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Community Empowerment Model for Preventing Child Stunting in Malang Regency

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Abstract

Stunting is a chronic nutritional problem due to a lack of long-term nutritional intake, resulting in impaired growth in children. The government's commitment to reducing stunting rates can be carried out through empowerment programs. The highest level of empowerment is reflected in being able to make decisions. This study aims to analyze the factors influencing decision-making related to the community empowerment development model to prevent stunting in children in Malang Regency. The research method uses Smart/PLS analysis. Respondents are stakeholders related to stunting. The study results show that welfare directly influences decision-making regarding stunting prevention. The community at the research location needs to improve welfare to increase their empowerment in reducing stunting. Awareness of stunting problems is a potent mediator for increasing empowerment through welfare and participation. This study suggests that it is necessary to develop welfare programs and community involvement to increase community empowerment and overcome stunting.

Keywords: empowerment, welfare, access, participation, critical awareness and control

INTRODUCTION

Stunting is a serious public health challenge in Indonesia, with a high prevalence that continues to be a national concern [1]. According to the Indonesian Nutritional Status Survey (SSGI), stunting in Indonesia reached 24.4% in 2021 [2]. This figure remains above the WHO standard, setting the ideal prevalence below 20% [3]. Stunting is caused by chronic malnutrition during the First 1000 Days of Life [4], which will impact physical development and cause children to become more susceptible to disease. Apart from that, the long-term impact of stunting can also cause a decline in cognitive function, namely in children's intelligence and way of thinking in the future [5]. Malang Regency is one of the priority areas in the stunting acceleration program in East Java, with a stunting prevalence reaching 19.5% in 2023, and is ranked 12th out of 38 regencies/cities with stunting prevalence rates in East Java [6]. The main problems in this area include limited access to nutritious food, inadequate sanitation, and minimal public awareness of the importance of preventing stunting. Other factors, such as the low capacity of local institutions to support prevention efforts, are also major obstacles [7]. In this context, the community empowerment model is a relevant strategy for increasing local capacity to overcome the stunting problem. Community empowerment focuses on increasing individual knowledge and skills and strengthening community institutions such as integrated health service posts, cross-sector partnerships, and utilizing local potential (BAPPENAS, 2019) [8].

This research aims to develop an evidence-based community empowerment model to integrate various main factors, including welfare, access, participation, and critical community awareness, to improve decision-making abilities in stunting prevention. One important approach is analysis: Structural Equation Modeling-Partial Least Squares (SEM-PLS). Method Partial Least Square (PLS) not only confirms existing theories but is also helpful in building new relationships that do not have a previous theoretical basis or proposition [9]. Structural Equation Modeling—Partial Least Square (SEM-PLS) is a very flexible and effective analysis technique, allowing structural equation modeling without requiring the data to be normally distributed [10]. This method can also be used on relatively small

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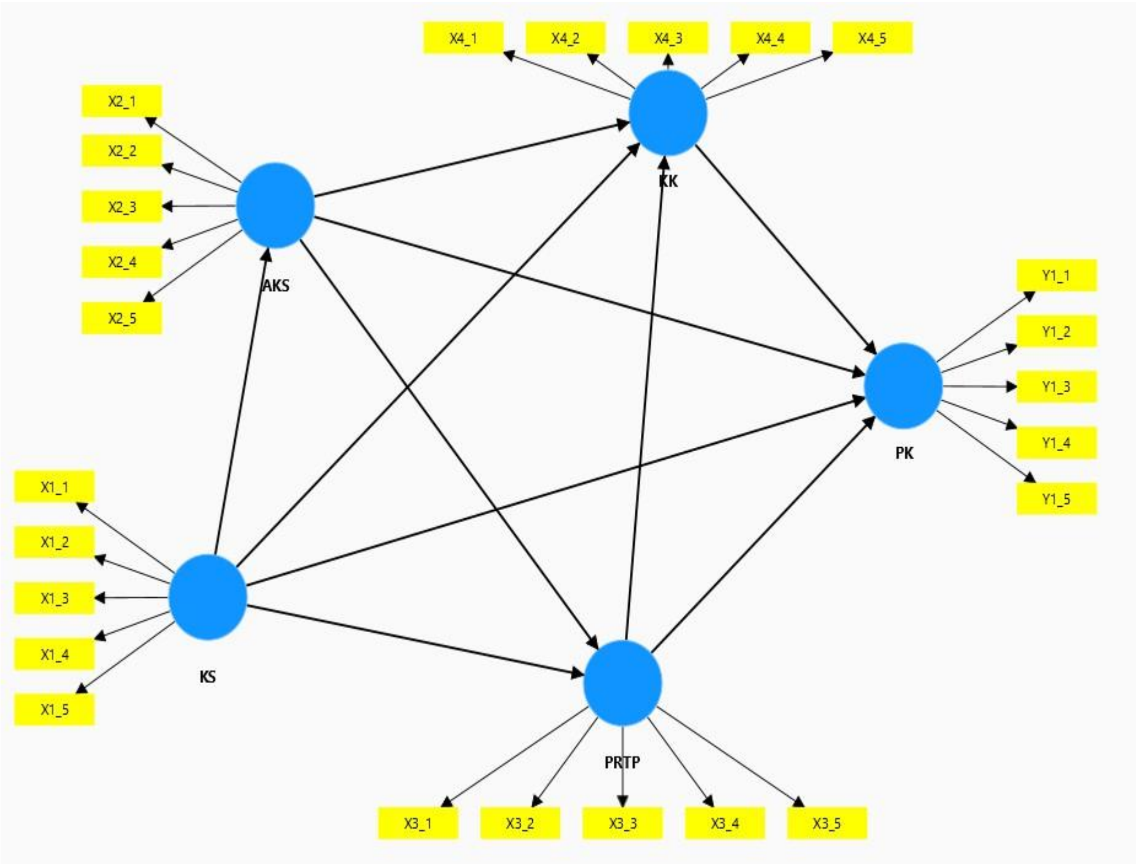
sample sizes and supports using reflective, formative indicators, or a combination of both [11]. This approach allows evaluation of the direct and indirect relationships between various factors that influence the success of community empowerment models, such as family well-being, access to health services, and the level of community participation in stunting prevention programs.

Through this research, it is hoped that the community empowerment model designed can provide an effective holistic approach to be implemented in Malang Regency and other areas with similar challenges. With a combination of community-based interventions and evidence-based analysis, this research aims to support national efforts to reduce the prevalence of stunting to reach the target of 14% by 2024, as set out in the 2020–2024 RPJMN.

MATERIAL AND METHOD

This research is a type of quantitative research with an explanatory approach that aims to test the relationship between variables in the empowerment model that has been designed. Data analysis was carried out using Structural Equation Modeling—Partial Least Squares (SEM-PLS), which was chosen because of its ability to process models with small sample sizes and complex variable structures [12]. A measurement model will be carried out to test the validity and reliability of the latent variables. Next, the value calculation will be carried out R-Square and Q-Square to see a variable's influence and level of predictive relevance [13]. Hypothesis testing is also done by comparing the p-value in the analysis path coefficients.



Data Collection

Data collection involved 58 selected respondents who met specific criteria. Data was collected using two techniques: questionnaires to obtain quantitative data and interviews to deepen information related to research variables. The questionnaire includes 25 questions designed based on the five main variables in the empowerment model. The questions use a five-level Likert scale to capture respondents' perceptions measurably

Table 1. Operational Variables

Variables	Indicator	Measurement
Well-being (X1)	My family's income is sufficient to meet children's nutritional needs (such as milk, protein, vegetables, and fruit). Without financial hardship, I can meet my child's basic needs (such as food, clothing, and health). I have sufficient knowledge about the importance of nutrition for children's growth. The education I received helped me understand the relationship between malnutrition and the risk of stunting in children. My social environment encourages healthy lifestyles, including hygiene and children's health.	Ordinal
Access (X2)	I find it easy to access health service facilities for mothers and children (such as Integrated Health Post, Community Health Centers, or clinics). I received support from the government's social assistance program, which supports children's nutritional needs. I have access to immunization programs and routine health checks that help prevent stunting in children. In my environment, healthy food is affordable to meet children's nutritional needs. In my environment, access to clean water and sanitation is adequate to support children's health and prevent stunting.	Ordinal
Participation (X3)	I actively participate in stunting reduction activities or programs in my area. I involve other family members to maintain children's health and prevent stunting. I often discuss with neighbors or friends the importance of preventing stunting in children in my neighborhood. I support increasing participation (providing suggestions) regarding clean water and sanitation resources in my environment for stunting prevention. I support government programs to prevent stunting, such as providing additional food or supplementation.	Ordinal
Critical Awareness (X4)	I know that a lack of proper nutritional intake in children can cause stunting. I know that stunting can affect children's cognitive and physical development in the long term. I know the importance of taking children to the Integrated Health Post, or community health center, to monitor growth regularly. I realize that the role of parents is very important in ensuring that children get adequate nutrition every day. I realize that family economic factors play a big role in the ability to provide nutritious food for children	Ordinal
Decision Making (Y1)	I regularly schedule children's health checks (such as Integrated Health Post or Health Center). I ensure that all decisions regarding child nutrition are taken based on correct and accurate information. I always look for assistance or counseling programs related to nutrition to support decision-making in preventing stunting in children. I consider recommendations from health workers or medical personnel before deciding on a child's food menu. I feel that my decisions regarding nutrition and child health have an impact on the overall well-being of the family.	Ordinal

This research uses primary and secondary data. Primary data was obtained through a questionnaire containing 25 questions to measure the five main variables in the empowerment model. The questions in the questionnaire are arranged using a five-level Likert scale, which allows respondents to respond based on their level of agreement with each statement. Apart from that, this research also used interviews with selected respondents to complete the quantitative data. Interviews are carried out in stages to gather more in-depth information that cannot be reached with just a questionnaire. This interview technique aims to validate quantitative data and provide context for the relationship between the tested variables.

The research population consisted of mothers of toddlers, Integrated Health Service Post administrators, midwives, and medical personnel involved in empowerment programs in the two villages used as research locations. Method purposive sampling ensures that the selected respondents comply with the research criteria. This sample selection was based on several inclusion criteria, such as:

1. Respondents must have a role or direct experience in the Integrated Health Service Post empowerment programs.
2. Willing to participate in filling out questionnaires and interviews.
3. Comes from a village determined as a research location.

From this population, 58 respondents were selected in stages. This sample size was determined based on analysis needs using SEM-PLS, where the number of respondents was sufficient to evaluate the model of 25 indicators. Meanwhile, secondary data was obtained from various sources, such as previous research, statistical data from the Central Statistics Agency (BPS), and relevant documentation. Data obtained from primary and secondary collection methods was then analyzed using the SEM-PLS approach to evaluate the relationship between variables and test the empowerment model that had been designed.

RESULT AND DISCUSSION

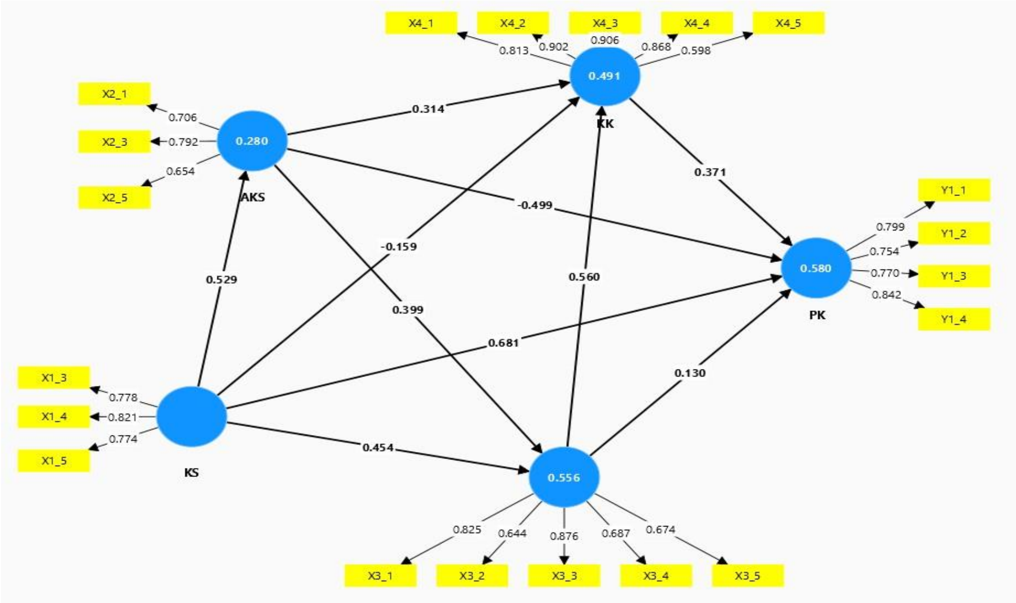
A. Validity Test

The first validity test is convergent validity, which can be seen from the value loading factor. The recommended loading factor value for testing convergent validity is >0.7; however, if the model in the research is new, then the indicator can still be declared valid if the value of the loading factor is >0.5 [14].

Table 2. Convergent Validity Test

Variable	Indicator	Loading Factor	AVE	Information
	X1.3	0.778		Valid
Well-being (WB)	X1.4	0.821	0.626	Valid
(X1)	X1.5	0.774		Valid
	X2.1	0.706		Valid
Access (ACS)	X2.3	0.792	0.518	Valid
(X2)	X2.5	0.654		Valid
	X3.1	0.825		Valid
	X3.2	0.644		Valid
Participation (PRTP)	X3.3	0.876	0.558	Valid
(X3)	X3.4	0.687		Valid
	X3.5	0.674		Valid
	X4.1	0.813		Valid
	X4.2	0.902		Valid
Critical Awareness (CA)	X4.3	0.906	0.681	Valid
(X4)	X4.4	0.868		Valid
	X4.5	0.598		Valid
	Y1.1	0.799		Valid
	Y1.2	0.754		Valid
Decision Making (DM)			0.627	
(Y1)	Y1.3	0.770		Valid
	Y1.4	0.842		Valid

Based on the analysis results in Table 2, 20 indicators comply with convergent validity requirements. The 5 indicators that do not meet are indicators X1.1 and X1.2 on the Welfare variable, X2.2 and X2.4 on the Access variable, and indicator Y1.5 on the decision-making variable. Indicators that do not meet convergent validity requirements are removed so as not to disrupt the research model.



Discriminant Validity Test

Based on the second validity test in the picture above, it is known that all variables have a loading factor that is greater than the value of the cross-loading factor. Therefore, this shows that the indicator meets the discriminant validity test.

B. Reliability Test

Data reliability can be seen in the composite reliability value and Cronbach's alpha. Criteria for composite reliability: if the composite reliability value is > 0.7, then a questionnaire can be said to be reliable. Criteria for Cronbach's alpha: if the value of Cronbach's alpha > 0.6, then the questionnaire can be considered consistent [8]. The results of the reliability test can be seen in the following table:

Table 3. Reliability

Variable	Composite Reliability	Cronbach's Alpha	Information
Well-being (X1)	0.712	0.704	Reliability Test Fulfilled
Access (X2)	0.596	0.592	Reliability Test Not Fulfilled
Participation (X3)	0.830	0.799	Reliability Test Fulfilled
Critical Awareness (X4)	0.904	0.878	Reliability Test Fulfilled
Decision Making (Y1)	0.801	0.801	Reliability Test Fulfilled

Table 3 shows that four of the five variables have values of composite reliability > 0.7 and Cronbach's alpha > 0.6, so it can be concluded that the four constructs for this research model are considered reliable. The questionnaire for the variables X1, X3, X4, and Y1 shows good reliability. However, for ACS variables (X2), value composite reliability, mark Cronbach's alpha indicates a problem with the reliability of the indicator.

B. R-Square

Mark R-Square (R2) is used to measure the extent to which the independent variable (independent) affects the dependent variable (dependent) [15]. Mark R-Square is divided into three criteria: an R-Square value of 0.65 means a strong influence, a value of 0.33 means moderate, and a value of 0.19 means weak.

Table 4. Convergent Validity Test

	R-Square	R-Square adjusted
Access (X2)	0.257	0.244
Critical Awareness (X4)	0.480	0.451
Decision Making (Y1)	0.592	0.561
Participation (X3)	0.562	0.546

The results of the analysis above show that the Access variable (X2) has a value R-Square of 0.257 or 25.7%, and the Critical Awareness (X4) variable of 0.480, or 48%, which means that the independent variable weakly explains this variable. Meanwhile, the Decision Making (Y1) and Participation (X3) variables have values R-Square of 0.592, 59.2%, and 0.562, or 56.2%, meaning that variability can be explained strongly by the independent variable. This shows that the modeling created produces a good model.

D. *Q*-Square

Predictive relevance (Q^2) in structural model evaluation shows a variable's level of predictive relevance [16]. The Q^2 value is calculated using the $Q^2 = 1-(1-R_1^2)(1-R_2^2)$. The closer to 1 the Q^2 value, the better the quality of the model. The Q^2 values in this research are as follows:

$$
\begin{aligned}
Q^2 &= 1 - (1-R_1^2)(1-R_2^2) \\
&= 1 - (1-0.592)(1-0.562) \\
&= 1 - (0.408)(0.438) \\
&= 1 - 0.178 \\
&= 0.822
\end{aligned}
$$

E. Significance Test

Table 5. Direct Connection

	Original Sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (I0/STDEVI)	P values
ACS -> CA	0.314	0.321	0.162	1.938	0.053
ACS -> DM	-0.499	-0.505	0.152	3.290	0.001
ACS -> PRTP	0.399	0.419	0.112	3.572	0.000
CA -> DM	0.371	0.380	0.144	2.578	0.010
WB -> ACS	0.529	0.546	0.114	4.622	0.000
WB -> CA	-0.159	-0.149	0.200	0.797	0.425
WB -> DM	0.681	0.680	0.139	4.915	0.000
WB -> PRTP	0.454	0.433	0.127	3.576	0.000
PRTP -> CA	0.560	0.563	0.143	3.919	0.000
PRTP -> DM	0.130	0.146	0.177	0.735	0.462

Based on the analysis path coefficients above, it can be concluded that:

1. ACS → CA

Original Sample (O): 0.314, Sample Mean (M): 0.321, STDEV: 0.162, P-value: 0.053

The relationship is positive but not statistically significant (P > 0.05). The standard deviation is quite large, indicating high variability.

2. ACS → DM

O: -0.499, M: -0.505, STDEV: 0.152, P-value: 0.001

The negative relationship was significant (P < 0.05). The coefficient (-0.499) shows that increasing ACS can significantly reduce DM.

3. ACS → PRTP

O: 0.399, M: 0.419, STDEV: 0.112, P-value: 0.000

The positive relationship was significant (P < 0.05). The fairly large coefficient (0.399) and small STDEV indicate a strong and consistent relationship.

4. CA → DM

O: 0.371, M: 0.380, STDEV: 0.144, P-value: 0.010

The positive relationship was significant (P < 0.05). The coefficient (0.371) shows the contribution of CA to DM, although STDEV is rather high.

5. WB → ACS

O: 0.529, M: 0.546, STDEV: 0.114, P-value: 0.000

The positive relationship was significant (P < 0.05). The high coefficient (0.529) with a small STDEV indicates a strong and consistent relationship.

6. WB → CA

O: -0.159, M: -0.149, STDEV: 0.200, P-value: 0.425

The relationship was negative but not significant (P > 0.05). A small coefficient (-0.159) with a large STDEV indicates a weak and inconsistent relationship.

7. WB → DM

O: 0.681, M: 0.680, STDEV: 0.139, P-value: 0.000

The positive relationship was significant (P < 0.05). A high coefficient (0.681) indicates a large contribution, with a small STDEV indicating consistency.

8. WB → PRTP

O: 0.454, M: 0.433, STDEV: 0.127, P-value: 0.000

The positive relationship was significant (P < 0.05). The moderate coefficient (0.454) with low STDEV shows a fairly strong and consistent relationship.

9. PRTP → CA

O: 0.560, M: 0.563, STDEV: 0.143, P-value: 0.000

The positive relationship was significant (P < 0.05). A high coefficient (0.560) indicates a large contribution, with a moderate STDEV indicating good consistency.

10. PRTP → DM

O: 0.130, M: 0.146, STDEV: 0.177, P-value: 0.462

The relationship is positive but not significant (P > 0.05). A small coefficient (0.130) with a large STDEV indicates a weak and inconsistent relationship.

Paths with a strong, significant, and consistent relationship (high coefficient, small STDEV, and P- value < 0.05): ACS → PRTP, WB → ACS, WB → DM, PRTP → CA. Paths with a weak or insignificant relationship (small coefficient or P-value > 0.05): ACS→ CA, WB→ CA, PRTP→ DM. Most of the relationships between variables show significant contributions, but non-significant paths can be revisited for model improvement or further interpretation.

F. Total Indirect Effects

Table 6. Indirect Relationships

	Original Sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (I0/STDEVI)	P values
ACS -> CA	0.223	0.234	0.085	2.625	0.009
ACS -> DM	0.251	0.283	0.107	2.341	0.019
WB -> CA	0.538	0.542	0.113	4.758	0.000
WB -> DM	-0.037	-0.034	0.142	0.258	0.796
WB -> PRTP	0.211	0.227	0.083	2.540	0.011
PRTP -> DM	0.208	0.210	0.090	2.321	0.020

Based on results bootstrapping on output Smart PLS, here is an interpretation of the values displayed for indirect effects (indirect effects):

1. ACS → CA

Original Sample (O): 0.223, T-statistics: 2.625, P-value: 0.009

The indirect relationship between ACS and CA was significant (P < 0.05). The positive coefficient (0.223) indicates that ACS contributes to increasing CA indirectly through certain mediators.

2. ACS → DM

O: 0.251, T-statistics: 2.341, P-value: 0.019

The indirect relationship between ACS and DM is significant (P < 0.05). The positive coefficient (0.251)

indicates a significant indirect effect, with ACS indirectly improving DM.

3. WB → CA

O: 0.538, T-statistics: 4.758, P-value: 0.000

The indirect relationship between WB and CA is highly significant (P < 0.01). The high coefficient (0.538) indicates that WB has a large indirect contribution to CA through mediators.

4. WB → DM

O: -0.037, T-statistics: 0.258, P-value: 0.796

The indirect relationship between WB and DM was insignificant (P > 0.05). A small negative coefficient (- 0.037) indicates a weak and insignificant relationship, so WB does not make a significant indirect contribution to DM.

5. WB → PRTP

O: 0.211, T-statistics: 2.540, P-value: 0.011

The indirect relationship between WB and PRTP was significant (P < 0.05). The positive coefficient (0.211) indicates that WB indirectly increases PRTP through certain mediators.

6. PRTP → DM

O: 0.208, T-statistics: 2.321, P-value: 0.020

The indirect relationship between PRTP and DM was significant (P < 0.05). The positive coefficient (0.208) indicates that PRTP indirectly improves DM through mediation pathways.

Significant indirect relationships were found in the pathways ACS → CA, ACS → DM, WB → CA, WB → PRTP, and PRTP → DM. This suggests the existence of relevant mediating influences on these pathways. The path WB → DM was insignificant (P > 0.05), indicating that WB did not have a significant indirect effect on DM. These results can be used to understand how the mediator variables strengthen or weaken the relationship between the main variables, with further testing using SEM-PLS to confirm the role of the mediation path.

CONCLUSION

Based on analysis using the SEM-PLS method related to the development of a community empowerment model for preventing stunting in children in Malang Regency, it was found that the factors of welfare, access, participation, and critical awareness have a significant influence on the community's ability to make decisions regarding stunting prevention. Community welfare was found to be the factor that has the strongest direct impact on decision-making. At the same time, critical awareness acts as a mediator that strengthens the relationship between welfare and decision-making. The strength of this research is its comprehensive and evidence-based approach and its analysis, which can capture complex variable relationships. However, there are weaknesses in the reliability of the access variables, and some relationships between variables are not significant, which indicates the need for model improvement.

RECOMMENDATION

Suggestions that can be given for further research related to developing a community empowerment model in efforts to prevent stunting, namely:

1. Increasing the validity and reliability of access variables through broader data collection and developing more representative indicators.
2. Strengthening locally based programs such as nutrition education, improving the quality of Integrated Health Service Post, and providing affordable access to nutritious food needs to be optimized.
3. Research can examine the effectiveness of this model in other areas to expand its applicability.

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