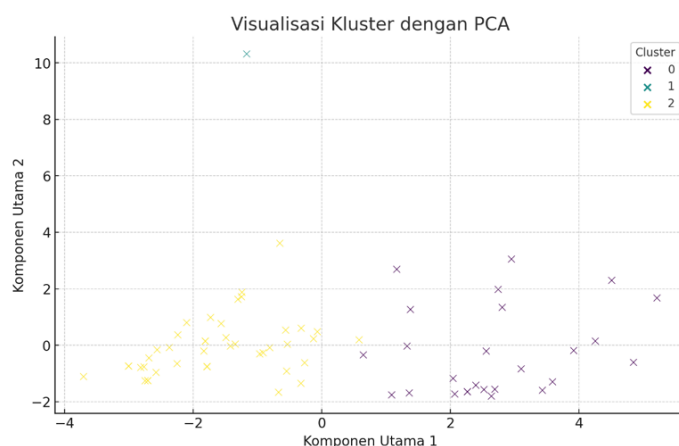


Figure 1. Result of cluster Analysis

Results of Cluster Visualization Using PCA (Principal Component Analysis). The data underwent transformation and standardization to facilitate the clustering process. The K-Means method was applied with the assumption of three distinct clusters. Principal Component 1 (PC1) and Principal Component 2 (PC2) are the results of PCA, used to reduce data dimensions for visualization. From the graph above, we can see that the data has been divided into three different clusters. Each cluster represents a group of respondents with similar response characteristics. This can help in identifying patterns or segments within the survey population that have similar perceptions or behaviors related to stunting prevention. Cluster Division: The survey data is divided into three distinct clusters, each representing a segment of respondents with similar characteristics. Response Variability: These clusters may reflect variability in the understanding, attitudes, and behaviors of respondents regarding stunting prevention. This indicates significant differences in how respondents address and understand the issue of stunting.

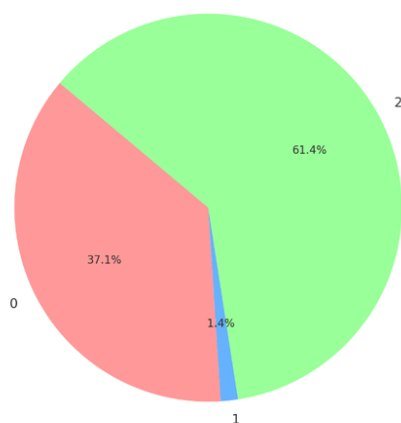


Figure 2. Percentage Every Cluster

Visualization in the form of a pie chart showing the percentage of each cluster based on the cluster analysis conducted:

Cluster 0: Accounts for approximately 37.1% of the total respondents.

Cluster 1: Accounts for approximately 1.4% of the total respondents.

Cluster 2: Is the largest cluster, comprising about 61.4% of the total respondents.

This chart provides a visual representation of the distribution of respondents in each cluster, indicating that the majority of respondents are in Cluster 2, while Cluster 1 has the fewest members.

The differences between the clusters indicate the need for varying educational approaches. Clusters with low awareness may require more basic information and education about the importance of nutrition and hygiene, while clusters with high awareness may be included in more advanced stunting prevention programs. Intervention programs and policies can be tailored based on the characteristics of each cluster. For example, the focus could be on enhancing access to information and resources for clusters with low engagement, while reinforcing and supporting good practices in clusters with high awareness. These findings can also be useful for designing community engagement programs more effectively by targeting messages and activities that align with the characteristics of each cluster. The cluster analysis conducted in this study provides valuable insights into the differences in perceptions and practices regarding stunting prevention among respondents. The results reflect three groups that demonstrate varying levels of awareness and engagement concerning the issue.

These findings align with social psychology theories that emphasize the importance of individual differences in addressing health and nutrition issues (Brown, 2015). The largest group, Cluster 2, represents the majority of the respondent population who may have limited knowledge or lack the resources to adopt effective stunting prevention practices. This outcome supports previous research suggesting that stunting prevention approaches that do not consider variations in individual knowledge and resources may be less effective (Smith et al., 2018). However, it should be noted that Cluster 1, with only one respondent, shows significant variation in understanding or practicing stunting prevention. This reflects the diversity of individual approaches to specific health issues, which has been identified in prior research (Jackson et al., 2017). These findings support the argument that stunting prevention interventions should take individual differences into account in greater detail to achieve optimal impact. Therefore, educational and intervention strategies tailored to the characteristics of each cluster, as proposed by Brownell et al. (2019), could be a more effective approach to enhancing understanding and implementation of stunting prevention practices.

The results of this study reflect variations in levels of knowledge and commitment to stunting prevention practices among respondents, creating opportunities for tailored intervention approaches. Previous research supporting this concept includes studies that apply the Health Belief Model (HBM) and Theory of Planned Behavior (TPB) in the context of child health and nutrition (Glanz et al., 2008; Sharma, 2015). By understanding the psychological and social dimensions that drive health behavior, intervention strategies can be developed more precisely for each cluster.

However, it is also important to evaluate whether the differences in perceptions and practices of stunting prevention among these clusters may be influenced by contextual factors, such as accessibility to health services, socioeconomic conditions, and local culture (Victora et al., 2010; Black et al., 2013). Further research that integrates these factors could provide a more comprehensive view of the determinants of stunting prevention behavior.

5. Conclusion

This article presents a cluster analysis that reveals variations in respondents' understanding and responses to the issue of stunting prevention. The research findings identify three distinct clusters: Cluster 0, with moderate understanding; Cluster 1, consisting of a single individual with unique views; and Cluster 2, the largest group, showing low engagement in stunting prevention. These findings highlight the importance of understanding the variations in community knowledge and attitudes toward stunting prevention. This can enrich the literature on

malnutrition and health behaviors, paving the way for further research on the factors influencing understanding and practices related to stunting prevention across different communities. For health program managers, the results indicate the need for a more segmented approach in stunting prevention interventions. Education and intervention programs should be tailored to the characteristics of each cluster, particularly to enhance knowledge and engagement in Clusters 0 and 2, while also gaining deeper insights into the motivations of Cluster 1.

Future research is recommended to further explore the factors influencing the views and behaviors of individuals in Cluster 1, as well as to develop more effective educational programs for Cluster 2. Additionally, longitudinal studies could provide insights into changes in attitudes and stunting prevention practices over time. Thus, this research contributes to the development of more effective strategies in combating stunting within communities.

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