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## Mass Distribution of Insecticide-Treated Nets: A Qualitative Study on Sumba Island

Yona Patanduk✉<sup>1</sup>, Rais Yunarko<sup>1</sup>, Mefi M. Tallan<sup>2</sup>, Anderias K. Bulu<sup>2</sup>, Marni Tangkelangi<sup>3</sup>

<sup>1</sup> National Research and Innovation Agency, Cibinong, West Java, Indonesia

<sup>2</sup> Waikabubak Public Health Laboratory, Ministry of Health, West Sumba, East Nusa Tenggara, Indonesia

<sup>3</sup> Health Polytechnic of the Ministry of Health Kupang, East Nusa Tenggara, Indonesia

✉Email: [yona\\_patanduk@yahoo.com](mailto:yona_patanduk@yahoo.com)

### ABSTRACT

**Background:** The distribution of insecticide-treated nets (ITNs) is one of the main forms of malaria control intervention in Sumba Island. Although it has been running for more than a decade, there are still some gaps in the planning and implementation of this program. **Aims:** This study aims to obtain an overview of the planning and implementation of the mass distribution of ITNs running on Sumba Island, Indonesia. **Methods:** This study is qualitative research conducted in 2019 in all districts on Sumba Island. Data were collected by conducting in-depth interviews with 53 informants, including those in charge of the program, cross-sectors, and communities selected based on the researcher's considerations. Thematic analysis was used to produce the findings. **Results:** The study showed a gap between the number of ITNs and the real target, the sources of data on ITNs targets are different, and cross-sector involvement is limited to socialization activities, not maximizing the socialization and education of ITNs to the community. **Conclusion:** The planning and implementation of the mass distribution of ITNs on Sumba Island have not run optimally at the stages of socialization, logistics management, and distribution to the community. Modification of socialization methods and strengthening of distribution strategies to the community is needed.

**Keywords:** distribution, insecticide-treated nets, malaria, socialization, Indonesia

### INTRODUCTION

Indonesia is entering a difficult period in the national malaria elimination program. After 10 years of declining cases, the last three years have seen an increase in malaria cases in some areas (Ministry of Health RI, 2018). Indonesia succeeded in reducing the Annual Parasite Incidence (API) to <1% from 2015 to 2020. However, in 2021 the API increased to 1.1% (Ministry of Health RI, 2021). Reducing the number of malaria cases seems easier than working toward sustainable elimination (Dhiman, 2019).

East Nusa Tenggara province has the third highest malaria prevalence rate (1.99%) in Indonesia. Sumba Island is the region with the most cases. Malaria prevalence in West Sumba was 8.61%, in Southwest Sumba 5.20%, in Central Sumba 8.41%, and in East Sumba 7.01% (Ministry of Health RI, 2019). All districts on Sumba Island are in the high endemic category

(API 5-50%) and are still in the acceleration stage (Ministry of Health RI, 2018).

Malaria control is part of the Sustainable Development Goals (SDGs) until 2030. The distribution of ITNs is a control effort to reduce malaria cases by protecting part or all of the population at risk. From 2004-2016, 23 million ITNs have been distributed in Indonesia. In 2017, 3,984,224 ITNs were distributed in the Eastern Region and focus areas outside the Eastern Region of Indonesia (DG of Disease Prevention and Control, 2018).

For more than two decades, long-lasting insecticidal nets (LLINs) have significantly reduced malaria morbidity and mortality (Paaijman and Huijben, 2020). Insecticide-treated nets are more effective in vector control and more cost-effective than Indoor Residual Spraying (IRS) (Zenkov *et al.*, 2017; Setyaningsih *et al.*, 2018).

Implementation of the ITNS program needs to pay attention to planning, strategic coordination, cross-sector cooperation, community involvement, and community leaders (Masaninga *et al.*, 2018). Collaborative planning and coordination processes influence the success of the ITN program (Arroz *et al.*, 2018) and coverage can be improved by developing a distribution strategy (Arroz *et al.*, 2017; Ntuku *et al.*, 2017).

Proper distribution will encourage increased coverage and utilization of ITNs by the community. Several periods of ITN distribution have been carried out but the high malaria cases on Sumba Island is the reason for reviewing the implementation of the ITN distribution program on Sumba Island. This study aimed to obtain an overview of the ITNs program on Sumba Island from planning to distribution to the community including barriers and opportunities in its implementation. The findings will help in planning the ITN program on Sumba Island.

## METHODS

This qualitative research has received approval from the Ethics Commission, National Institute of Health Research and Development Ministry of Health of the Republic of Indonesia number LB. 02.01/2/ KE.029/2019. The research was conducted in 2019 in all districts on Sumba Island, namely West Sumba, Southwest Sumba, Central Sumba, and East Sumba.

The research's informants were purposively selected based on specified criteria related to their position as the person in charge of the disease control program, malaria program manager, and other officers who play a role in distributing ITNs to the community. Data were obtained from 53 district informants and collected through in-depth interviews. The informants consisted of community members, cadres, community leaders, the person in charge of the public health center (PHC) program, the person in charge of the health office program, and the vector program section at the central level.

Data were collected by the research team who had been provided

with guidelines and materials for ITN programs. The guidelines were based on the guidelines for the mass distribution of ITNs in Eastern Indonesia and were developed during the interview process. The interviews were recorded and transcribed. The results were analyzed based on themes presented in a narrative.

## RESULTS AND DISCUSSION

### A. General Characteristics of The Informant

Between May - October 2019, we visited and interviewed 53 informants. Informants were selected based on their position and involvement in ITN distribution. We interviewed multiple informants because the ITN program is a multi-role program. Many informants were interviewed to get more information from each role in the implementation of the ITN distribution program on Sumba Island. Public health center (PHC) informants were from PHC with high malaria cases. We visited nine PHCs on Sumba Island, two in West Sumba, three in Southwest Sumba, three in Central Sumba, and one in East Sumba.

A total of 52 informants were from districts on Sumba Island and one informant was a malaria sub-directorate officer from the Ministry of Health who we interviewed while on official duty in East Sumba District. We interviewed a central informant to obtain information and confirmation on the ITN distribution process at the central level. The researcher coded "D" for district health office informants, "Q" for PHC officers, "L" for cross-sector/cadres, "M" for the community, and "PT" for the central informant.

Table 1 shows the general characteristics of the informants. In the years of service characteristic, the missing data are community informants.

Table 1. Characteristics of District Informants in Sumba Island, 2019

Characteristics	District			
	Southwest Sumba	West Sumba	Central Sumba	East Sumba
<b>Gender</b>				
Male	7	3	5	4
Female	10	7	9	7
<b>Type of Informants</b>				
District Health Officer	4	1	3	3
Public Health Center Officer	8	5	6	4
Cross-Sector and cadres	3	3	3	3
Community	2	1	2	1
<b>Years of service</b>				
0-5 years	7	1	6	3
>5 years	8	8	6	7
Missing	2	1	2	1

### B. Overview of Insecticide-Treated Nets Distribution in the Last Period of 2018

Insecticide-treated nets (ITNs) programs in Sumba Island have been running for more than a decade and were the main malaria control intervention most recorded by Sumba Island communities. The last ITNs distribution period was in 2018 a few months before this study was conducted. Initially, ITN distribution was planned for the end of 2017. The ITN distribution schedule in that period shifted because the logistics arrived late in the district. The central informant mentioned:

*"There were several things that caused it to happen, one: the mosquito nets arrived late...another one is the problem of the distribution cost...so that can make it late." (PT: Vector Control, Sub-Directorate of Malaria)*

The district informant mentioned that the delay was due to transportation problems, namely locations far to reach by land and sea. The delivery of ITNs was through a central contract with a *Franco System* and sent through an expedition. The administrative verification process takes a long time because it requires tiered assessments and checks from the center, province, and district according to the implementation guidelines.

*"...the schedule was delayed because of transportation issues. Because they have to sign, so they have to sign everything first, verify it, then submit it. It's done, so the financial submission. That process was*

*what made it long." (D1: Head of Disease Control, Central Sumba)*

The whole process was the same in all districts because the logistics were delivered once for Sumba Island. The logistics arrived at the port of East Sumba Regency and then continued by land to Central Sumba, West Sumba, and Southwest Sumba Regencies.

### C. General Components of The Insecticide-Treated Nets Implementation Program

The following is an overview and stages of the implementation of ITN distribution on Sumba Island:

#### 1) Planning Coordination: Provincial, District, and PHC levels

Tiered socialization from the provincial, district, sub-district, and PHC levels was conducted more than once and attended by central resource persons, and provincial and district malaria focal points. District ITN needs, budget estimates and community distribution plans were calculated at these meetings. Information on the provincial socialization stage was entirely obtained from the experience of district informants.

The district socialization involved the person in charge of the PHC and cross-sectors such as the subdistrict and village head. The weakness of district socialization was that not all relevant parties knew about and attended the socialization. This condition results in information that is not continuous and uniform. PHC informants in Central Sumba mentioned that they were not aware of the ITNs socialization activities in the district:

*"There was no meeting, the district manager called and said there was a distribution of mosquito nets for the village... so asked for distribution points..." (Q1: PHC Malaria Officer, Central Sumba)*

Early notification of ITN distribution allows for better planning for those who should be involved as it fosters a sense of ownership and better orientation toward the program (Masaninga *et al.*, 2018). The involvement of all parties in coordination and planning was to ensure all tiered processes provide a common perspective in understanding the information and rules of ITNs (Arroz *et al.*, 2018). The source of target data needs to be discussed in ITN planning coordination. There were differences in the data sources used in calculating ITN targets in the districts. Informants from Southwest Sumba districts mentioned that, when using village data, there may be data that did not match.

*"There were some data that did not match because they use RASKIN data, there were double data..." (Q9: PHC Malaria Officer, Southwest Sumba).*

The West Sumba District informant mentioned that data for ITNs were collected directly because a fee was provided for data collection:

*"Data collection was done for the distribution of ITNs ...PHC officers and cadres do the data collection because there were transport costs for the data collection." (Q18: PHC Officer, West Sumba)*

A study shows that inaccurate targeting data can be caused by unrecorded population mobility, difficult and remote locations, and limited time and transportation costs (Linn *et al.*, 2019). Inaccurate target data can lead to insufficient or even excess ITN logistics. Accurate data sources will help in calculating the population of people who were not protected by new nets and predicting the need for ITNs in the next period.

Targeting and prioritizing ITN intervention can be done using several approaches including statistical and

geographical. Whatever approach is used, it must take into account external factors that are significantly associated with malaria incidence such as community characteristics (Young *et al.*, 2022). Appropriate targeting of ITNs is important in achieving ITN coverage indicators because no one can use ITNs if they do not have access to them. Access considerations relate to the costs and health benefits provided (Koenker *et al.*, 2022).

## 2) Financing

Insecticide-treated nets were distributed to communities free of charge. All financing for this program comes from the central government and Global Fund (GF) grants. Informants from the West Sumba and East Sumba districts stated that the ITN budget was sufficient and funds were prepared for distribution to the house. Research states that in countries that implement this program, 60% of the cost is for the production of ITNs and 40% for operational costs including distribution to the community (Alfonso *et al.*, 2020).

The budget for ITN distribution in 2018 came entirely from the Global Fund. According to informants from the center, there will be a change in the budgeting mechanism for ITN distribution in the future. The budget will be managed directly by local governments through the Specific Allocation Fund (DAK). Local governments are expected to be more focused on implementing the program according to the conditions and needs of each region.

*"In the last two years, there has been no ITN procurement from the state budget (APBN) except GF grants. In the future, we will provide a budget through DAK so that direct procurement can be carried out by the regions." (PT: Vector Control, Sub-Directorate of Malaria).*

According to the district informant, the malaria control program was greatly assisted by the APBN through DAK.

*"It's very helpful that the central and provincial governments pay attention to us. We can't force funds from us... so the budget is very*

helpful.” (D11: District Malaria Manager, East Sumba).

In terms of financing, there were not many obstacles that could be explored because all informants mentioned that most of the budget for ITN programs comes from the central government. West Sumba District informants mentioned that the entire budget provided for ITN distribution was sufficient. The budget was provided for distribution starting from the health office until it reached the community.

*“All the budget from there... for distribution anywhere has been calculated. The budget for us was sufficient... even to reach remote areas.” (D8: Head of Disease Control, West Sumba Sumba).*

Budget shortfalls are usually for technical matters related to the personnel involved more than the budget provided during planning. This happened in Southwest Sumba and Central Sumba districts:

*“...the manpower in the field was not as planned, for example, we were planned for 1 person but when in the field there were many people involved” (Q8: PHC Malaria Officer, Southwest Sumba)*

*“For cadres, because at that time sometimes we only asked for two cadres but more came...” (D2: District Malaria Manager, Central Sumba)*

Although the cost of bed nets was quite high, malaria prevention through LLINs is seen as more cost-effective than IRS because the additional cost incurred to increase ITN coverage was less than IRS, especially in areas that are not yet resistant to pyrethroid insecticides (Zenkov et al., 2017). The effectiveness of ITN budgets in some countries is influenced by many components. Some of these include the type of ITNs associated with how the ITNs are used, how they are distributed, and the support of the community and society (Paintain et al., 2014).

Malaria cases on Sumba Island are still fluctuating, tending to decrease after

the distribution of ITNs and increase afterward. However, the decline in API after the ITN distribution prompted the district to start seeking the continuation of the distribution of mosquito nets from the Regional Budget (APBD) allocation.

*“We see that when we get mosquito net assistance our API goes down but when the distribution of ITNs was stuck it goes up. That’s why when there are funds, we focus on procuring ITNs,” (D10: Head of Disease Control, East Sumba).*

If it is deemed effective in controlling malaria, it is necessary to continue the distribution of nets during the next mass distribution period (Koenker, 2018). Expansion of funding sources is important to close the gap of increasing cases with underutilization (Alonso & Noor, 2017).

### 3) Cross-sector involvement

Cross-sector partnerships are aimed at creating a supportive atmosphere and shaping public opinion for the success of this program. According to the guidelines for the mass distribution of ITNs, the targets of the district partnership are cross-program, cross-sector, NGOs, professional organizations, and other community organizations (DG of Disease Prevention and Control, 2017). There were no NGOs, professional organizations, or other community organizations involved in ITNS distribution in Sumba Island.

*“There were no NGO involved...” (Q4: PHC Malaria Officer, Central Sumba)*

*“So far there were no NGOs involved ... but we usually work with cross-sectors.” (Q20: Head of Puskesmas, East Sumba)*

The cross-program involved by all district health offices in the distribution of ITNs was only the Maternal and Child Health (MCH) program because there was a special ITN distribution for pregnant women.

*“We are integrated with disease control because the program is with them but the target of pregnant*

women is with us." (Q3: Maternal and Child Health Program Manager, Central Sumba)

Cross-sectors that were always involved in the socialization and distribution of ITNs were limited to regional officials such as sub-district and village heads. Village informants stated:

"We were invited...at that time it was not the current sub-district head but the previous one." (L1: Village Secretary, Central Sumba)

"We were invited...they delivered the schedule... During the meeting, we discussed ITNs, how to use ITNs." (L7: Village Head, West Sumba)

The East Sumba district malaria manager mentioned that cross-sectors that play an active role in distributing ITNS were village officials:

"Village officials are involved...the ones who read out the names of the community are the village officials. That's what I found in some places, the village apparatus plays an active role." (D11: District Malaria Manager, East Sumba)

Although several cross-sectors have been involved, not all have played an active role. There were still those who were not present during the distribution and monitoring of mosquito net use in the community. This has led to roles that should have been carried out by cross-sectors being carried out entirely by health workers. Socialization to get cross-sectoral support has not been maximized and has become a ceremonial formality that does not result in cross-sectoral commitment to bed nets.

According to the PHC officer, the involvement of NGOs in the area was more in community empowerment activities, but an NGO engaged in malaria prevention also distributes ITNs, albeit independently:

"...2018, some villages received the distribution of ITNs from Sumba Foundation, not through the PHC, they went directly to the village." (Q1: Head of PHC, West Sumba).

Contributions and commitment from cross-sectors must start with two-way communication with policymakers. Cross-sectors should be involved from the beginning of planning and at the end of program activities, jointly conducting evaluations by listening to inputs and finding solutions to the obstacles found (Vroblevska *et al.*, 2022). Good and close collaboration between the health sector and other sectors is important in increasing community acceptance and use of health strategies, including malaria control and other vector-borne diseases (WHO, 2015).

#### 4) Logistics Management

Logistics refers to the supply, storage, and delivery of ITNs. Based on implementation guidelines and planning coordination, the distribution of ITNs is based on sleeping groups. However, some districts did not distribute according to the guidelines. All ITNs are aid that has been allocated and the amount cannot be increased, so it must be adjusted. In that period, 360,100 ITNs were distributed to Sumba Island. East Sumba Regency had as many as 100,000 sheets, Central Sumba 42,700 sheets, West Sumba 67,400 sheets, and Southwest Sumba 150,000 sheets.

Informants from West Sumba and Central Sumba districts mentioned that the number of ITNs received was sufficient. East Sumba district distributed ITNs by taking into account malaria pockets; some areas did not distribute nets. Southwest Sumba district distributed ITNS in all villages without taking into account malaria pocket areas so that ITNs were not distributed based on sleeping groups.

"Less ... the calculation of the need for 265,000, the sleeping groups have been calculated, but the data is from the village. Our allocation is not appropriate." (D6: District Malaria Manager, Southwest Sumba)

A central informant from the malaria sub-directorate mentioned that the lack of ITN supply was due to budget changes. Logistics were originally planned to come from the Global Fund and APBN but the APBN was canceled so all ITN logistics only came from Global Fund assistance.

The management of ITN storage in the districts is different because not all health centers have warehouses to store nets. This condition causes ITNs to be stored in ways and places that do not meet storage requirements.

*"Honestly ... at that time we had no storage ... 2018 there were many ITNS, especially because I had 20 villages." (Q12: Head of PHC, Southwest Sumba)*

*"Emm...I didn't have a warehouse... I was prepared tarpaulins."(Q17: Head of PHC, West Sumba)*

Some PHCs delivered the nets to the distribution points ahead of the distribution schedule but some stored the nets directly at the distribution points.

*"It was stopped at the PHC, and two days later the distribution started to the villages. Arriving in the village, some were distributed immediately, some tomorrow, but not more than a week, two or three days at most." (Q13: PHC Malaria Officer, Southwest Sumba)*

*"So when the nets come, we bring them together to the distribution point. It did not stop at the PHC so it was stored at the integrated services post, at the cadre leader's house..." (Q1: PHC Malaria Officer, Central Sumba)*

The ITNs that were directly delivered to the distribution points had to be distributed as soon as possible to the community because the logistics storage requirements were not met. Good logistics management will be more efficient in terms of time, especially in areas with difficult and hard-to-reach areas (Masaninga et al., 2018). Good logistics management is necessary as funding is not the only way to increase coverage. Logistics management has an impact on budget effectiveness and a significant impact on timelines (de Brito et al., 2020).

##### 5) Distribution to the Community

The distribution of ITN on Sumba Island was carried out by gathering the community at the distribution points.

Public health centers coordinated through letters and direct meetings with village officials to ensure that information on the distribution of ITNs reached the community. Despite coordinating with village officials, not all communities knew and came at the time of distribution of ITNs so nets had to be delivered to homes, which requires energy and time management.

*"When the nets were there, they didn't tell us, we only heard from people. So we went to the distribution place..." (M1: Male, Southwest Sumba)*

Non-delivery of information on ITNs distribution may occur due to limited resources and inappropriate methods. The community-based ITNs distribution scheme shows that information about ITNs delivered through mass campaigns and mobile campaigns has encouraged communities to get new or additional ITNs when they need them (Kilian et al., 2020).

*"...those who happen to be absent, we were going to their houses...tell them how to use it. I went with the officers, not alone." (L8: Health cadre, West Sumba)*

At the time of ITN distribution, not all locations conducted socialization of ITN installation; officers only gave explanations according to the instructions on the ITN packaging. Socialization and education when gathering the community are sometimes ineffective. The community did not come in unison but one by one and even late so some did not participate in the socialization of ITNs installation and maintenance. In addition, people not coming according to the schedule will cause a buildup of targets at certain times. When there is too much crowding, people do not focus on listening and are busy with other activities. The use of language and who provides socialization also affects the attention of the community:

*"Sometimes not everyone listens to what we tell them. They were busy talking here and there, they didn't hear...it's more appropriate to use the local language, and it has to be certain people, if the health workers..."*



*they were busy calming the children, so they didn't hear." (Q16: PHC Malaria Officer, West Sumba)*

Another informant mentioned that if they only distribute ITNs then there is no problem but when it comes to socialization, they do not have enough competent personnel. The consistent use of ITNs by the community is not only due to the factor of net ownership but also due to the lack of knowledge and understanding about the use of ITNs and malaria transmission (Astin and Alim, 2020). This is where the role of socialization during the distribution of ITN is important.

*"In terms of manpower, the number was sufficient to distribute ITNS, but if the distribution was accompanied by enlightenment to the community, we need more competent personnel." (Q2: Head of PHC, Central Sumba)*

Research suggests that the socialization of ITN would be better if delivered directly by experts (Pratamawati *et al.*, 2018). Providing training on ITNs and health for officers and using local languages by officers during socialization can increase the coverage of ITNs (Raghavendra *et al.*, 2017).

When gathering the community, the schedule and location must be emphasized so that there is no accumulation at certain times and points. The distribution point must be large enough and easily accessible to the community. Regulating the flow of community movement including during demonstrations of ITN installation and maintenance is important. In addition to involving hamlet heads and cadres, to mobilize the community to come on time and schedule, announcements can also be made at places of worship or community gatherings such as traditional events (Masaninga *et al.*, 2018).

Another obstacle to the ITN program on Sumba Island was that ITNs were not durable. This was because the habit of the community to care for ITNs is still lacking. The treatment in question includes the habit of washing and sewing the net if there is a tear.

*"Use is no problem, but the first maintenance is how to wash, second when the mosquito net was torn...sewing is easy but not done, so it lasts a year." (D1: Head of Disease Control, Central Sumba)*

*"That's how people were here. A dirty, slightly torn net is immediately turned into a fence to keep out chickens... Even though the ITNs is only one year old." (Q15: Head of PHC, West Sumba)*

Many factors cause the lifetime of ITNs to be no more than two years, such as the quality of nets, frequency of washing, length of washing, not sewing torn parts, location of the kitchen, fuel used for cooking, and poor housing construction (Iyer *et al.*, 2019). The use of open flames for indoor lighting and the non-separate location of the kitchen can lead to holes and damage to ITNs (Tomass *et al.*, 2016).

There are still people in Sumba who live or build houses with the construction and layout of traditional houses where the kitchen or fireplace is in the center of the room (Gunawan, Gunawan and Umbu, 2018). Based on observations in several community houses, this condition causes ITNs that were always hanging to become dirty and damaged quickly due to smoke or fire from the wood stoves used. According to the district malaria manager, such conditions cannot be intervened by health workers alone. The use of ITNs needs to be sought so that it is not only effective in the first year of distribution. The sustainability of ITN distribution must be a concern for many parties.

Insecticide-treated nets are a program that continues to be expected by communities in malaria-endemic areas (Astuti *et al.*, 2020). Although there are still obstacles in the implementation of the ITNs program, according to informants, ITNs have reduced malaria cases in several areas on Sumba Island. West Sumba and Central Sumba informants stated that there has been a decrease in malaria cases in recent years since the ITN intervention:

*"In the years before the distribution of bed nets, one month almost 300 specifically at the PHC, were positive. But after 2013 there*

was distribution of mosquito nets began to decline, now it's not up to 100 anymore." (Q16: PHC Malaria Officer, West Sumba)

"There was a decrease in cases ... although not drastically, but even if there is an increase, it was no longer as much as in previous years." (Q3: Head of PHC, Central Sumba)

## CONCLUSION

The insecticide-treated nets program has been running for more than a decade on Sumba Island, but until the implementation in 2018 there were still several discrepancies with the Implementation Guidelines for Mass ITNs Distribution, including data sources that did not describe the real target, ITNs were not distributed according to sleeping groups and logistics management was not running well, especially in storage.

Cross-sector commitment as a result of socialization does not yet exist. The role of cross-sectors as drivers and shapers of community opinion has not been implemented. Methods of socialization and community education have not been maximized, especially in the installation and maintenance of mosquito nets. However, some districts have made efforts to procure ITNs to increase coverage through local budgets.

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## The Influence of Community and Societal Factors on the Occurrence of Wasting in Children Aged 3-5 Years

Yuni Riska Hadi<sup>1</sup>✉, Ristya Widi Endah Yani<sup>2</sup>, Anisah Ardiana<sup>3</sup>

<sup>1</sup> Magister of Public Health Science, Postgraduate Program, Universitas Jember, Jember, East Java Indonesia 68121

<sup>2</sup> Faculty of Dentistry, Universitas Jember, Jember, East Java Indonesia 68121

<sup>3</sup> Faculty of Nursing, Universitas Jember, Jember, East Java Indonesia 68121

✉Email: [yuniriskahadi@gmail.com](mailto:yuniriskahadi@gmail.com)

### ABSTRACT

**Background:** Nutritional problems in toddlers remain a serious issue in several regions in Indonesia, including the working area of Songgon Health Center in Banyuwangi Regency. **Aims:** This study aims to analyze the influence of community and societal factors on wasting in children aged 3-5 years. **Methods:** The study uses a case-control approach with the entire population of toddlers in the working area of Songgon Primary Health Center as the target population. A cluster random sampling technique was used to obtain a sample of 166 individuals (83 wasting cases and 83 controls). Data were collected using a questionnaire that had passed validity and reliability testing. The collected data were analyzed through bivariate analysis using the chi-square test, and multivariate analysis using logistic regression. **Results:** The research results on wasting showed the following p-values: *t* for family income  $0.520 > \alpha (0.05)$ ; occupation  $0.263 > \alpha (0.05)$  access to healthcare  $0.121 > \alpha (0.05)$ ; *f* immunization status  $0.064 > \alpha (0.05)$ ; education  $0.436 > \alpha (0.05)$ ; maternal knowledge  $0.148 > \alpha (0.05)$ ; family support  $0.931 > \alpha (0.05)$ , and food security  $0.430 > \alpha (0.05)$ , thus it can be interpreted these do not have a significant influence on wasting incidence. However, environmental sanitation has a significant influence on wasting incidence, as the p-value is  $0.002 < \alpha (0.05)$ . **Conclusion:** The most influential factor in wasting incidence is environmental sanitation. Meanwhile, factors that have no influence are family income, mother's occupation, healthcare access, immunization, education, knowledge, family support, and food safety.

**Keyword:** Children, Sanitation, Wasting

### INTRODUCTION

Wasting in toddlers remains a significant nutritional problem in many countries, especially in developing countries, including Indonesia. Undernutrition poses a serious challenge in developing countries (Khamis *et al.*, 2019) and wasting poses a serious threat to the survival and development of children (Hasanah *et al.*, 2022). The age of 36-59 months is a critical period for a child's growth and development. Children between the ages of 36-59 months are more cooperative in communication compared to those under 36 months (Komalasari *et al.*, 2023).

Based on data from UNICEF/WHO/World Bank and Estimates (2021), the prevalence of wasting in 2020 was 6.7% or 45.4 million toddlers worldwide. In Asia, where the majority of

children with nutrition problems reside, there were 31.9 million toddlers (8.9%) suffering from wasting. In Southeast Asia, wasting cases were reported in 4.6 million toddlers (8.2%) (UNICEF, 2021).

The World Health Organization (WHO) has set guidelines for each country and province regarding the prevalence of wasting, which should not exceed 5% in toddlers. Thus, if the prevalence of wasting is  $\leq 5\%$ , it is considered acceptable or within tolerable standards. However, nationally, wasting in Indonesia is considered acute as 27 provinces have a wasting prevalence of  $\geq 5\%$ , with the national wasting prevalence being 7.1% (SSGI, 2021). The prevalence of wasting in East Java Province is 6.4%, while in Banyuwangi, it is 7.4% (SSGI, 2021). The latest data in February 2022 show that the working area of Songgon Primary Health Center in Banyuwangi Regency has

an increasing number of wasting cases each year, with 122 toddlers (5.5%) in 2020, 152 toddlers (6.1%) in 2021, and 188 toddlers (6.5%) in 2022.

Other research conducted on wasting children under 5 years old in Southeast Asia by Harding (2018) states that boys are more prone to wasting than girls. Additionally, factors such as a child's history of infections, caregiving practices, and birth weight also influence the occurrence of wasting (Harding, 2018). The impact of wasting includes an increased risk of illness, mortality, suboptimal brain development, motoric and mental delays, and susceptibility to non-communicable diseases and degenerative diseases. One of the non-communicable diseases is cancer, where children with cancer who experience wasting are at higher risk than those with optimal nutritional status (Unicef Indonesia, 2020).

Efforts to prevent and address nutrition problems, including wasting, in the working area of Songgon Primary Health Center, include various activities such as Posyandu (integrated health services post), prenatal examinations and immunizations, supplementary feeding for malnourished pregnant women and toddlers, family planning services, iron supplementation for adolescent girls and pregnant women, deworming, antenatal care classes, nutrition-aware family activities (kadarzi), nutritional case management, counseling on exclusive breastfeeding and the four gold food standards, as well as introducing supplementary feeding at posyandu. In 2020, the health department conducted stunting prevention convergence activities with various sectors.

In April 2022, the researchers conducted a preliminary survey and interviewed nutrition health workers at Songgon Primary Health Center, obtaining information that various efforts have been made to reduce the incidence of wasting, but the problem persists, and wasting cases at Songgon Primary Health Center have been increasing every year. So far, there has been no primary data research conducted on the issue of wasting in toddlers in the working area of Songgon Primary Health Center. Considering the high prevalence of wasting among toddlers, it is essential to conduct research on the influence of community

and societal factors on the occurrence of wasting in children aged 3-5 years in the working area of Songgon Primary Health Center, Banyuwangi Regency.

## METHODS

This research is classified as an analytical observational study with a case-control design. The study was conducted from February to April 2023 in the working area of Songgon Primary Health Center, Banyuwangi Regency. The target population for this study was all toddlers attending posyandu (integrated health services post) in the working area of Songgon Primary Health Center, totaling 3526 toddlers. Based on sample size calculation using the Lameshow formula, the sample size for the wasting variable in each group was determined to be 83, resulting in a minimum required sample size of 166 respondents.

The sampling technique used in this study was cluster random sampling, where samples are taken randomly from the population based on certain groups or areas (Sugiyono, 2017). Researchers use this technique because the population is quite large, and the cluster random sampling method is often used in various research projects in the health sector.

Data were collected through interviews using a questionnaire as the data collection method. The research instrument has validity and reliability testing, and the results indicated that it is both valid and reliable. Bivariate analysis using the chi-square test was conducted to examine the relationship between two variables, while multivariate analysis using logistic regression was employed to explore the relationship between multiple variables and their associated risks. Ethical clearance for this study was obtained from the research ethics committee of the Faculty of Dental Medicine, Jember University, with certificate number 1849/UN25.8/KEPK/DL/2023.

## RESULTS AND DISCUSSION

Based on Table 1, it is evident that the majority of toddlers come from families with low income, accounting for 63.3%. Almost all toddlers have mothers who are not employed, representing 77.7% of the respondents. Nearly half of

the toddlers have reasonably accessible healthcare services, with a percentage of 48.8%. Almost all toddlers have received complete immunizations, accounting for 95.2%. The majority of mothers have low educational levels, constituting 54.2%. The level of maternal knowledge is sufficient for 57.8% of the respondents. Almost all toddlers receive good family support, with a percentage of 88.0%. The majority of toddlers have good food security, reaching 90.4%. Lastly, 57.2% of toddlers have access to proper environmental sanitation.

**Table 1.** Distribution Frequency of the Respondents' Characteristics Based on the Occurrence of Wasting

Variable	Frequency	%
<b>Wasting</b>		
Normal	83	50.0
Wasting	83	50.0
<b>Community and Societal Factors</b>		
<b>Family Income</b>		
High	61	36.7
Low	105	63.3
<b>Total</b>	<b>166</b>	<b>100</b>
<b>Mother's Occupation</b>		
Doesn't Work	129	77.7
Work	37	22.3
<b>Total</b>	<b>166</b>	<b>100</b>
<b>Healthcare Access</b>		
Easy	73	44.0
Enough	81	48.8
Difficult	12	7.2
<b>Total</b>	<b>166</b>	<b>100</b>
<b>Immunization Status</b>		
Complete	158	95.2
Incomplete	8	4.8
<b>Total</b>	<b>166</b>	<b>100</b>
<b>Mother's Education</b>		
High	76	45.8
Low	90	54.2
<b>Total</b>	<b>166</b>	<b>100</b>
<b>Mother's Knowledge</b>		
Good	45	27.1
Enough	96	57.8
Insufficient	25	15.1
<b>Total</b>	<b>166</b>	<b>100</b>
<b>Family Support</b>		
Good	146	88.0
Enough	15	9.0
Insufficient	5	3.0
<b>Total</b>	<b>166</b>	<b>100</b>
<b>Food Safety</b>		
Good	150	90.4
Insufficient	16	9.6
<b>Total</b>	<b>166</b>	<b>100</b>
<b>Environment</b>		

<b>Sanitation</b>		
Healthy	71	42.8
Unhealthy	95	57.2
<b>Total</b>	<b>166</b>	<b>100</b>

Based on Table 2, the bivariate analysis shows the relationship between community and societal factors and the incidence of wasting in toddlers. It was found that a higher proportion of cases came from families with low income, which accounted for 55 (66.3%) compared to 50 (60.2%) in the control group. The chi-square test yielded a p-value of 0.520, indicating that the null hypothesis (Ho) is accepted since the p-value of 0.520 > α (0.05). Therefore, it can be concluded that there is no significant influence between family income and the incidence of wasting in toddlers aged 3-5 years in the working area of Songgon Primary Health Center.

More cases had working mothers, which amounted to 22 (26.5%), compared to 15 (18.1%) in the control group. The bivariate analysis using the chi-square test resulted in a p-value of 0.263 > α (0.05), indicating that the null hypothesis is accepted, suggesting that there is no significant influence between maternal employment and the incidence of wasting in toddlers aged 3-5 years in the working area of Songgon Primary Health Center.

Difficult access to healthcare services was more prevalent in the case group, with nine (10.3%) cases compared to three (3.6%) in the control group. The bivariate analysis using the chi-square test yielded a p-value of 0.121 > α (0.05), leading to the acceptance of the null hypothesis, suggesting that there is no significant influence between access to healthcare services and the incidence of wasting in toddlers aged 3-5 years in the working area of Songgon Primary Health Center.

Incomplete immunization in toddlers was more prevalent in the case group, with seven (8.4%) cases compared to one (1.2%) in the control group. The chi-square test resulted in a p-value of 0.064, leading to the acceptance of the null hypothesis, suggesting that there is no significant influence between immunization status and the incidence of wasting in toddlers aged 3-5 years in the working area of Songgon Primary Health Center.

Mothers with low levels of education were more in the case group, constituting 48 (57.8%), compared to 31 (37.3%) in the control group. The bivariate analysis using the chi-square test yielded a p-value of  $0.436 > \alpha$  (0.05). Therefore, the null hypothesis is accepted, suggesting that there is no significant influence between maternal education and the incidence of wasting in toddlers aged 3-5 years in the working area of Songgon Primary Health Center.

Less knowledge of the mother was more common in the case group with 17 (20.5%), compared to eight (9.6%) in the control group. The chi-square test resulted in a p-value of  $0.148 > \alpha$  (0.05), leading to the acceptance of the null hypothesis; it means that there is no significant influence between maternal knowledge and the incidence of wasting in toddlers aged 3-5 years in the working area of Songgon Primary Health Center.

Family support found a higher proportion of cases experienced inadequate family support, with three (3.6%), compared to one (1.2%) in the control group. The chi-square test yielded a p-value of 0.931, indicating that the null hypothesis is accepted. Therefore, it can be concluded that there is no significant influence between family

support and the incidence of wasting in toddlers aged 3-5 years in the working area of Songgon Primary Health Center.

Food security was more or less common in the case group, 10 (12.0%), compared to six (7.2%) in the control group. The bivariate analysis using the chi-square test yielded a p-value of 0.430, which indicates that the null hypothesis is accepted. Consequently, it can be concluded that there is no significant influence between food security and the incidence of wasting in toddlers aged 3-5 years in the working area of Songgon Primary Health Center.

Unhealthy environmental sanitation was more prevalent in the case group, with 58 (69.9%) cases compared to 37 (44.6%) in the control group. The chi-square test resulted in a p-value of 0.002, which is less than  $\alpha$  (0.05). Therefore, the null hypothesis is rejected, indicating that there is a significant influence between environmental sanitation and the incidence of wasting. Based on the odds ratio calculation, the value obtained is 0.347 ( $1/0.347=2.8$ ), which means that toddlers with healthy environmental sanitation have a 2.8 times smaller chance of experiencing wasting compared to toddlers with unhealthy environmental sanitation.

**Table 2.** Bivariate Analysis Results of the Influence of Community and Societal Factors on the Incidence of Wasting in Toddlers Aged 3-5 Years in the Working Area of Songgon Primary Health Center

Variable	Occurrence of Wasting				Total		p-value	OR (CI 95%)
	Normal		Wasting		n	%		
	N	%	N	%				
<b>Community and Societal Factors</b>								
<b>Family Income</b>								
High	33	39.8	28	33.7	61	36.7	0.520	-
Low	50	60.2	55	66.3	105	63.3		
Total	83	100	83	100	166	100		
<b>Mother's Occupation</b>								
Not Working/Unemployed	68	81.9	61	73.5	129	77.7	0.263	-
Working/Employed	15	18.1	22	26.5	37	22.3		
Total	83	100	83	100	166	100		
<b>Healthcare Access</b>								
Easy	41	49.4	32	38.6	73	44.0	0.121	-
Enough	39	47.0	42	50.6	81	48.8		
Difficult	3	3.6	9	10.8	12	7.2		
Total	83	100	83	100	166	100		
<b>Immunization Status</b>								
Complete	82	98.8	76	91.6	158	95.2	0.064	-
Incomplete	1	1.2	7	8.4	8	4.8		
Total	83	100	83	100	166	100		
<b>Mother's Education</b>								
High	35	42.2	41	49.4	76	45.8	0.436	-
Low	48	57.8	42	50.6	90	54.2		

<b>Total</b>	<b>83</b>	<b>100</b>	<b>83</b>	<b>100</b>	<b>166</b>	<b>100</b>		
<b>Mother's Knowledge</b>								
Good	24	28.9	21	25.3	45	27.1		
Sufficient	51	61.4	45	54.2	96	57.8	0.148	-
Insufficient	8	9.6	17	20.5	25	15.1		
<b>Total</b>	<b>83</b>	<b>100</b>	<b>83</b>	<b>100</b>	<b>166</b>	<b>100</b>		
<b>Family Support</b>								
Good	79	95.2	67	80.7	146	88.0		
Adequate	2	2.4	13	15.7	15	9.0	0.931	-
Insufficient	2	2.4	3	3.6	5	3.0		
<b>Total</b>	<b>83</b>	<b>100</b>	<b>83</b>	<b>100</b>	<b>166</b>	<b>100</b>		
<b>Food Safety</b>								
Good	77	92.8	73	88.0	150	90.4		
Poor	6	7.2	10	12.0	16	9.6	0.430	-
<b>Total</b>	<b>83</b>	<b>100</b>	<b>83</b>	<b>100</b>	<b>166</b>	<b>100</b>		
<b>Environmental Sanitation</b>								
Healthy	46	55.4	25	30.1	71	42.8		
Unhealthy	37	44.6	58	69.9	95	57.2	0.002	0.347 (0.183-0.656)
<b>Total</b>	<b>83</b>	<b>100</b>	<b>83</b>	<b>100</b>	<b>166</b>	<b>100</b>		

**Table 3.** Multivariate Analysis Results of the Influence of Community and Societal Factors on the Incidence of Wasting in Toddlers Aged 3-5 Years in the Working Area of Songgon Primary Health Center

Variable	Sig	Exp (B)	95% C.I for EXP (B)	
			Lower	Upper
Environmental Sanitation	0.001	0.347	0.183	0.656

The multivariate analysis results indicate that the environmental sanitation variable (p-value = 0.001) is the most influential factor in the incidence of wasting in the working area of Songgon Primary Health Center. Toddlers with healthy environmental sanitation have a 2.8 times lower chance of experiencing wasting compared to families with unhealthy environmental sanitation.

#### Family Income Influence on the Occurrence of Wasting

Family income does not have a significant influence on the incidence of wasting in toddlers aged 3-5 years in the working area of Songgon Primary Health Center. This finding is consistent with a study conducted by Rukmana (2023), which stated that there is no significant relationship between family income and wasting incidence in the working area of Titi Papan Primary Health Center in Medan City, with a p-value of 0.80. Research (Danso & Appiah, 2023) shows there is no significant relationship between socioeconomic status and wasting in Nkwanta South Municipality, Ghana.

According to Kesmas Kemkes (2019) socioeconomic status reflects an individual's standard of living. Socioeconomic status is determined by factors such as education, occupation,

income, and living environment. Socioeconomic factors can affect various aspects of life, including daily eating habits. Based on the researcher's assumption, family income does not have a significant effect on wasting incidence in toddlers aged 3-5 years in the working area of Songgon Primary Health Center because not all of the total family income is used to meet dietary needs. Therefore, income does not have a direct correlation with the nutritional status of toddlers. This is because there is no tendency for respondents with higher income to allocate more for high dietary needs, and vice versa, there is no tendency for those with lower income to allocate less for dietary needs.

#### Mother's Employment Status on the Occurrence of Wasting

Based on the research findings, there is no significant influence of the mother's employment status on the incidence of wasting in toddlers aged 3-5 years in the Working Area of Songgon Primary Health Center. This result is consistent with a study conducted by Soedarsono (2021), which stated that there is no significant relationship between the mother's employment status and wasting incidence in the working area of Simomulyo Primary Health Center in Surabaya, with a p-value of 0.747



( $p > 0.05$ ). Studies by Getu *et al.* (2023) reveal that housewives are more likely to have wasted children 17 (3.9%) than working mothers.

Parental occupation is related to family income, and, therefore, it can be said that the type of occupation can also determine someone's ability to meet the nutritional needs of the family. Working mothers have less time to care for their children compared to non-working mothers. This can affect the quality of child care and subsequently influence the nutritional status of the child. Working mothers with full-time jobs may not have enough time to pay attention to their child's food and nutritional needs (Fauzia *et al.*, 2019). In this study, almost all (77.7%) of the mothers of the toddlers were working as housewives, yet many children still experienced wasting.

According to the researcher's assumption, there is no influence of the mother's employment status on wasting incidence in toddlers aged 3-5 years in the Working Area of Songgon Primary Health Center. This may be attributed to the fact that working mothers mostly have higher levels of education while non-working or housewives mostly have lower levels of education. Even though non-working mothers have more time to take care of their children, if they have a lower level of education, they may face challenges in understanding nutritional information and struggle to apply the knowledge acquired in child feeding practices. On the other hand, highly educated mothers are more likely to comprehend nutritional information and apply it in child care and feeding practices, even with limited time available.

#### **Access to Health Services Influence on the Occurrence of Wasting**

Based on the research findings, there is no significant influence of access to health services on wasting incidence in toddlers aged 3-5 years in the working area of Songgon Primary Health Center. This result is consistent with a study conducted by Asri *et al.* (2019), which stated that there is no significant relationship between access to health services and wasting incidence in the working area of Simomulyo Primary Health Center in Surabaya, with a  $p$ -value of 0.817 ( $p > 0.05$ ).

Access to health services is determined by factors such as distance, travel time, and cost required to reach health facilities. The distance is a measure of the proximity of one's home to the nearest health service. The distance from the respondent's residence to the health service is one of the obstacles to utilizing health services (Kamila, 2022). Studies by Tariq *et al.* (2018) reveal that these factors range from maternal literacy, household income and utilization of healthcare services influence wasting.

According to the researcher's assumption, access to health services does not influence wasting incidence in toddlers aged 3-5 years in the working area of Songgon Primary Health Center because half of the respondents have access to health services that are already quite affordable. The affordability of access in this study is assessed based on distance, travel time, and ease of transportation to reach health services. Access to health services is easier because the majority of respondents already have transportation means to reach health facilities, so they do not face difficulties in accessing health services even if the distance traveled is relatively far, more than 2 km, for a small fraction of respondents who still find it challenging to access health services.

#### **Immunization Status on the Occurrence of Wasting**

Based on the research findings, there is no significant influence of immunization status on wasting incidence in toddlers aged 3-5 years in the working area of Songgon Primary Health Center. This result is consistent with a study conducted by Lestari *et al.* (2022) which stated that there is no significant relationship between immunization status and wasting incidence in toddlers in the working area of Siduaori Primary Health Center, Siduaori District, South Nias Regency, with a  $p$ -value of 0.426 ( $p > 0.05$ ).

Immunization is an effort to provide immunity to infants and children by introducing vaccines into the body to stimulate the production of antibodies to prevent certain diseases. Vaccines are substances used to stimulate the formation of antibodies that are introduced into the body through injection (e.g., BCG, DPT, and measles)

and the mouth (e.g., polio vaccine). The benefits of immunization include protecting infants and children from dangerous diseases, preventing severe illness, disability, or death, preventing the spread of specific diseases, and eradicating certain diseases. Immunization enhances the immune system of infants and children, enabling them to fight against preventable diseases (Nasution, 2022).

Immunization is a step to increase a person's immunity to a disease so that if they are exposed to the disease they will not get sick or only experience mild illness (Hudhah *et al.*, 2017). The research findings also indicate that out of 158 toddlers with complete immunization status, there are still 76 toddlers classified as wasted. This could be attributed to other factors causing wasting in toddlers, such as a history of infectious diseases. Infectious diseases can disrupt linear growth, first affecting the nutritional status of toddlers. If infectious diseases persist for a prolonged period and are not promptly addressed, they can reduce food intake and interfere with nutrient absorption, thereby increasing the risk of wasting in toddlers. Therefore, immunization is important and is considered to provide good benefits because the effects it produces provide protective action (Utviaputri, 2018).

According to the researcher's assumption, immunization status does not have an influence on wasting incidence in toddlers aged 3-5 years in the working area of Songgon Primary Health Center because both toddlers with complete and incomplete immunization have an equal chance of experiencing wasting. The possible causes of wasting in the working area of Songgon Primary Health Center may be attributed to other factors, as wasting in children is multifactorial, including factors such as previous infections experienced by toddlers, environmental sanitation conditions, nutritional intake, and others.

#### **Mother's Education Level Influence on the Occurrence of Wasting**

Based on the research findings, there is no significant influence of the mother's education level on wasting incidence in toddlers aged 3-5 years in the working area of Songgon Primary Health Center. This result is consistent

with a study conducted by Nurlia (2021) with statistical test results showing  $p = 0.057 > 0.05$ , which means that the  $p$ -value is not statistically significant. The conclusion obtained is that there is no significant relationship between the mother's education level and wasting in toddlers in the working area of Nambo Primary Health Center, Kendari City. Research by Ngwira (2020) explains that there is no significant relationship between mother's education level and wasting in Atlanta, GA, USA, showing that levels of mother's education coefficients were negative for all three malnutrition indicators (stunting, wasting, overweight), meaning maternal education reduces the probability of the three malnutrition indicators. None of the maternal education level coefficients were significant, except the secondary education coefficient on stunting ( $b = -0.854$ ;  $P = 0.024$ ), which was significant.

Mother's education is fundamental to achieving good nutritional status in toddlers. The mother's education level is related to her ability to receive information about nutrition and health from external sources. Mothers with higher education levels are more likely to absorb information from external sources compared to those with lower education levels. In families facing economic limitations, the majority have lower education levels due to their inability to pursue higher education (Nurlia, 2021).

According to the researcher's assumption, the mother's education level does not influence wasting incidence in toddlers aged 3-5 years in the working area of Songgon Primary Health Center. This is because, in this study, mothers with lower education levels do not necessarily have more toddlers with wasting issues compared to mothers with higher education levels. The mother's education level is just one of the underlying causes of malnutrition issues, and many other factors can influence the occurrence of malnutrition, particularly wasting and stunting in toddlers, such as balanced nutritional intake, history of low birth weight, infections, and others.

#### **Mother's Knowledge Influence on the Occurrence of Wasting**

Based on the research findings, there is no significant influence of mother's knowledge on wasting incidence

in toddlers aged 3-5 years in the working area of Songgon Primary Health Center. This result is consistent with a study conducted by Sari (2022) which stated that there is no significant relationship between mother's knowledge and wasting incidence in toddlers aged 1 to 5 years in the Jortong Koto working area of Gunung Medan Primary Health Center, with a p-value of 0.805 ( $p > 0.05$ ).

The incidence of wasting in toddlers is related to their intake of nutrients. The daily nutrient intake of a toddler depends on their mother, thus the mother plays a crucial role in the nutritional status of the toddler. Mothers with a better level of knowledge are more likely to apply their knowledge in caring for their children, especially in providing foods that meet the nutritional needs of the toddlers, thus preventing them from experiencing malnutrition (Sari, 2022).

Having a high level of knowledge does not necessarily guarantee that a mother will have a toddler with a normal nutritional status. Applying knowledge in daily life is influenced not only by the level of knowledge but also by other factors, such as socioeconomic status, sociocultural factors, and the environment (Notoatmodjo S., 2010).

According to the researcher's assumption, knowledge does not influence wasting incidence in toddlers aged 3-5 years in the working area of Songgon Primary Health Center because wasting is not solely caused by knowledge but possibly by other factors, such as the mother's feeding practices toward her child. The food intake provided to the child is not solely based on knowledge but is more influenced by the mother's habits in food preparation, resulting in the child's nutritional needs being met.

#### **Family Support Influence on the Occurrence of Wasting**

Based on the research findings, there is no significant influence of family support on wasting incidence in toddlers aged 3-5 years in the working area of Songgon Primary Health Center. Family support focuses on the interactions that occur within social relationships. Family support refers to the attitudes, actions, and acceptance of family members toward each other. Family members perceive supportive individuals as always

ready to provide help and assistance when needed (Mahalia, 2019).

External factors influencing family support include family practices, such as how the family provides support usually through disease prevention practices, as an example, to influence other family members to do the same (Muhith & Siyoto, 2016).

According to the researcher's assumption, family support does not influence wasting incidence in toddlers aged 3-5 years in the working area of Songgon Primary Health Center because families feel responsible for caring for their children, as children are part of the family members. The research results also show that almost all families provide good support to their toddlers. Family support in taking care of the toddlers, in terms of emotional support, instrumental support, and informational support as stated in the questionnaire, has been provided by the mothers and families for both wasting and normal toddlers. Thus, nutritional status issues like wasting can still occur in toddlers despite receiving support from the family.

#### **Food Safety Influence on the Occurrence of Wasting**

Based on the research findings, there is no significant influence of food safety on wasting incidence in toddlers aged 3-5 years in the working area of Songgon Primary Health Center. This research is consistent with the findings of Ali *et al.* (2019) which states that there is no relationship between household food security status and waste incidence of children aged 6-59 months in rural Bangladesh.

Food safety refers to the conditions and efforts required to prevent food from potential three types of contamination, biological, chemical, and physical hazards, that could compromise, harm, or endanger human health and are consistent with the religious, cultural, and societal norms to be considered safe for consumption. Processed foods must be produced following good manufacturing practices to ensure quality and safety (DKKP, 2023).

According to the researcher's assumption, food safety does not influence wasting incidence in toddlers aged 3-5 years in the working area of Songgon Primary Health Center because

almost all respondents have good food safety practices. Mothers feel responsible for the safety and health of their children, ensuring that the food consumed by their children is safe and healthy. This practice is observed among mothers with both normal and wasting toddlers.

### **Environmental Sanitation Influence on the Occurrence of Wasting**

Environmental sanitation influences wasting incidence in toddlers aged 3-5 years in the working area of Songgon Primary Health Center. This research is consistent with the findings of Danso and Appiah (2023) which states that there is a relationship between environmental sanitation and waste incidence in the Municipality, of Ghana. The study explains that toddlers with poor sanitation are at a 2-fold higher risk of experiencing wasting compared to those with good sanitation. Hygiene and environmental sanitation play a dominant role in providing an environment that supports the health and growth of young children. Personal and environmental cleanliness plays a crucial role in the occurrence of diseases, which can affect their nutritional status (Anggraeni, 2019). Research by Chowdhury *et al.* (2020) explains that the causes and influencing factors of stunting and wasting among children less than two years are manifold and complex; one of them is improved sanitation facilities.

Poor sanitation conditions can lead to various types of diseases such as diarrhea, worm infections, and gastrointestinal infections. When a child suffers from gastrointestinal infections, the absorption of nutrients is disrupted, leading to nutritional deficiencies. Malnourished individuals are more susceptible to diseases, which can also hinder their growth (Andolina, 2021). From the research results in the table above, the obtained odds ratio is 0.347 ( $1/0.347 = 2.8$ ), meaning that toddlers with healthy environmental sanitation have 2.8 times lower odds of experiencing wasting compared to those in an unhealthy environment. From the interviews and observations conducted by the researchers with the respondents regarding environmental sanitation, it was found that clean water sources are generally obtained from dug wells, and some still use water storage which may lead to various infectious diseases. The

condition of the environment is such as poor waste and garbage management and lack of healthy toilets. Household waste is often disposed of directly into rivers or open areas behind the house. An unfavorable environment can harbor microorganisms that can attack young children who are vulnerable to diseases, leading to frequent illnesses such as diarrhea, worm infestations, typhoid, hepatitis, dengue fever, and more. Frequent illnesses in young children can hinder their growth and development.

In this research, three components of environmental sanitation were assessed, namely house components, sanitation facilities, and occupant behavior. In the house components, seven indicators are assessed, namely the ceiling/roof, walls, floor, bedroom windows, living room windows, ventilation, and sleeping smoke holes. The second component, namely sanitation facilities, has three indicators that are assessed, including clean water facilities, latrines, and wastewater disposal facilities. Meanwhile, the third component, namely occupant behavior, has five indicators that are assessed, including opening the bedroom window, opening the family room window, cleaning the house and yard, throwing baby and toddler feces into the latrine, and throwing rubbish in its place (Risksedas, 2013).

In Table 2, it can be seen that the assessment categories are divided into healthy environments and unhealthy environments, where the percentage of unhealthy environments is higher than healthy environments. This shows that the sanitation behavior of the community in the Songgon Community Health Center working area is classified as poor based on the assessment carried out by researchers using questionnaires and direct observation in each research respondent's home. Apart from that, respondents' hand hygiene behavior is classified as poor because respondents do not know the correct steps for washing hands according to the seven steps of hand washing theory, respondents only wash their hands with water without using soap, and there is a lack of hand washing facilities equipped with running water, soap, and channels, wastewater disposal.

### **CONCLUSION**

Based on the results and discussion of the research on the Influence of Community and Societal Factors on Wasting Incidence in Toddlers Aged 3-5 Years in the working area of Songgon Primary Health Center, Banyuwangi Regency, the following conclusions can be drawn: environmental sanitation influences wasting incidence in toddlers and the strongest influence on wasting incidence in toddlers is environmental sanitation.

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## "Feel Supported and not Alone": A Qualitative Study of Supports Needed by Pregnant Women in Preventing Anemia

Izzatul Arifah✉<sup>1</sup>, Nur Shabrina Ramadhani<sup>1</sup>, Yuli Kusumawati<sup>1</sup>, Arif setiawan<sup>2</sup>

<sup>1</sup> Public Health Study Program, Faculty of Health Science, Universitas Muhammadiyah Surakarta

<sup>2</sup> Information Technology Education Study Program, Faculty of Teaching and Education, Universitas Muhammadiyah Surakarta

✉Email: [ia523@ums.ac.id](mailto:ia523@ums.ac.id)

### ABSTRACT

**Background:** The ability of pregnant women to prevent anemia is influenced by their social environment support, such as family, husband, or health workers. However, it has not been known which sources of support are preferred and needed by pregnant women. **Aims:** This study aims to explore the support preferred and needed by pregnant women in preventing anemia. **Methods:** This study was qualitative research with a case study approach. Semi-structured interviews were conducted with 18 pregnant women at the gestational age starting from 16 weeks who had pregnancy checks at the Sangkrah, Kratonan, and Gilingan Primary Healthcare Centers, Surakarta City. Informants were obtained through a purposive sampling technique. This study used thematic data analysis. **Results:** Three emerging themes from this study include 1) pregnant women's perceived ability and motivation to prevent anemia; 2) the support needed to prevent anemia; and 3) information technology support for preventing anemia. Some women felt difficulties preventing anemia, especially in consuming IFA tablets and nutritious food; feeling supported and not alone was the motivation to prevent anemia. The most preferred support was from the husband, and the next was health workers. Pregnant women welcome an application with some features to support preventing anemia. **Conclusions:** Support from husband and health workers is the most preferred. Pregnant women perceive the benefits of using applications that support anemia prevention. It is necessary to develop applications that integrate support from husbands and health workers to create good conditions that enable and motivate pregnant women to practice anemia prevention behavior.

**Keywords:** Anemia prevention, Pregnancy anemia, Support need

### INTRODUCTION

Anemia in pregnant women is a global priority health problem. The World Health Organization (WHO) estimated that the prevalence of anemia in pregnant women was 38% (WHO, 2015). Anemia during pregnancy indirectly contributes to an increased maternal death risk (Basnet *et al.*, 2022; Zamané *et al.*, 2019). This is also a priority health problem in Indonesia because the prevalence of anemia exceeds 40% (WHO, 2023). The prevalence of anemia in pregnant women based on 2018 Basic Health Research (Riskesdas) data is 48.9%. Anemia during pregnancy can increase the risk of low birth weight and infant death (Means, 2020). Based on data from the Surakarta Health Service in 2020, several Primary Healthcare Centers

in Surakarta have a gap in the prevalence of anemia in pregnant women of 10.34%. However, several other Primary Healthcare Centers, such as Sangkrah Primary Healthcare Center, Gilingan Primary Healthcare Center, and Kratonan Primary Healthcare Center, still have a prevalence above 20%. Therefore, the issue of anemia in these areas needs to be addressed.

The WHO recommends preventing anemia in pregnant women through routine administration of Blood Supplement tablets or Iron and Folic Acid (IFA) tablets, nutritional education, and consumption of healthy foods (WHO, 2016, 2019). The Indonesian government has implemented a policy of providing a minimum of 90 IFA tablets to pregnant women, and the target achieved is above

95% (Kemenkes RI, 2018). However, there is still a gap where pregnant women's IFA tablet consumption is not monitored thoroughly. Riskesdas data in 2018 showed that the percentage of pregnant women who took IFA tablets received during pregnancy checks was only 38.1% (Kemenkes RI, 2018). Research shows that many pregnant women do not comply with dietary recommendations to prevent anemia (Pathirathna *et al.*, 2020).

Active subjects in preventing anemia during pregnancy, pregnant women need to be motivated to make various efforts to overcome anemia (Darmawati *et al.*, 2020; Mishra *et al.*, 2021). The Capability Opportunity Motivation for Behavior Change (COM-B) approach explains that three components facilitate behavior change: capability, motivation, and opportunity. Maternal capacity and motivation need to be increased to implement anemia prevention. Environmental support creates opportunities to implement anemia prevention behavior. Social support from several important sources, such as husbands, family, health workers, and health cadres, strengthens mothers' motivation to prevent anemia (Morrison *et al.*, 2021). The results of the research show that the reasons why mothers do not follow recommendations for consuming IFA tablets and anemia prevention diets are a lack of information about the dangers of anemia to fetal health and a lack of solutions from health workers, as well as the difficulty of providing a diet menu that is following recommendations without the support of a husband or family (Williams *et al.*, 2020). The results of qualitative research in South Asia show that synergy is needed between health workers, families, and communities to overcome anemia (Morrison *et al.*, 2021). Meanwhile, it is not yet known what support source preferences are most desired by pregnant women in preventing anemia.

Support to prevent pregnant women from experiencing anemia is also starting to be carried out by utilizing information technology on smartphones (mobile health) (Andriani *et al.*, 2022; Falah *et al.*, 2022; Fertimah *et al.*, 2022; Nurherliyany *et al.*, 2022). This aims to increase program efficiency and overcome obstacles that health workers and cadres have in getting involved in the program.

Previous research shows that mobile health has increased client empowerment and access to health services and health quality (Alaiad, 2019; Nsor-anabiah *et al.*, 2019; Vo *et al.*, 2019). Meanwhile, the Indonesian government has started using mHealth in some programs to report Antenatal Care services routinely, namely e-cohort. Another application for maintaining women's health during pregnancy is available via the private sector and used voluntarily by pregnant women. A preliminary study showed no unique application built for anemia prevention by the government sectors. In some areas of the study site, the health providers made a WhatsApp Group for pregnant women to provide online counseling for pregnant women in maintaining healthy pregnancy. Therefore, this study aims to 1) identify the support needed by pregnant women to prevent anemia, 2) identify the most preferred source of support, and 3) identify the need for support provided through information technology (applications).

## METHODS

This study was qualitative research with a case study approach from April to August 2023 in three work areas: Sangkrah Primary Healthcare Center, Kratonan Primary Healthcare Center, and Gilingan Primary Healthcare Center in Surakarta City, Central Java Province. This study has received ethical permission number 4997/B.2KEPK-FKUMS/VIII/2023 from the Health Research Ethics Committee, Faculty of Medicine, Universitas Muhammadiyah Surakarta. The primary informants were pregnant women with a gestational age of more than 16 weeks with anemia status or without anemia status, who underwent antenatal care (more than once) at the Gilingan or Sangkrah or Kratonan Primary Healthcare Center in Surakarta City. The number of main informants involved in the research was 18 pregnant women, consisting of nine pregnant women who had anemia and nine who did not have anemia. This study used a purposive sampling technique. The researchers met the informants during their visit to the primary healthcare centers following the direction of the midwife coordinator of every primary healthcare center. The



researchers then made interview appointments with pregnant women willing to become informants at the agreed location. This study used source triangulation techniques to increase the credibility of the research data. The triangulation informants were three husbands of pregnant women, three midwives, and three nutrition officers at the three health centers above. In total, there were nine triangulation informants.

Data collection was carried out using semi-structured interviews with an interview guide. Interviews were conducted for 20-45 minutes at an agreed-upon place by every informant. The interview guide was prepared by researchers based on a literature review regarding mothers' abilities to prevent anemia and motivation and opportunities to make behavior changes (Whittal *et al.*, 2021). The guide was reviewed by two experts (not researchers). One example of a question in the interview was: "In your opinion, how difficult do you feel when preventing anemia?" Participants were also asked about what support they needed to help prevent anemia during pregnancy, the difficulties they experienced, whose support they needed most, their opinions on whether they received support through information technology, and what features they needed. The researchers used recorders and notepads to record and jot down notes during data collection.

Data analysis was carried out using thematic analysis. First, the researcher transcribed the interviews. Then, the researchers reduced the data through coding and categorization using ATLAS.ti software (web version). Finally, the researchers interpreted and presented the data. The research results were divided into three themes that answer the research objectives.

## RESULTS AND DISCUSSION

There were 18 main participants as subjects of this study. The characteristics of the informants based on age, education level, occupation, gestational age, parity, and anemia status are shown in Table 1. Nearly half of the total informants were aged between 26-30 years. Nearly a third of the informants were high school graduates, half of whom were

housewives. Eight out of 18 informants were pregnant with their first child.

**Table 1. Participants Characteristics**

Characteristics	Frequency (n)	Percentage (%)
<b>Age</b>		
20-25	5	27.8
26-30	8	44.4
>30	5	27.8
Min; Max	20; 38	
Mean $\pm$ SD	28.02 $\pm$ 4.6	
<b>Education</b>		
Junior high school	1	5.6
Senior high school	12	66.6
D3/S1	5	27.8
<b>Work</b>		
Employee	5	27.8
Self-employed	3	16.7
Housewife	10	55.5
<b>Gestational age</b>		
Trimester 2	3	16.7
Trimester 3	15	83.3
<b>Hemoglobin Level</b>		
Anemia	9	50
Normal	9	50
<b>Pregnancy</b>		
1	8	44.4
2	5	27.8
3	5	27.8

The interviews showed that all pregnant women had received services from health workers to prevent anemia during pregnancy checks. Almost all informants stated that blood supplement tablets were a service provided by health workers to prevent anemia. Some informants received additional services such as checking hemoglobin levels, classes for pregnant women, and education about nutrition. Informants who experienced anemia said they were advised to take more blood-enhancing tablets (twice a day). Some anemic informants received additional side dishes (PMT) in their diet. The main informant conveyed the prevention of anemia by the triangulation informant about the anemia prevention program given during the pregnancy check-up. The actions differed from measures to prevent anemia for pregnant women and countermeasures if pregnant women had anemia. Triangulation informants stated that pregnant women who did not experience anemia were recommended to consume IFA tablets once a day. However, pregnant women who experienced anemia were asked to consume it twice daily. Some informants were given additional

side dishes (PMT) and referred to the nutrition clinic for nutritional counseling.

Based on interviews related to identifying the support needed by pregnant women to prevent anemia, three themes emerged. They include 1) the perceived ability and motivation of pregnant women to prevent anemia, 2) the support needed to prevent anemia, and 3) information technology support for preventing anemia.

#### 1) Perceived ability and motivation of pregnant women to prevent anemia

The first and second themes that emerged from the results of the data analysis were the ability and motivation of pregnant women to carry out recommendations from health workers to prevent anemia. There are two subthemes here, namely 1) perception of the ability to prevent anemia during pregnancy and 2) motivation to prevent pregnancy.

Based on the perception of the ability to prevent anemia, 13 out of 18 informants stated that they could prevent anemia during pregnancy and did not experience difficulties in preventing anemia. They did not mind consuming IFA tablets and nutritious foods helpful in preventing anemia, such as animal protein sources high in iron.

*"I don't have any difficulty consuming blood-boosting tablets because I drink them with orange juice. I was advised to drink it with orange juice." IU 1, pregnant woman with anemia*

*"Easy. The health worker gave me blood-boosting tablets. I didn't encounter any problems." IU 5, pregnant woman with anemia*

*"It's not difficult." IU 4 pregnant women with anemia, IU 7, IU 9 pregnant women without anemia*

*"It's not difficult. I am still allowed to eat meat." IU 16, pregnant woman without anemia*

*"I often eat chicken liver. They say this is good for raising hemoglobin levels." IU 18, pregnant woman with anemia*

On the other hand, five pregnant women stated they experienced difficulties preventing anemia. Among their reasons were a lack of motivation and avoidance of the unpleasant side effects of IFA tablets.

*"Sometimes, I am lazy about following the doctor's recommendations. I only took it once, even though it was recommended twice. Most of the time, it's because I don't feel dizzy or nauseous; that's why I don't feel the need to consume it twice a day." IU 2, pregnant woman with anemia*

*"I don't like the smell of the tablets. I only took it once, and I vomited. I can't stand the smell." IU 11, pregnant woman with anemia*

This follows the triangulation informant, who stated that one of the obstacles in the anemia prevention program for pregnant women is the non-compliance of pregnant women in consuming IFA tablets, as shown below.

*"Getting them to comply with the doctor's recommendations is not easy. They did not finish their tablets because of dizziness, nausea, and vomiting. We know this when we do home visits. They said they still had tablets left even though they should have been used. This means that they did not follow the doctor's recommendations." IT 1*

The Capability Opportunity Motivation for Behavior Change (COM-B) model explains that three components facilitate behavior change: capability, motivation, and opportunity. The findings of this study showed that most mothers perceived they could overcome anemia by regularly consuming IFA tablets. However, some mothers were unable to consume IFA tablets regularly. This difficulty in consuming IFA tablets regularly aligns with previous research conducted in seven countries in Africa and Asia, which found that non-compliance with IFA tablet consumption was one of the problems preventing anemia. Internal barriers such as experiencing side effects made pregnant women less motivated to consume IFA tablets (Siekman et al.,

2018). Another study in India also found that negative attitudes arising from the experience of these side effects overpowered the desire to take IFA tablets even though they knew its benefits for preventing anemia (Sedlander *et al.*, 2020). Another study also showed that a low perception of susceptibility to experiencing anemia (as a result of not feeling any symptoms indicating anemia and feeling healthy) can reduce motivation to continue taking IFA tablets regularly when experiencing side effects (Triharini *et al.*, 2023).

Some informants said that it was difficult to prevent anemia because they could not avoid consuming foods or drinks that could inhibit iron absorption, such as tea. They expressed difficulty consuming foods that increase hemoglobin levels (a source of animal protein), as shown below.

*"I had difficulty following what the doctor told me to do. The doctor said I shouldn't drink this or that, but I drank it instead. I realize this is not good, but I really have difficulty controlling my cravings." IU 18, pregnant woman with anemia*

*"I have little appetite. I prefer to eat vegetables without rice because it doesn't make me nauseous. So, I just get my iron intake from vegetables. But I wonder why my hemoglobin levels have dropped." IU 12*

This also follows the explanation from the triangulation informant who said that, apart from problems in consuming IFA tablets, some pregnant women still have problems regarding their food consumption behavior, which can prevent anemia, as stated below.

*"Some do not get enough iron in their daily diet. Some pregnant women eat only vegetables without meat. Apart from that, some pregnant women cannot eliminate their habit of drinking tea or coffee, which can affect iron absorption. Their awareness of the importance of nutritional health is still low." IT 3*

Anemia prevention behavior, including consumption of IFA tablets and foods high in iron, can be motivated by

anemia-related knowledge, such as concepts, symptoms, and impacts, obtained from counseling sessions (Mekonnen *et al.*, 2021). Most pregnant women understand anemia as a lack of hemoglobin levels. Some added that anemia is characterized by dizziness, nausea, and low Hb levels. Two informants shared what to do if anemia occurs during pregnancy. They explained that pregnant women with anemia should prepare to donate blood during the birth process in case bleeding occurs, as shown below:

*"Anemia is a lack of blood, red blood cells," IU 10, IU 7, IU 8*

*"This occurs when the hemoglobin level does not meet the standard." IU 1*

*"Blood deficiency, characterized by dizziness, nausea, and low Hb." IU 4*

*"... it is hazardous if it happens to pregnant women later during birth... so at birth, the Hb must be sufficient. Otherwise you will have to prepare a donor for the birth process," IU 2*

Based on the motivation aspect, the desire of pregnant women to avoid the effects of anemia could motivate them to consume IFA tablets and eat nutritious food to prevent anemia. Research in Vietnam found that the underlying factor for pregnant women who did not regularly consume supplements was a low perception of the severity of the impact of anemia (Nechitilo *et al.*, 2016). Having good knowledge about anemia, including its symptoms and impacts, increases motivation to engage in behaviors that can avoid anemia (Wiradnyani *et al.*, 2016). Pregnant women who know the benefits of consuming IFA tablets for their babies can also motivate themselves to continue consuming IFA tablets (Lyoba *et al.*, 2020). This was acknowledged by some informants, as shown below.

*"Instill in ourselves to be healthier to enjoy more time with our family. If we are anemic, we will get sick, affecting our children." IU 9, pregnant woman without anemia.*

*"To ensure that our fetus is healthy, our body must first be healthy." IU 16, pregnant woman without anemia.*

The opportunity to carry out anemia prevention behavior also arises if the mother is motivated by her husband and family. The majority of research informants said they received motivation from their husbands and family, where they were often reminded to eat nutritious food and regularly take blood supplement tablets.

*"I am reminded to eat this and that (nutritious food). Sometimes someone cooks for me." IU 12, pregnant woman with anemia*

*"My husband likes to remind me to take blood-boosting tablets before bed." IU 1, pregnant woman with anemia*

Informants stated that the support and motivation provided by family and close people such as husbands made mothers more enthusiastic about making efforts to maintain pregnancy and prevent anemia, as stated by the following informant.

*"I feel more enthusiastic when my family pays attention to me. It makes me feel supported and not alone." IU 9, pregnant woman without anemia*

Family support increases the mother's motivation to make various efforts to prevent anemia. This is supported by previous research, which shows that the family plays an essential role in reminding people to take IFA tablets (Siekman *et al.*, 2018). Research in Tanzania also found similar findings that the family plays a role as a prominent reminder (Lyoba *et al.*, 2020). A quantitative study in Indonesia also found that mothers who received their husband's support were 90% more likely to adhere to taking IFA tablets regularly (Wiradnyani *et al.*, 2016). This is related to the motivation provided apart from being a reminder to consume IFA tablets. If the mother's self-ability and motivation to prevent anemia are still lacking, the mother needs support to continue carrying out anemia-prevention behavior.

## 2) The support needed to prevent anemia

The second theme has subthemes that are preferred support and required support. Regarding preferred support, ten out of 18 informants preferred their husbands as the primary source of support; three informants preferred their husbands and family as their primary support system, while the rest preferred support from friends and health workers.

*"My husband has become a part of my life, so that's the most important thing." IU 12*

*"I prefer support from family and husband, of course." IU 9*

*"Of course, support from my husband. Other than that, maybe support from health workers because they are experts." IU 1, pregnant woman with anemia.*

*"I prefer support from health workers rather than parents. That's because health workers have a related educational background and understand pregnancy." IU 18, pregnant woman with anemia*

Support from husbands is considered the most critical source of support for most pregnant women. This follows the results of previous research, which shows that husbands can perform various roles apart from being a reminder to consume IFA tablets. The husband provides other necessary support, such as taking check-ups when the supplements have run out, buying various necessary supplements, and buying nutritious food for the wife (Williams *et al.*, 2020). Husband support is the primary support at various stages of maternal reproduction, including during pregnancy, as an effort to prevent various health problems, as stated in several research results (Darmawati *et al.*, 2022; Lyoba *et al.*, 2020; Siekman *et al.*, 2018; Wiradnyani *et al.*, 2016). The husband's supportive role is to help with a positive attitude, provide instrumental and emotional support, and provide appropriate responses at critical moments, including when the wife is diagnosed with a health problem (Eddy & Fife, 2021; Kusumawati *et al.*, 2022). Husbands who are aware of

the health problems experienced by their wives and try to help their wives make their wives more motivated to maintain their health. This is in line with the results of interviews regarding the source of support preferred by pregnant women, where they want their husbands to continue encouraging them to eat nutritious food, including buying them nutritious food and reminding them to take blood supplement tablets. Therefore, husbands must be equipped with the knowledge to support their partners in preventing anemia. The involvement of husbands in every counseling session in pregnancy checks, class activities for pregnant women, or educational sessions is necessary so that husbands have the knowledge to support pregnant women in preventing anemia (Talegawkar *et al.*, 2021).

Apart from husbands, health workers are also considered as another important source of support. Previous research shows that support in the form of counseling regarding information and the importance of preventing anemia is significantly related to compliance with IFA tablet consumption (Noptriani & Simbolon, 2022; Palivela *et al.*, 2021). Consistent counseling from health workers regarding the implementation of behaviors that can prevent anemia and strategies to overcome side effects or difficulties has been proven to be able to overcome obstacles in treating anemia in pregnant women (Arifah *et al.*, 2023; Nahrisah *et al.*, 2020; Siekmans *et al.*, 2018).

Some informants wished that health workers could have provided more support. They wished they would focus not only on the fetus's health but also on the pregnant mother's health, as shown below.

*"I think health workers are still more focused on the fetus. If the mother doesn't complain about her health, then nothing happens." IU 15, pregnant woman without anemia*

This follows the results of previous qualitative research in Indonesia, which found that health workers did not provide adequate counseling to pregnant women during pregnancy check-up sessions. Counseling is only given according to what pregnant women ask or complain about

(Rahmawati *et al.*, 2021). This may occur due to several obstacles, such as the absence of specific guidelines for anemia management during pregnancy and health workers (midwives) having never received training in interpersonal communication or anemia counseling (Darmawati *et al.*, 2020). Therefore, training to improve communication skills during ANC visits is needed by health workers to support pregnant women to avoid anemia (McGowan *et al.*, 2023).

### **3) Information technology support for preventing anemia.**

The third theme has subthemes: perceived usefulness of information technology support for preventing anemia and preferred information technology support. Some of the respondents joined in the WhatsApp Group consisting of pregnant women in each healthcare center coordinated by the health professionals. Some of them already used an application related to pregnancy. The majority of pregnant women anticipated the use of information technology to support them in preventing anemia. Several mothers stated that information technology, such as mobile applications, can make things easier because they are used to smartphones in everyday life and they suit the needs of today's young people. Some informants stated that using the application could reduce obstacles, such as feeling embarrassed if they wanted to ask health workers about certain things. Some informants also stated that they had used applications related to pregnancy and utilized the information received through the application to overcome problems during pregnancy. The following are informants' statement regarding this matter.

*"Mobile applications make things easier because we always carry our phone anytime, anywhere." IU 12, pregnant woman without anemia.*

*"I think it's good because it keeps up with current technology and needs." IU 13, pregnant woman with anemia*

*"I also like opening apps related to pregnancy. I like to follow their advice if I think it's good." IU 18, pregnant woman with anemia*

*"Sometimes I don't dare ask [health workers], so I choose to find certain information via apps." IU 13, pregnant woman with anemia*

In their research, Siekmans et al. (2018) and Pathirathna et al. (2020) recommend using innovative technology to remind pregnant women to take IFA tablets. A systematic review of interventions to prevent anemia also recommends using information technology for anemia prevention because access to information technology in LMICs has grown dramatically over the last decade (Gomes et al., 2021). Most informants in the study supported using apps to support pregnant women to prevent anemia as illustrated by the results of a survey on mobile Health (mHealth) users in Indonesia in 2020 by the Katadata Survey, which showed that mHealth users in Indonesia reached 57%. Many users use mHealth to overcome health problems (Pusparisa, 2020). This also shows the acceptance of Indonesian society for using apps to overcome health problems. A systematic review of app use among pregnant women showed good acceptance of the various existing apps to support pregnancy (Carter et al., 2019). This shows the potential for developing a support system for anemia prevention through information technology.

Pregnant women who support using apps to prevent anemia stated several features they expected to find in an app. Most pregnant women and their husbands stated that online consultation with health workers was the most needed feature. Apart from that, another feature mentioned as necessary by informants and triangulation informants was the reminder to take daily blood supplement tablets. Several informants also conveyed other essential features, such as a short video related to pregnancy knowledge, motivational messages to encourage IFA tablet consumption, and other efforts to prevent anemia, as well as features to provide food recommendations that can overcome anemia along with explanations of the iron content in foods, as shown below.

*"I find online consultation helpful." IU 1, pregnant woman with anemia*

*"I can communicate with experts via the app." IU 5, pregnant woman with anemia*

*"I can chat with health workers easily via the app [mention the name of a consultation app with a known doctor]." IU 6, pregnant woman with anemia*

*"I like it because the consultation is free. I think it's important that we are accompanied by experts." IT 4*

*"This is very useful, especially the reminder feature for IFA tablet consumption. Let's say we haven't taken the supplement today; the app will notify us to check." IU 15, pregnant woman without anemia*

*"The app presents us with nutritional facts of food, like how much spinach can increase our Hb levels, etc." IU 9, pregnant woman without anemia*

*"The app gives us information about what is good and not for pregnant women. We need that." IU 14, pregnant woman without anemia*

*"I can find information to avoid foods that are not good for pregnant women via the app." IU 18, pregnant woman with anemia*

*"I hope the apps start adding video content. The article content is good, but sometimes we're too lazy to read. It's more engaging with video because it can provide some demonstrations, too." IU 5, pregnant woman with anemia*

These desired features follow the results of a scoping review on the use of mobile apps in pregnancy, which shows that mobile apps offer many features and functions (multifunction), with the primary function being data collection and communication (Carter et al., 2019). Collecting personal data that can be processed to provide unique feedback for every individual according to their needs (personalized) is a superior feature. Thus, future application development can be directed at collecting data about IFA tablet consumption and consumption

patterns of pregnant women and then providing appropriate feedback to improve this behavior.

The essential element is communication features between patients and health workers and facilitation for groups with lower levels of health literacy using photos and explanatory videos (Ambarwati & Sulastri, 2023; Carter *et al.*, 2019). The potential for app utilization will increase if the app meets user needs. Therefore, developers need to focus on providing features that are considered essential and can answer user questions, especially in dealing with anemia. What increases the use of mHealth is the trust of app users in the application developer or manager (Octavius & Antonio, 2021). Hence, collaboration with related parties trusted by users (health workers) is expected to increase the use of the app.

All in all, the findings of this study show that husbands are the source of support most pregnant women need. Another desired source of support is support from health workers. The findings of this study regarding the perceived usefulness and acceptance of using apps to prevent anemia show the potential for developing a support system for preventing anemia using apps. Thus, future studies should be able to develop a support system for pregnant women to prevent anemia through apps by providing features that are considered necessary according to the results of this study. The features in the app can be designed primarily to connect pregnant women with health workers more efficiently so that they can fulfill their counseling and education needs outside of pregnancy check-ups. Husbands' involvement in monitoring their wives' IFA tablet consumption and diet can be facilitated through features in the application. Involving these critical sources of support using applications is necessary to create more efficient opportunities for pregnant women to increase their ability and motivation to prevent anemia. Even so, there are weaknesses in this study. This study did not explore in depth the perspectives of husbands or health workers regarding obstacles in supporting pregnant women to prevent anemia. Therefore, future researchers are expected to focus on exploring this issue.

## CONCLUSION

Some pregnant women perceived that they could prevent anemia during pregnancy. However, some others found it difficult to take measures to prevent anemia. Therefore, it requires support from various parties, such as husbands, families, and health workers, to help pregnant women avoid anemia. Most pregnant women stated that the source of support they most needed was their husbands. After their husbands, they felt they needed support from health workers. Based on the research findings, it was concluded that pregnant women perceived the benefits of using apps to support the prevention of anemia. According to the findings of this study, it is necessary to develop apps with the features that pregnant women need. Support from husbands and health workers can be integrated through apps that create good conditions to enable and motivate pregnant women to practice anemia prevention behavior.

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## Students' Perception of Their Self-Efficacy by Being a "Hey Peer Educator" in Drug Abuse Prevention

Ira Nurmala<sup>1</sup>, Lutfi Agus Salim<sup>1</sup>, Muthmainnah Muthmainnah<sup>1</sup>, Yuli Puspita Devi<sup>1,2</sup>, Neil Harris<sup>1,3</sup>, Nicola Wiseman<sup>3</sup>, Asma Nadia<sup>1</sup>

<sup>1</sup> Faculty of Public Health, Universitas Airlangga, Surabaya, East Java Indonesia 60115

<sup>2</sup> Faculty of Health Sciences, Universitas Gresik, Gresik, East Java Indonesia 61119

<sup>3</sup> School of Medicine, Griffith University, Queensland, Australia

✉Email: [iranurmala@fkm.unair.ac.id](mailto:iranurmala@fkm.unair.ac.id)

### ABSTRACT

**Background:** Peer education programs provided in schools are one method to help prevent drug abuse; however, the effectiveness of these programs relies, in part, on their delivery to the population in need. Therefore, the effectiveness of the program relies on the self-efficacy of peer educators. The peer education program helps students to practice their skills as peer educators in avoiding drug abuse. **Aims:** This study aimed to explore the students' self-efficacy as peer educators after being a peer educator in the peer education program. **Methods:** In-depth semi-structured interviews were conducted with 45 student peer educators in Middle schools located in Surabaya, Indonesia. **Results:** Adolescents who acted as student peers perceived and experienced an improvement in their knowledge and ability to help their peers avoid drug abuse. **Conclusion:** The peer education program is perceived to improve students' self-efficacy in counseling tasks, to learn analytical skills, and to maintain positive behavior.

**Keywords:** high school education; program evaluation; public health; self-efficacy; student peer educator

### INTRODUCTION

The number of narcotic abusers in Indonesia was 784 cases in the first semester alone (National Narcotics Agency, 2017). The number of drug abuse cases in Indonesia is 1,184, with 1,483 suspects in 2021. This number increased in 2022 to 1,350 cases, with 1,748 suspects. In 2023, from January to July, there were already 1,125 drug cases involving 1,625 people (Narcotics National Agency, 2023).

Data from all three surveys (2009, 2012, and 2017) showed prevalence by education level, indicating a user group shift. In 2009 the high prevalence of abusers was at the level of secondary education (junior high and high school equivalent) to a young college education. In the 2012 survey, the prevalence was high in the group of unschooling, high school graduates, and college graduates. In the 2017 survey, the prevalence of drug abuse was high in the group of elementary school children and high school graduates.

This age range of drug abusers should be a concern as the behavior could potentially lead to more dangerous engagement in risky behavior and poor health outcomes (National Narcotics Agency, 2018). The survey results in 2023 still showed that students were the highest group of drug users (fourth), and teenage drug users were dominated by high school students (Provincial National Narcotics Agency, 2023). Efforts to improve human resources to support adolescents are critical to discourage them from engaging in drug abuse.

Peer education is one of the prevention programs conducted for students held by the District Education Office in Surabaya, Indonesia. However, the program is not currently running since the power shift from the District Education Office to the Provincial Education Office in 2014. Peer education programs are aimed at empowering students as peer educators. The peer education program helps students understand healthy behaviors and

strengthen their knowledge and skills by educating others. The Peer Educator Program empowers students to improve their self-efficacy as an educator of their peers (Ghasemi *et al.*, 2019).

As stated by several researchers, the peer educator program has been proven to be effective and has played an important role for adolescents or youth who are living with HIV (ALHIV) in their issues of self-acceptance as HIV sufferers, ART treatment, and developing self-esteem (Kitetele *et al.*, 2022). Engaging in the peer educator training program has led to enhancements in health behaviors (Vivian & Flanagan, 2022). Properly organized peer educator training has the potential to enhance the knowledge of volunteer students and foster a positive shift in attitude (Ozaydin *et al.*, 2020). The experience of being a peer educator was found to have improved personal skills and knowledge, self-confidence, self-esteem, sense of belonging, and civic engagement (Mehta *et al.*, 2020).

One example of a peer educator program is the HEY (Health Educator for Youth) Program started in 2017. This program continues to be developed to support teenagers to become peer educators who have the necessary skills and knowledge. This program provides training and materials and involves students as peer educators.

Self-efficacy is a person's belief in his/her ability to organize and complete various tasks that affect his/her life (Bandura, 1994). Self-efficacy can also be interpreted as a person's evaluation of their ability or competence in performing a task, achieving a goal, or overcoming a problem. This confidence in one's ability can affect one's feelings, ways of thinking, motivation, and social behavior. The stronger the self-efficacy, the higher the individual's achievements and abilities.

Self-efficacy is comprised of three dimensions: the confidence to be able to carry out tasks, learn specific skills, and control positive behavior despite challenges (Schwarzer & Renner, 2009). One of the forms of self-efficacy is verbal persuasion (Bandura, 1997). An example of verbal persuasion would be an attempt to convince peers that the student peer educators can achieve certain results. Verbal persuasion through peer counseling can strengthen resilience and prevent

engagement in risky behaviors. The function of student peer educators is as friends who are willing to help, listen, and understand, help their peers to grow and develop with their groups, as well as leaders who care for social change (Rogation, 1996). It is expected that student peer educators can motivate their peers to prevent drug abuse despite challenges that may arise and increase the efficacy of their peers to avoid drug abuse.

Peer educator programs have increased adolescents' self-efficacy in avoiding drug use (Demirezen *et al.*, 2019). Peer educator programs may strengthen the role of self-efficacy especially in drug abuse prevention (Nurmala *et al.*, 2020) and they offer policymakers valuable and cost-effective ways to improve health, increase self-efficacy, strengthen community engagement, and promote active participation and trust (Mehta *et al.*, 2020). The literature showed the benefit of peer education programs for improving students' efficacy, especially those who participated as peer educators. Therefore, this study was conducted to examine the students' self-efficacy by being a peer educator in avoiding drug abuse.

## METHODS

### Design and Participants

A qualitative case study approach was adopted to capture peer educators' views of their self-efficacy after participating in a peer education program. We drew on this research approach due to its flexibility in allowing researchers to openly explore peer educators experiences, and, therefore, provide detailed and in-depth accounts (Moeloeng, 2006). Each part of the investigation contains a combination of grouping, analyzing, intuiting, and description to understand and interpret the phenomenon under study (Wojnar & Swanson, 2007).

The formation of peer education in each school was a school initiative program as a follow-up program which was carried out by the Surabaya Education Office. The process of selecting students who are student peer educators at each school was different. Some schools stated that the student peer

educators were selected through health ambassador selection, but some teachers chose the student peer educators because of the activity of those students in the organization at school.

10 schools participated in this study. These schools were chosen to represent each region in Surabaya. There was one private school and one public school in each region. To identify potential participants, the researchers approached teachers working within all regions in Surabaya who had an awareness of students who had participated in a peer-education program in their school. Participants were recruited by the teachers in each school with inclusion criteria of students who have been involved as peer educators and have participated in training as peer educators at least once. 45 voluntary participants identified as student peer educators by their teachers between 15 - 19 years of age. The participants were students in West Surabaya, North Surabaya, Central Surabaya, South Surabaya, and East Surabaya. The key participants in this study were students who were student peer educators in their school environment.

#### **Data Collection and Analysis**

Ethical approval for this study was granted in June 2018 by the Health Research Ethics Committee [reference: 940-KEPK]. The Health Research Ethics Committee is responsible for ensuring the research protocol follows ethical guidelines and protects the study respondents. The researchers conducted interviews and focus groups with student peer-educators between May and August 2018 with each interview lasting 30 - 60 minutes in length. Focus groups were conducted with participants if the participating school had more than six student peer educators. Before each interview, written consent was obtained from all participants.

A semi-structured interview guide was used to allow participants to speak openly and comfortably, thus allowing the researcher to capture their perceptions of changes in their knowledge and skills related to their role as student peer educators. To foster a safe and comfortable environment, thus helping to ensure that the responses participants provided were authentic, the researcher interviewed the participants in a place

and time that the participants felt comfortable and the researchers ensured that the teachers were not present in the interview's location. The interview topics were related to their experience as peer educators and only followed up by related questions to answer the research questions.

To capture participant discussions, each interview/focus group was audio recorded using a digital tape recorder and transcribed verbatim. To help further enhance the credibility of the data collected, we also conducted the observation in high school environment related to the available space and information related to drugs abuse prevention. We conducted the observation as part of source triangulation as required in the qualitative studies.

After each of the interviews/group interviews, the researchers analyzed the interviewees' answers. Interviews and group interviews were transcribed and data were coded and categorized into the dimension of self-efficacy due to the peer educator program (Creswell, 1998). The researchers used inductive reasoning which moves from specific observations to broad conclusions. The researchers reading and re-reading transcripts were to get a sense of participant experiences and continue to look for themes related to the confidence to be able to carry out tasks, to learn specific skills, and to control positive behavior despite challenges from the transcripts. We assigned codes related to the three dimensions of self-efficacy and added other codes to accommodate other findings.

With qualitative research, acknowledging the inherent biases that may arise through the research teams' prior knowledge and experience is important (Watanabe, 2017), in this case within the domains of adolescent health promotion. To help acknowledge and reflect on biases that may occur during the research process, the researchers engaged in frequent and ongoing dialogue regarding all aspects of the research process (Onwuegbuzie *et al.*, 2009).

#### **RESULTS AND DISCUSSION**

The analysis showed findings related to the dimensions of self-efficacy of the participants. The results section describes the characteristics of these peer

educators and their perception of the 3 dimensions of self-efficacy. Characteristics of student peer-educators included: student peer educators men or women, at the first, second, or last grade (age 15-19 years old), had experience as a peer educator in <1 year or 1 year and more (Table 1).

**Table 1.** Characteristics of student peer-educators (N = 45)

Participant characteristics		n
Age (years)	15-16	23
	17-19	22
Grade	First	6
	Second	17
	Last	22
Gender	Male	12
	Female	33
Experienced as a peer educator	<1 year	18
	1 year and more	27

### Self-Efficacy

Students stated that their self-efficacy in educating their peers to avoid drug abuse was improved by being student peer-educators especially self-efficacy related to the confidence to be able to carry out tasks, to learn specific skills, and to control positive behavior despite challenges. These skills are the results of the training that they participated in and from their experience as educators for their peers.

### The Confidence to Be Able to Carry Out Tasks

After serving their role as student peer educators, the participants explained that there had been a change before and after becoming student peer educators. The most widely felt difference by the participants was their ability to carry out tasks in counseling with their peers about the dangers of abusing drugs. Specifically, participants reported multiple improvements in carrying out cognitive tasks, including improvements in knowledge about avoiding drug abuse, together with improvements in providing information to help others solve their problems.

*"The difference is I did not have any knowledge about that (drug abuse) before. So when I get the knowledge from my peer counselors from training. So when there is a friend in need I can give him/her*

*appropriate information. I feel that we learn about it together."* (Student 4).

*"I did not have appropriate knowledge about that (drug abuse). After being a peer educator my knowledge about drugs (narcotics, psychotropic, and addiction substances) increased. There is a friend who said that I am very motivating to help people and can set the pattern as I like."* (Student 3)

The participants also explained that their peers often talked about the problems they faced, including family and relationship problems.

*"The problem is when there is somebody who confides about his girlfriend. I just said that I could not give him solutions because I am not experienced. He said, 'What kind of counselor are you?' yeah, something like that."* (Student 1)

*"(...) Family problems, youth problems, and so on."* (Student 7)

*"Yes, like problems with their girlfriends. They usually talked about their girlfriends' family."* (Student 8)

*"Yes, my friend told me about his problem in romance. I did not have any experience about that. So I just told him to do this and that and also give a little advice that I think could help him."* (Student 1)

### The Confidence to Learn Specific Skills

The participants also explained that, after they were selected as student peer educators by the school, in 2017 they received training and counseling from the Surabaya Education Office which was given to several high schools that had student peer educators. Participants reported that this training helped lay the foundation for peer educators to learn specific analytical skills which helped them identify drug use and addiction within their social environment

*"They held a training, so there were about 5 training in education office, they continuously made training for each school, but those*

*who ran this peer education program were only a few schools.” (Student 11)*

In addition, student peer educators also received training and coaching from stakeholders such as the National Narcotics Agency (BNN) and the Police.

*“We were chosen as health ambassadors and we will have training each month, after we have learned the material, we can educate our peers about this. Now we will have the task as the top 10 health ambassadors to spread the information to other friends.” (Student 12)*

*“We directly saw the presenter tell a story, we were also given photos that made us think, ‘We should not be like this’. It was so inspiring. I think it is so cool to work at the BNN to help sick people like that, who need to be rehabilitated so maybe if I have a friend or neighbor like that, I can help them.” (Student 4)*

#### **The Confidence to Control Positive Behavior Despite Challenges**

The student peer educator expected the school and stakeholders to monitor their activities by providing continuous training on the latest issues regarding drug abuse. In addition, several participants also wished that the supervising teacher would hold regular meetings with the student peer educators to discuss cases and challenges in adolescent’s problems. The student peer-educators felt that their peers should have the ability to control their positive behavior despite many challenges. Unfortunately, the school and community has not supported the regular meeting for these student peer-educators

*“Counseling is rarely held, there should be (...) Like from the community health center, yes the material should be about teenage problems.” (Student 9)*

*“In our school, the counselors are not active (...) There is a counselor in each class, they can have a group discussion every week to talk about the problem faced by our friends.” (Student 10)*

This study aimed to look at the three aspects of self-efficacy that student peer educators need to possess. Self-efficacy was related to the confidence to be able to carry out tasks, learn specific skills, and control positive behavior despite challenges. Regarding the confidence to be able to carry out tasks, the student peer-educators in this study felt that they experienced an improvement in their skills. These skills were beyond the cognitive aspect, these student peer-educators perceived the improvement in their skill of giving advice and implementing what they know without having the same experience as their peers. By being student peer educators, they can help their peers, whether inside or outside of the school environment. Research shows that an individual’s development will be fostered if students have supportive peers, while friends who like to impose their will and create many conflicts will hinder development (Santrock, 2006). A positive environment for peers can be used to change adolescents’ behavior and values (Laursen, 2005). Peer education programs contribute to this conclusive and positive environment.

Regarding learning specific skills, the peer education program helped student peer educators acquire new specific skills. The peer education program training provided the media that the student peer-educators used to identify their social environment and use their analytic skill in preventing addiction to drug abuse. The self-efficacy to learn specific skills is important especially as adolescence is a challenging period and there are many ways in which students’ self-efficacy can be reduced by the negative influences (Zimmerman, 2010). In addition, research has found that, conceptually, self-efficacy is an individual’s belief about his ability to achieve his goals. Psychometrically, self-efficacy is formed from the construction of self-motivation, especially about target outcomes, self-concept, or locus of control (Zimmerman, 2000). This supported the notion that student peer-educators with high self-efficacy are more likely to have control of their behavior to make healthy choices, and that in turn may help them to use this skill to motivate their friends to do the same.

Regarding the third self-efficacy construct, to control positive behavior despite challenges, these student peer-educators faced challenges that contributed to, and influenced, student achievement (Elahi *et al.*, 2011): specifically, the direct effect of self-efficacy and indirect academic participation on achievement motivation and self-learning strategies (Yusuf, 2011). Previous research has shown there were no statistically significant differences in students' academic self-efficacy beliefs in terms of gender (Yang & Ersanl, 2015). These challenges were overcome with goal setting, access to information, and the expectation of reward (Schunk, 1991). Peer education programs offered the skill to set goals, access to information, and a sense of accomplishment as the reward. The goals of helping their friend were supported through active listening, showing empathy to friends who experienced social or emotional difficulties, and providing peer support (Cowie & Wallace, 2000). Training provided by the school and stakeholders is beneficial for the student peer educators in carrying out their role of controlling positive behavior. After receiving the training, the student peer-educators were encouraged to implement these trainings to their peers individually or in groups. Student peer-educators in this study gave support to their peers by listening to their peers' stories and by offering solutions to the problems. One of the tasks of the student peer educators is to support their peers in existing networks or pay attention to those showing signs of having a problem (Suarjo, 2008). One challenge, as conveyed by the participants, was that training was rarely held and they were expected as a school to continue establishing cooperation with stakeholders to provide training continuously. Continuous training will maximize peer educator's ability to help and assist their peers. The teaching methods of these training should be varied by using multiple methods and media. When applied to the development of practical skills, alternative teaching methods to traditional one-on-one tutoring can produce equivalent learning outcomes (Maloney *et al.*, 2013). Based on the many advantages gained by the students in peer education programs, schools, and other stakeholders should

continue their support for the sustainability of the program.

This study is unique since it explores the perceived self-efficacy resulting from the program that they participated in at school as many works of literature evaluate students' self-efficacy from the perspective of the teachers. This study highlights the importance of involving these students in planning the peer-education program implementation in their school to get the maximum benefit in their self-development as student peer educators and contributes to the existing literature by providing another perspective on the development of self-efficacy of these student peer educators. Study results also serve as recommendations to stakeholders to continue their support for the sustainability of the training program of these student peer educators. It must, however, be noted that the study was conducted in Surabaya and, therefore, the results of the study may not reflect the Indonesian population. However, Surabaya is the second biggest city in Indonesia with a diverse ethnic and cultural population, and, as such, may provide a broad insight into how diverse groups experience the improvement of self-efficacy in the confidence to be able to carry out tasks, to learn specific skills, and to control positive behavior despite challenges.

## CONCLUSION

Peer educator programs increase students' self-efficacy in three ways: the confidence to be able to carry out tasks, to learn specific skills, and to control positive behavior despite challenges. The result showed that the peer education program helps the students in improving their self-efficacy in avoiding drug abuse. Therefore, the local government needs to maintain the improvement of the self-efficacy of these student peer educators by conducting capacity-building activities. These efforts may support the sustainability of the peer education program in Surabaya. It is also necessary to do a direct observation to measure the increase in the self-efficacy of the student peer educators.



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## Household Latrine Utilization Behavioral Model as an Effort to Improve Open Defecation-Free Program

Erna Hartatik<sup>1)</sup>, Rondhianto Rondhianto<sup>2)</sup>, Dina Helianti<sup>3)</sup>

<sup>1</sup> Master of Public Health Science, Postgraduate Program, Universitas Jember, Jember, Indonesia

<sup>2</sup> Faculty of Nursing, Universitas Jember, Jember, Indonesia

<sup>3</sup> Biomedical Department, Faculty of Medicine, Universitas Jember, Jember, Indonesia

✉Email: [rondhianto@unej.ac.id](mailto:rondhianto@unej.ac.id)

### ABSTRACT

**Background:** Healthy latrine-using behavior indicates healthy behavior. However, many people still practice open defecation, which can cause illness and increase death risk. Self-efficacy is a dominant predictor of health behavior change. **Aims:** The study aims to develop a household latrine utilization behavior model based on self-efficacy to improve an open defecation-free (ODF) program. **Method:** The study was a descriptive-analytic with a cross-sectional design. The sample size was 138 respondents with cluster random sampling. The study variables were endogenous (household latrine utilization), exogenous (predisposing, enabling, and reinforcing factors), and intervening variables (self-efficacy). Data were collected by questionnaire and analyzed using SEM-PLS. **Result:** The household latrine utilization behavior-based self-efficacy model is fit (SRMR=0.098; NFI= 0.910; Q<sup>2</sup>=0.334). Valid and reliable indicators were education (predisposing), clean water availability and latrine maintenance (enabling), and health worker and family support (reinforcing). Path analysis showed exogenous factors, directly and indirectly, influence latrine utilization behavior through self-efficacy. Predisposing and reinforcing factors had a direct and significant effect ( $p = 0.025$ ;  $p = 0.001$ ) while enabling factors were insignificant ( $p = 0.438$ ). Enabling and reinforcing factors indirectly and significantly affected latrine utilization behavior through self-efficacy ( $p = 0.033$ ;  $p = 0.004$ ), while predisposing factors were insignificant ( $p = 0.141$ ). Self-efficacy significantly influenced latrine-using behavior ( $p = 0.023$ ). **Conclusion:** The household latrine utilization behavior-based self-efficacy model is a fit model with good predictive relevance in predicting household latrine use behavior. Health workers can use the model to enhance household latrine utilization behavior and improve the ODF program and public health status.

**Keywords:** defecation, latrines, model, self-efficacy

### INTRODUCTION

Defecating in the household latrine indicates clean and healthy living to prevent various infectious diseases (Kementerian Kesehatan RI, 2022; United Nations Children's Fund and World Health Organization, 2023). Exposure to fecal pathogens contributes to diarrhea and can also cause stunting in childhood, causing short-term and long-term impacts that are harmful to health (Ellis *et al.*, 2020; Mara, 2017). Open defecation (OD) is a big problem that must be resolved immediately because its impact is very bad for health (United Nations Children's Fund and World Health Organization, 2023).

In 2021, only 86.1% of families in Indonesia had access to adequate

sanitation facilities. East Java Province was ranked 6th, namely 94.5% (Kementerian Kesehatan RI, 2022), with Situbondo district as one of the districts with the lowest percentage of healthy latrine facilities, namely only 70.7% (Dinas Kesehatan Provinsi Jawa Timur, 2022). However, the presence of latrines is only effective in improving health if they are used properly. In 2022, in some countries, more than half of the population still practices OD, for example, Chad (63%), Niger (65%) and South Sudan (60%) (United Nations Children's Fund and World Health Organization, 2023). The percentage of villages that have successfully implemented the Stop OD program is only 48.7%. East Java Province is in 7th position as a province that has

successfully implemented the Stop OD program, namely 74.6% (Kementerian Kesehatan RI, 2022), and specifically, Situbondo District only 61% (Dinas Kesehatan Provinsi Jawa Timur, 2022). It means that there are still many people who practice OD.

According to the PRECEDE-PROCEED model, health behavior is influenced by predisposing, enabling, and reinforcing factors (Green *et al.*, 2022). Several previous studies stated predisposing factor that influences the behavior of using a healthy latrine is age (Lopez *et al.*, 2019; Sinha *et al.*, 2017); gender (Lopez *et al.*, 2019; Tamene & Afework, 2021; Temesgen *et al.*, 2021); education level (Leshargie *et al.*, 2018; Tamene & Afework, 2021; Temesgen *et al.*, 2021; Woyessa *et al.*, 2022); income level (Abebe *et al.*, 2020; Sclar *et al.*, 2022; Yulyani *et al.*, 2019); number of family members (Asnake & Adane, 2020; Sinha *et al.*, 2017; Temesgen *et al.*, 2021; Woyessa *et al.*, 2022); habits (Sinha *et al.*, 2017; Tamene & Afework, 2021); knowledge (Ellis *et al.*, 2020; Kpoeh, 2020; Leshargie *et al.*, 2018; Omer *et al.*, 2022; Yulyani *et al.*, 2019); and attitudes (Ellis *et al.*, 2020; Lopez *et al.*, 2019; Tamene & Afework, 2021; Yulyani *et al.*, 2019). Enabling factors include the availability of clean water facilities (Yulyani *et al.*, 2019), house-to-water source distance (Abebe *et al.*, 2020; Omer *et al.*, 2022; Woyessa *et al.*, 2022; Yulyani *et al.*, 2019), and maintenance of latrines (Asnake & Adane, 2020; Lopez *et al.*, 2019; Omer *et al.*, 2022; Temesgen *et al.*, 2021; Woyessa *et al.*, 2022). Reinforcing factors include family support (Asnake & Adane, 2020; Sclar *et al.*, 2022; Temesgen *et al.*, 2021; Woyessa *et al.*, 2022), health workers support (Yulyani *et al.*, 2019), and community leaders support (Tribbe *et al.*, 2021).

Self-efficacy is the main factor influencing behavior change (Bandura, 2018). Previous study showed self-efficacy is the dominant predictor of latrine utilization behavior (Kpoeh, 2020; Sclar *et al.*, 2022). With high self-efficacy, a person will experience success in making important decisions for specific actions and situations (Bandura, 2018). The existence of facilities in the form of latrines and clean water facilities is not a

guarantee for eliminating the practice of defecating. Even the already available latrines are only sometimes consistently used by the community (Sinha *et al.*, 2017; Temesgen *et al.*, 2021). There are still problems with families who practice OD, not limited to the unavailability of infrastructure, namely toilets and clean water supplies, but also the behavioral aspect, namely community behavior. Based on the background above, it can be seen that there are three main factors behind the behavior of using toilets, namely predisposing, enabling and reinforcing factors. There is also a self-efficacy factor, an intervening variable in shaping latrine use behavior. Therefore, the study aims to develop a household latrine utilization behavior model by analyzing the influence of predisposing, enabling, and reinforcing factors through self-efficacy in the Situbondo district. The developed model can be used to develop appropriate intervention models for the community to improve household toilet use behavior, support the ODF program, and improve public health.

## METHODS

The study was analytically observational with a cross-sectional design conducted in Situbondo District, East Java, Indonesia, in March - December 2022. The study population was families who received social assistance in the form of healthy latrines from the government through Situbondo Regency APBD funds in 2019 (500 families from five villages: Klatakan = 60, Dawuhan = 264, Patokan = 106, Patemon = 34, and Kertosari = 36). The sample size was 135 respondents calculated using G Power Software ( $f^2 = 0.15$ ;  $\alpha = 0.05$ ; and  $\beta$  power = 0.8) with the inclusion criteria being: (1) receiving household latrine program through 2019 Situbondo District APBD funds; (2) act as head of the family; (3) able to communicate well; (4) do not have physical or mental limitations that could interfere with the conduct of study (blindness, deafness, dementia, etc.). The sampling technique used cluster random sampling, namely Klatakan ( $n = 60/500 \times 135 = 16$ ); Dawuhan ( $n = 264/500 \times 135 = 71$ ); Patokan ( $n = 106/500 \times 135 = 29$ ); Patemon ( $n = 34/500 \times 135 = 9$ ); Kertosari ( $n = 36/500 \times 135 = 10$ ).

The study variables consist of (1)

household latrine utilization behavior as an endogenous variable, (2) exogenous variables were predisposing factors (age, gender, education level, income level, number of family members, habits, knowledge and attitudes), enabling factors (availability of clean water, house-to-water source distance, and latrine maintenance), and reinforcing factors (family support, support from health workers, and support from community leaders), and (3) the intervening variable is self-efficacy. The instrument used is a questionnaire, which consists of:

- (1) A sociodemographic questionnaire was used to collect sociodemographic data: age, gender, education, income and number of family members.
- (2) The habits questionnaire was adapted from the concept of latrine usage habits (Peraturan Menteri Kesehatan Republik Indonesia Nomor 3 Tahun 2014 Tentang Sanitasi Total Berbasis Masyarakat, 2014), which consists of six items, namely the latrine utilization (4 items) and latrine maintenance (2 items) with a Likert scale of 1 - 3. The validity and reliability test results were  $r = 0.432 - 0.741$ ; Cronbach's  $\alpha = 0.673$ . The habit was categorized as poor ( $< 10$ ), moderate ( $10 - < 14$ ), and good ( $\geq 14$ ).
- (3) *The knowledge questionnaire was adapted from the concept of knowledge of latrine use* (Peraturan Menteri Kesehatan Republik Indonesia Nomor 3 Tahun 2014 Tentang Sanitasi Total Berbasis Masyarakat, 2014), which consists of eight items, namely understanding (2 items), the benefits of defecating in the latrine (4 items), and latrine maintenance (2 items) with a Guttman scale (0 = false; 1 = true). The validity and reliability test results were  $r = 0.444 - 0.696$ ; Cronbach's  $\alpha = 0.709$ . Knowledge was categorized into low ( $< 2.67$ ), moderate ( $2.67 - < 5.33$ ), and high ( $\geq 5.33$ ).
- (4) The attitude toward latrine use questionnaire was adapted from the concept of attitudes toward latrine use (Peraturan Menteri Kesehatan RI, 2014), which consists of seven items, namely latrine use (5 items) and latrine maintenance (2 items) with a Likert scale of 1 - 3. The validity and reliability test results were  $r = 0.267 - 0.676$ ; Cronbach's  $\alpha = 0.901$ . Attitude toward latrine use was categorized into poor ( $< 13.33$ ), moderate ( $13.33 - < 18.67$ ), and good ( $\geq 18.67$ ).
- (5) The availability of clean water facilities questionnaire adapted from the concept of clean water and its use (Kementerian Kesehatan RI, 2017), which consists of five items, namely types of clean water sources (2 items) and the use of clean water facilities (3 items) with a Likert scale of 1 - 3. The validity and reliability test results were  $r = 0.377 - 0.593$ ; Cronbach's  $\alpha = 0.674$ . The availability of clean water facilities was categorized into poor ( $< 11.67$ ), moderate ( $11.67 - < 16.33$ ), and good ( $\geq 16.33$ ).
- (6) The house-to-water sources distance questionnaire was obtained from the checklist form of the sanitation water source observation (Mukherjee, 2011). Answers are measured using an ordinal data scale (1 =  $< 100$  m, 2 = 100-500 m, 3 =  $\geq 500$  m).
- (7) The latrine maintenance questionnaire was adapted from the checklist form of the observation sheet regarding latrine maintenance procedures (Peraturan Menteri Kesehatan RI, 2014), which consists of eight items with the Guttman scale. The correct answer is given a score of 1, and the wrong answer is 0. Latrine maintenance was categorized into poor ( $< 2.67$ ), moderate ( $2.67 - < 5.33$ ), and good ( $\geq 5.33$ ).
- (8) The perceived family support questionnaire was adapted from the concept of social support (Friedman et al., 2003), which consists of 12 items, namely informational (3 items), assessment (3 items), emotional (3 items) and instrumental (3 items) with a Likert scale of 1 - 5. The validity and reliability test results were  $r = 0.365 - 0.664$ ; Cronbach's  $\alpha = 0.741$ . Family support was categorized into low ( $< 28$ ), moderate ( $28 - < 44$ ), and high ( $\geq 44$ ).
- (9) The perceived health worker support questionnaire was adapted from the

concept of social support (Friedman *et al.*, 2003), which consists of 10 items, namely informational (3 items), assessment (2 items), emotional (2 items) and instrumental (3 items) with a Likert scale of 1 - 5. The validity and reliability test results were  $r = 0.477 - 0.792$ ; Cronbach's alpha = 0.828. Health workers support was categorized into low ( $< 23.33$ ), moderate ( $23.33 - < 36.67$ ), and high ( $\geq 36.67$ ).

- (10) The perceived community leaders support questionnaire was adapted from the concept of social support (Friedman *et al.*, 2003), which consists of 11 items, namely informational (3 items), assessment (2 items), emotional (3 items) and instrumental (3 items) with a Likert scale of 1 - 5. The validity and reliability test results were  $r = 0.646 - 0.918$ ; Cronbach's alpha = 0.962. Community leaders support was categorized into low ( $< 25.67$ ), moderate ( $25.67 - < 40.33$ ), and high ( $\geq 40.33$ ).
- (11) The latrine use self-efficacy questionnaire was adapted from self-efficacy theory (Bandura, 2018). This questionnaire consists of 10 items consisting of four indicators, namely cognitive (4 items), affection (3 items), motivational (1 item), and selection (2 items), with a Likert scale of 1 - 5. The results of the validity and reliability tests were  $r = 0.265 - 0.827$ ; Cronbach's alpha = 0.774. Self-efficacy was categorized into low ( $< 23.33$ ), moderate ( $23.33 - < 36.67$ ), and high ( $\geq 36.67$ ).
- (12) The household latrine use behavior questionnaire was adapted from the concept of family health tasks (Friedman *et al.*, 2003), which consists of 14 items, the domains of recognizing diseases caused by OD (2 items), making decisions about using a latrine (3 items), maintaining latrine cleanliness for health (3 items), modifying the environment (3 items), and using latrine facilities (3 items) with a Likert scale of 1 - 5. The validity and reliability test results were  $r = 0.353 - 0.685$ ; Cronbach's alpha = 0.811. Household

latrine utilization behavior was categorized into poor ( $< 32.67$ ), moderate ( $32.67 - < 51.33$ ), and good ( $\geq 51.33$ ).

Data were collected by interviewing respondents directly at the respondent's home. Before data collection, the researcher explained the study's aims, benefits, procedures and possible risks to prospective respondents. After the prospective respondent understood and was willing to become a respondent, they were asked to sign a consent form. Data were analyzed using descriptive and inferential statistics. Descriptive analysis was used to describe the characteristics of study variables using SPSS V24 and SmartPLS V3 for structural equation modeling. The study has received approval from the Ethical Committee of Health Research of the Faculty of Dentistry, Universitas Jember, with protocol number 1665/UN25.8/KEPK/DL/2022.

## RESULTS AND DISCUSSION

Based on sociodemographic characteristics, most respondents were aged 41 - 60 years (73.19%), female (57.25%), and had secondary education (55.80%) with family members  $\leq 4$  people (81.88%). All respondents have an income level less than the Regency Minimum Wage (RMW). Most respondents have good habits (78.30%), good knowledge (84.80%), and good attitudes toward using healthy latrines (46.40%). Most respondents have adequate clean water facilities (89.10%), and the distance between the house and the source of clean water is quite far (more than 500 meters) (74.60%), with the condition of latrine maintenance in the good category (84.10%). Most respondents have perceived family support and health workers in the high category (76.80%; 97.80%). Meanwhile, perceived community leaders support was low (54.30%). The study results also showed that most respondents have high self-efficacy (55.80%) and the behavior of using latrines for defecation in the high category (76.80%) (Table 1).

**Table 1.** Respondents' Characteristics and Study Variables Distribution Frequency

No	Variable	n (%)	Mean $\pm$ SD (CI 95%)
1.	Age (years)		47.79 $\pm$ 8.912 (46.30 - 49.30)

No	Variable	n (%)	Mean±SD (CI 95%)
	18 - 40	29 (21.01)	
	41 - 60	101 (73.19)	
	≥ 61	8 (5.79)	
2.	Gender		
	Female	79 (57.25)	
	Male	59 (42.75)	
3.	Education Level		
	No Education	9 (6.52)	
	Basic Education	52 (37.68)	
	Middle Education	77 (55.80)	
	High Education	0 (0)	
4.	Income Level		
	Less than RMW	138 (100)	
	More than RMW	0 (0)	
5.	Number of Family Members		
	≤ 4 persons	113 (81.88)	
	> 4 persons	25 (18.12)	
6.	Latrine use habits		15.02 ± 1.916 (14.69 - 15.34)
	Poor	0 (0)	
	Moderate	30 (21.70)	
	Good	108 (78.30)	
7.	Knowledge about Healthy Latrines		6.80 ± 1.520 (6.54 - 7.05)
	Low	1 (0.70)	
	Moderate	20 (14.50)	
	High	117 (84.80)	
8.	Attitudes toward the Use of Healthy Latrines		16.25 ± 4.333 (15.52 - 16.98)
	Poor	33 (23.90)	
	Moderate	41 (29.70)	
	Good	64 (46.40)	
9.	Availability of Clean Water Facilities		14.11 ± 1.867 (13.79 - 14.42)
	Poor	15 (10.90)	
	Moderate	123 (89.10)	
	Good	0 (0)	
10.	House-to-Water Source Distance		
	< 100 m	19 (13.80)	
	100 - 500 m	16 (11.60)	
	> 500 m	103 (74.60)	
11.	Latrine Maintenance Conditions		6.99 ± 1.512 (6.74 - 7.25)
	Poor	4 (2.90)	
	Moderate	18 (13.00)	
	Good	116 (84.10)	
12.	Perceived Family Support		48.16 ± 5.660 (47.21 - 49.11)
	Low	1 (0.70)	
	Moderate	31 (22.50)	
	High	106 (76.80)	
13.	Perceived Health Workers Support		49.25 ± 4.419 (48.50 - 49.99)
	Low	0 (0)	
	Moderate	3 (2.20)	
	High	135 (97.80)	
14.	Perceived Community Leaders Support		27.67 ± 13.36 (25.42 - 29.92)
	Low	75 (54.30)	
	Moderate	27 (19.60)	
	High	36 (26.10)	
15.	Self-efficacy in using healthy latrine		36.99 ± 4.025 (36.31 - 37.66)
	Low	0 (0)	
	Moderate	61 (44.20)	
	High	77 (55.80)	
16.	Household latrine Utilization Behavior		56.38 ± 5.776 (55.41 - 57.36)
	Poor	0 (0)	
	Moderate	32 (23.20)	
	Good	106 (76.80)	

**Table 2.** The Results of Validity and Reliability Test (Outer Model or Measurement Model)

Variable	Indicators		Modeling		Modeling II			
			Loading factor	Loading factor	AVE	Discriminant Validity	Cronbach Alpha	Composite Reliability
(X1) Predisposing Factors	X1.1	Age	-0.677	-	1.000	1.000	1.000	1.000
	X1.2	Gender	0.284	-				
	X1.3	Education level	0.827	1.000				
	X1.4	Income level	-0.127	-				
	X1.5	Family members	0.153	-				
	X1.6	Habits	0.501	-				
	X1.7	Knowledge	0.125	-				
	X1.8	Attitude	0.021	-				
(X2) Enabling Factors	X2.1	Availability of clean water facilities	0.848	0.898	0.704	0.839	0.721	0.826
	X2.2	House-water source distance	0.618	-				
	X2.3	Latrine maintenance	0.762	0.776				
(X3) Reinforcing Factors	X3.1	Perceived Family Support	0.837	0.865	0.760	0.872	0.782	0.863
	X3.2	Perceived Health Workers Support	0.859	0.878				
	X3.3	Perceived Community Leaders Support	0.276	-				
(I) Self-efficacy	I.1	Cognitive	0.640	0.875	0.647	0.804	0.721	0.784
	I.2	Affection	0.799	0.726				
	I.3	Motivational	0.624	-				
	I.4	Selection	-0.596	-				
(Y) Household Latrine Utilization Behavior	Y.1	Knowing diseases	0.713	-	0.672	0.820	0.756	0.860
	Y.2	Decide to use a healthy latrine	0.737	0.773				
	Y.3	Maintain the household latrine	0.806	0.847				
	Y.4	Modify the environment	0.676	-				
	Y.5	Using household-healthy latrine infrastructure	0.816	0.837				

Table 2 shows that several indicators had loading factors  $< 0.7$  in the first model testing, then the researcher retested the model. The results of the

second modeling show that the loading factor for all indicators for each variable is  $> 0.7$ , average variance extracted (AVE)  $> 0.5$ , with the discriminant validity value



being more significant than the other variables. The composite reliability and Cronbach's alpha values are also > 0.7.

So, it means the indicators are valid and reliable.

**Table 3.** Statistical Test Results for the Effect of Determination, Effect Size, Cross-validated Redundancy, and Model Fit (Inner Model or Structural Model)

Variable	Model fit		R <sup>2</sup>	f <sup>2</sup>		Q <sup>2</sup>
	SRMR	NFI		Self-efficacy	Household latrine Utilization Behavior	
Predisposing Factors				0.001	0.047	
Enabling Factors				0.401	0.007	
Reinforcing Factors				0.051	0.287	
Self-efficacy	0.098	0.910	0.430		0.046	0.256
Household Latrine Utilization Behavior			0.527			0.334

Table 3 shows that the model is fit (SRMR = 0.098 < 0.10; NFI = 0.910 > 0.9). The value of Q<sup>2</sup> = 0.256 and 0.334 > 0, meaning the model has good predictive relevance. The values of R<sup>2</sup> = 0.430 and 0.527 indicate that predisposing, enabling, and reinforcing factors influenced self-efficacy of 43% and household latrine utilization behavior of

52.7%. Based on the effect size value, it can be concluded that the factors most significantly influencing household latrine utilization behavior were reinforcing factors (f<sup>2</sup> = 0.287), including the medium category. Meanwhile, predisposing and enabling factors and self-efficacy value f<sup>2</sup> = 0.047; 0.007; 0.046 < 0.15, so it is categorized as having a minor influence.

**Table 4.** Path Analysis and Significance Test Results

No	Variable	Coefficient	t	p	Note
1.	Predisposing Factors --> Household Latrine Utilization Behavior	0.180	2.248	0.025	Direct effects, significant
2.	Predisposing Factors --> Self-efficacy	0.021	0.288	0.774	Direct effects, not significant
3.	Predisposing Factors --> Self-efficacy --> Household Latrine Utilization Behavior	0.004	0.251	0.802	Indirect effect, not significant
4.	Enabling Factors --> Household Latrine Utilization Behavior	0.178	0.776	0.438	Direct effects, not significant
5.	Enabling Factors --> Self-efficacy	0.532	5.993	0.001	Direct effects, significant
6.	Enabling Factors --> Self-efficacy --> Household Latrine Utilization Behavior	0.104	2.142	0.033	Indirect effect, significant
7.	Reinforcing Factors --> Household Latrine Utilization Behavior	0.503	7.551	0.001	Direct effects, significant
8.	Reinforcing Factors --> Self-efficacy	0.208	2.913	0.004	Direct effects, significant
9.	Reinforcing Factors --> Self-efficacy --> Household Latrine Utilization Behavior	0.041	1.474	0.141	Indirect effect; not significant
10.	Self-efficacy --> Household Latrine Utilization Behavior	0.195	1.700	0.023	Direct effects, significant

Table 4 shows that only predisposing and reinforcing factors have a direct, positive and significant influence on household latrine utilization behavior of 18% and 50.30% (t = 2.248; p = 0.025 and t = 7.511; p = 0.001) while enabling factors do not have a direct and significant effect (t = 0.776; p = 0.438). The results of the further analysis show that predisposing and reinforcing factors do not have a

significant influence on household latrine utilization behavior through self-efficacy (t = 0.251; p = 0.802 and t = 1.474; p = 0.141), but reinforcing factors have a direct influence significantly on self-efficacy by 20.80% (t=2.913; p = 0.004), while enabling factors have a significant effect in a positive direction on household latrine utilization behavior through self-efficacy by 10.40% (t=2.142; p= 0.033).

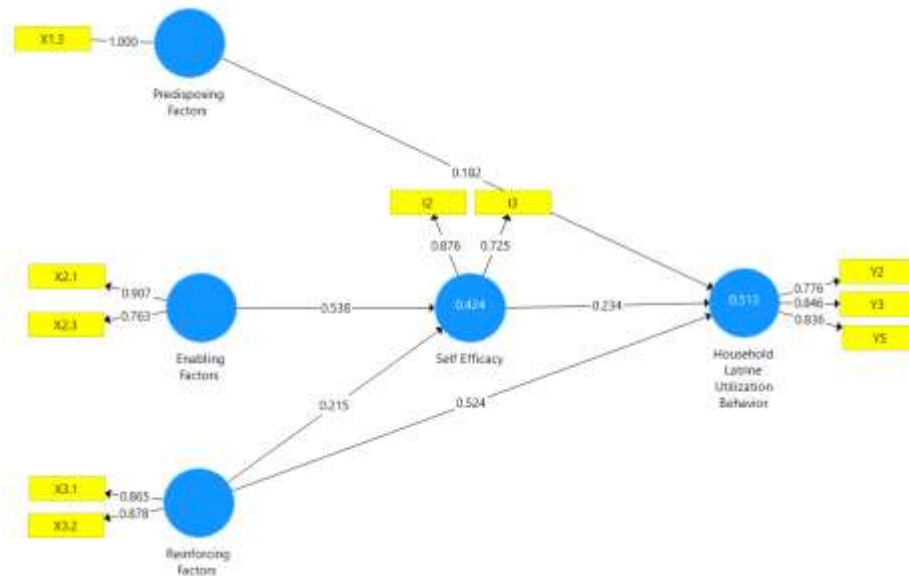


Figure 1. Result of Household Latrine Utilization Behavior Modelling

The results of this study follow several previous studies which stated that most family heads are in the middle adult age category, namely more than 40 years old (Kpoeh, 2020; Temesgen *et al.*, 2021), female (Woyessa *et al.*, 2022), the family type is a nuclear family with  $\leq 4$  (Abebe *et al.*, 2020), with low level of education and income (Abebe *et al.*, 2020; Temesgen *et al.*, 2021; Woyessa *et al.*, 2022). The results of this study showed that no one had latrine utilization behavior in the poor category. The findings follow several previous studies that stated that most people had good defecation practices in the latrine, namely 71.8 - 91.2% (Abebe *et al.*, 2020; Asnake & Adane, 2020; Lopez *et al.*, 2019). The results of this study do not agree with some previous studies, namely a study in Indonesia that stated that only 55.6% of people used the toilet to defecate (Yulyani *et al.*, 2019). A study's results in Ethiopia also showed that even if a family already had latrines, 27.8% of households still practiced OD (Temesgen *et al.*, 2021). Another study shows that only 41.9% of people use latrines to defecate (Omer *et al.*, 2022).

#### The influence of predisposing factors on household latrine utilization behavior

The study showed only one valid

and reliable indicator explaining the predisposing factors for household latrine utilization behavior: education (Table 1). The study results also show that predisposing factors directly, positively and significantly influence family toilet use behavior. However, it does not significantly influence household toilet use behavior through self-efficacy (Table 4 and Figure 1). This study's results follow several previous studies stating that education is an essential component that shapes latrine use behavior. The higher the level of education, the better the behavior of using toilets as a means of defecation (Abebe *et al.*, 2020; Garn *et al.*, 2017; Leshargie *et al.*, 2018; Tamene & Afework, 2021; Temesgen *et al.*, 2021; Woyessa *et al.*, 2022; Zewdie *et al.*, 2021).

People with formal education are likelier to use healthy latrines (Leshargie *et al.*, 2018; Woyessa *et al.*, 2022). Someone who has never attended formal education will tend to engage in OD (Garn *et al.*, 2017; Temesgen *et al.*, 2021). A higher level of education enables a person to be increasingly able to know, understand or analyze clean and healthy living. On the other hand, the lower a person's level of education, the lower the person's understanding of using the household latrine (Abebe *et al.*, 2020; Leshargie *et al.*, 2018). In line with the

increase in people's educational status, their knowledge about the causes of disease, transmission and the role of human waste in the occurrence of infectious diseases also increases. Therefore, to maintain health, they manage and dispose of all types of waste, including human waste (Tamene & Afework, 2021; Temesgen *et al.*, 2021; Woyessa *et al.*, 2022).

The study results showed that predisposing factors, in this case, the level of education, do not significantly influence behavior through self-efficacy. Sources of self-efficacy are mastery experiences, vicarious experiences, verbal or social persuasion, and physiological and emotional states (Bandura, 2018). The level of education may be an indicator that forms one source, namely mastery experiences. However, many other indicators still shape it, for example, sociodemographic conditions and other psychosocial factors (Kpoe, 2020; Sclar *et al.*, 2022). The research results show that age, gender, income level, number of family members, habits, knowledge and attitudes are unreliable indicators of predisposing factors (Table 2). So, there is also the possibility that predisposing factors do not significantly influence household latrine use behavior through self-efficacy.

#### **The influence of enabling factors on household latrine utilization behavior**

The study results showed that valid and reliable indicators explain the enabling factors: the availability of clean water facilities and latrine maintenance conditions (Table 1). The results of the study showed that enabling factors do not have a direct influence on household toilet use behavior. However, it indirectly, positively and significantly influences household toilet use behavior through self-efficacy (Table 4 and Figure 1). The results of this study follow several previous studies that stated the availability of clean water facilities and latrine maintenance conditions enable someone to carry out latrine utilization behavior (Asnake & Adane, 2020; Budhathoki *et al.*, 2017; Garn *et al.*, 2017; Woyessa *et al.*, 2022). However, the results of this study do not agree with previous studies, which stated that

distance from a clean water source is one of the factors that influence latrine use behavior (Abebe *et al.*, 2020; Woyessa *et al.*, 2022). House-to-water source distance is not a valid and reliable indicator, possibly because all respondents in this study were recipients of healthy toilet assistance from the government. Every latrine built for families is equipped with sanitation system facilities. In addition, most respondents are near their homes to clean water sources, namely more than 500 m, so the possibility of them defecating in rivers or water sources is relatively small.

The results of this study follow several previous studies which stated that latrine maintenance conditions had a positive effect on latrine utilization behavior (Asnake & Adane, 2020; Budhathoki *et al.*, 2017; Garn *et al.*, 2017; Woyessa *et al.*, 2022). The better the latrine maintenance, the more likely someone is to use the latrine 2.19 times (Woyessa *et al.*, 2022). Apart from that, the availability of clean water facilities can also increase the behavior of using toilets (Abebe *et al.*, 2020; Garn *et al.*, 2017; Zewdie *et al.*, 2021). Latrine maintenance, accessibility, privacy, type of facility, and access to better hygiene are often associated with better latrine utilization, whereas poor sanitary conditions are associated with lower use (Garn *et al.*, 2017). The absence of infrastructure makes it difficult for someone to carry out certain behaviors, which causes a decrease in motivation to change. Assistance from the government in providing healthy latrine facilities for families, especially low-income families, is expected to increase community access to clean and healthy sanitation. Having healthy and clean latrine facilities can reduce OD behavior (United Nations Children's Fund and World Health Organization, 2023). However, the results of this study do not agree with a previous study, which stated that adequate facilities only sometimes correlate positively with latrine utilization behavior (Sinha *et al.*, 2017).

Adequate infrastructure will increase self-awareness, self-efficacy, and self-control (Bandura, 2018). The research results show that most

respondents have self-efficacy in the high category, which is possibly the reason why the latrine utilization behavior of most respondents is also in the good category (Table 1). This study's results follow a previous study that stated that self-efficacy has a positive relationship with hygiene behavior (Kpoeh, 2020). High self-efficacy will lead to increased cognitive, affective, motivational and selective processes so that a person can choose the correct behavior (Bandura, 2018). The results of this study emphasize the importance of strengthening one's self-efficacy to further increase self-confidence in using the available household toilets. Self-efficacy increases awareness of disease risks to improve disease prevention behavior (Yoo & Song, 2021).

#### **The influence of reinforcing factors on household latrine utilization behavior**

The study results showed that only perceived family support and health workers' support are valid and reliable indicators of reinforcing factors (Table 1). The study results also showed that reinforcing factors directly, positively and significantly influence the behavior of household latrine use. However, it does not significantly influence household toilet use behavior through self-efficacy (Table 4 and Figure 3). This study's results follow a previous study stating that family support is essential to behavior change. Family support will increase latrine utilization behavior (Asnake & Adane, 2020; Sclar *et al.*, 2022; Temesgen *et al.*, 2021; Woyessa *et al.*, 2022). Support from health workers is also the main predictor in shaping latrine use behavior. The higher the support from health workers, the better the community's toilet behavior (Tamene & Afework, 2021; Yulyani *et al.*, 2019).

However, the results of this study do not agree with previous studies that stated that support from community leaders is essential in changing behavior in using toilets (Tribbe *et al.*, 2021). The lack of influence of perceived community leaders is probably because most respondents had perceptions of support from community leaders in the

low category (Table 1). Community leaders only facilitate the construction of latrines, which is assistance from the government. After that, there needed to be follow-up in the form of activities that motivated the community. People feel that the health workers around them play a more critical role in reminding, encouraging and directing them not to defecate in the open area.

Family is the primary support system for an individual life. In the health context, based on Denham's (2003) Family Health Model theory, health routines and health outcomes are determined mainly by interactions between individuals and their families (Kaakinen *et al.*, 2015). Optimal family support in the form of informational, assessment, emotional and instrumental support will determine an individual's health routine (Friedman *et al.*, 2003). Apart from that, support from other people, in this case, optimal health workers, can also increase knowledge and understanding about the disease, its management, and disease prevention procedures (Kaakinen *et al.*, 2015). The study results showed that most respondents positively perceived family support and health workers in the high category (Table 1). Support from the external environment is a source of a person's self-efficacy, which can be categorized as part of verbal or social persuasion. Increasing verbal or social persuasion can increase perceived self-efficacy to improve cognitive function, motivation to change, controlled emotions, and selecting appropriate actions to increase positive behavioral changes (Bandura, 2018).

The study showed self-efficacy influenced household latrine use behavior (Table 4 and Figure 3). The study results follow previous studies, which stated that the family environment can increase self-efficacy by increasing perceptions of risk and vulnerability and reducing perceived barriers to taking action, which ultimately increases good behavior in waste or feces disposal (Kpoeh, 2020; Sclar *et al.*, 2022). The limitation of the study is that several other variables, such as ethnic differences or policies/regulations regarding the prohibition of open defecation from the

government, have not been studied, which may influence behavior. Future studies may compare open defecation behavior based on culture. Technically, the limitation of this study is that, because it was conducted directly door to door, some respondents could not meet according to schedule, so they had to reschedule for data collection.

## CONCLUSION

The study concludes that three factors influence household latrine utilization behavior: predisposing, enabling and reinforcing, and self-efficacy as an intervening variable. Predisposing factors, namely education and reinforcing factors, namely family support and support from health workers, directly influenced the formation of household latrine utilization behavior without going through self-efficacy. Meanwhile, the enabling factors, namely the availability of clean water facilities and latrine maintenance conditions, indirectly influence the household's latrine utilization behavior through self-efficacy. However, self-efficacy significantly influenced changes in household latrine utilization behavior. Health interventions aimed at increasing toilet use behavior as part of ODF interventions should not only be carried out by providing latrines equipped with clean water infrastructure. However, health workers must also develop educational interventions tailored to the community's level of education, which not only facilitate knowledge but also motivate them to increase self-efficacy in using the household toilet to reduce open defecation behavior and prevent diseases related to open defecation.

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## The Influence of Health Promotion Interventions Counseling and Peer Education Groups on Clean and Healthy Living Behaviors of Students in Islamic Boarding Schools

Puspita Sari✉<sup>1)</sup>, M. Ridwan<sup>1)</sup>, Silvia Marwati Perdana<sup>1)</sup>

<sup>1</sup> Universitas Jambi, Muaro Jambi Regency, Jambi, Indonesia

✉Email: puspita.sari@unja.ac.id

### ABSTRACT

**Background:** The concept of healthy students is related to clean and healthy living behavior (PHBS) in the Islamic boarding school environment, which combines clean and healthy living behavior (PHBS) in educational institutions and the home environment. **Aims:** To determine the effect of counseling and peer education groups on the clean and healthy living behavior of students at the Irsyadul Ibad Islamic boarding school. **Method:** This research is an experimental study using a factorial design with two variables: counseling and peer education. The research sample was 84 students divided into 4 different groups, namely the combination group (counseling and peer education), the counseling group, the peer education group, and the control group. Each group lives in a different dormitory. The health promotion intervention was carried out for 15 days with 10 meetings to discuss clean and healthy living behavior. The statistical tests used were paired t-test and Wilcoxon to determine the differences in values before and after treatment. Kruskal Wallis and Mann Whitney were used to determine the differences in the scores of each group. **Results:** There are significant differences in knowledge and attitude values before and after treatment, namely: combination group (counseling and peer education), Knowledge  $p= 0.003$ , attitude  $p= 0.009$ , Knowledge counseling group  $p= 0.001$ , attitude  $p= 0.030$  peer group education knowledge  $p= 0.000$ , attitude  $p= 0.001$  and control group knowledge  $p= 0.067$ , attitude  $p= 0.053$ . There are differences in knowledge and attitudes in each group, namely the combination group (counseling and peer education), with the control group, knowledge  $p = 0.000$ , attitude =  $0.000$ , counseling group with the control group, knowledge  $p = 0.000$ , attitude  $p = 0.000$  peer education group with the control group knowledge  $p=0.000$  attitude  $p= 0.000$ . Combination group (counseling and peer education), with knowledge counseling group  $p=0.063$  attitude  $p= 0.134$  combination group (counseling and peer education), with peer education knowledge  $p=0.079$ , attitude  $p=0.095$ . Counseling group with peer education group knowledge  $p= 0.332$ , attitude  $p=0.424$ . **Conclusion:** Combination groups (counseling and peer education), counseling groups, and peer education groups influence clean and healthy living behavior among students at the Irsyadul Ibad Islamic Boarding School.

**Keywords:** Health promotion, Peer Education, PHBS, Boarding school

### INTRODUCTION

PHBS in schools has eight indicators that are used as measures to evaluate PHBS in schools namely; washing hands with running water and using soap, eating healthy snacks in the school cafeteria, using clean and healthy latrines, exercising regularly and in a measured manner, eradicate mosquito larvae, do not smoke at school, weigh yourself and measure your height every month, and throw away rubbish in the right place (Proverawati, 2012).

The World Health Organization (WHO, 2018) stated that the achievement of PHBS implementation in school settings was 22.5% with a target of 65%. The national target for educational institutions implementing PHBS is 70%. According to Indonesian Ministry of Health data from 2018, coverage of clean and healthy lifestyle habits in the regions remains low; only 35.8% of schools implement clean and healthy living habits (PHBS) compared to the national target of 70% in 2018 (Resiyanthi, 2021).



Islamic boarding schools are Islamic educational institutions with a (mixed) boarding system, then an independent community is formed consisting of students, teachers/kyai and families of their Islamic boarding school itself. The term cabin comes from the Arabic Funduq which means hotel, place to live for rent (Daulay's son, Haidar) The term Islamic boarding school is a place to live and acquire knowledge from the Islamic boarding school itself (Tilarso, 2005).

In Indonesia, there are 27.28 Islamic boarding schools consisting of 13,446 (49.4%) Saafi Islamic boarding schools, 3,064 (39.4%) Khaafi Islamic boarding schools and 10,708 (39%) integrated Islamic boarding schools. with a total of 3,642,738 students that is 1,895,580 (52.0%) men and 1,747,158 (48.0%) women (Regulation of the Minister of Health of the Republic of Indonesia 2013). According to demographics, the growth in the number of Islamic boarding schools in Indonesia is quite significant: 23,329 out of 28,839 (82.74%) on the island of Java. and 641 or 2.75% in eastern Indonesia. (Islamic boarding schools database, 2022).

In its journey, Pesantren, as an educational institution that has strong roots in the Indonesian Muslim community, has been able to maintain and maintain its existence and has a multi-functional and multi-aspect educational model. Students are not only taught to be someone who understands religious knowledge and general knowledge but also receive natural leadership, independence, simplicity, perseverance, togetherness, equality, and other positive attitudes.

Specifically for the Batanghari Regency area, there are 20 Islamic boarding school classes. Islamic boarding schools play a very influential role both in terms of education, external and internal, and intelligence as a reference for the

concept of the state of mind of students. For this reason, Islamic boarding schools are often referred to as a tool for cultural transformation. When learning in Islamic boarding schools, students not only seek knowledge but also skills that they must master, but most importantly, the three most important aspects of education, namely psychomotor, affective and cognitive, are provided in a stimulated and balanced to achieve the objectives.

## METHODS

This research is experimental research using a factorial design with two independent variables. This research aims to determine the effect of health promotion interventions on the clean and healthy living behavior of students at the Irsyadul 'Ibad Islamic boarding school, Kubu Kandang Village, Batanghari Regency. Researchers took samples using random sampling. The total sample was 84 students divided into four different groups, namely the combination group (counseling and peer education), the counseling group, the peer education group and the control group (Lemeshow, 1997). These four groups differ in terms of delivery and treatment. Each group lives in a different dormitory. Data analysis used paired t-test and Wilcoxon to determine differences in values before and after treatment. Kruskall Wallis and Mann Whitney were used to determine the differences between each group (Notoatmodjo, 2012).

## RESULTS AND DISCUSSION

### Respondents' Characteristics

Characteristics of respondents based on gender, age, and PHBS information on Irsyadul 'Ibad Islamic Boarding School student.

**Table 1.** Characteristics of respondents based on gender, age and PHBS information in four treatment groups at Irsyadul 'Ibad Islamic Boarding School students (n=84)

Respondents' Characteristics	Group							
	Combination Group (counseling and peer education)		Counseling Group		Peer Educator=Group		Control Group	
	n	%	n	%	n	%	n	%
<b>Gender</b>								
Male	9	42,9	9	42,9	9	42,9	9	42,9

Female	12	57,1	12	57,1	12	57,1	12	57,1
<b>Age</b>								
12- < 14 years	11	52,4	11	52,4	11	52,4	11	52,4
14-15 years	10	47,6	10	47,6	10	47,6	10	47,6
<b>PHBS information</b>								
Tall	7	33,3	6	28,6	7	33,3	6	28,6
Low	14	66,7	15	71,4	14	66,7	15	71,4

Source: Primary data processed for 2023

Table 1 states that the number of males in the combination group (counseling and peer education), counseling, peer educator and control is nine (42,9%), females 12 (57,1%), then based on age in the combined group, counseling, peer educators and control, namely ages 12 - < 14 years 11 (52.4) and 14 - 15 years, namely 10 (47.6). Respondents received information on Clean and Healthy Living Behavior (PHBS )

from the combination group (counseling and peer education), counseling group, peer educators group and control group, namely high 7 (33,3%) and low 14 (66,7%). Based on a survey conducted (Zumroh *et al.*, 2016) at Mamba'ul Hisan at the Isyhar Islamic Boarding School, data were obtained on the attitudes of male students and poor students with average scores of 2.71 and 2.73, respectively (Zumroh *et al.*, 2016).

**Table 2.** Differences in PHBS behavioral scores before and after health promotion intervention for Students of Irsyadul Ibad Islamic Boarding School

Variable	Combination Group (counseling and peer education)				
	Pre-Test		Post-Test		p value
	Mean	Standard deviation	Mean	Standard deviation	
Knowledge	16.80	1.93	29.47	3.87	0.001
Attitude	14.25	2.47	27.73	5.67	0.003
Variable	Counseling Group				
	Pre-Test		Post-Test		p value
	Mean	Standard deviation	Mean	Standard deviation	
Knowledge	16.25	1.35	25.44	16.25	1.35
Attitude	15	2.30	27.55	15	2.30
Variable	Peer Education Group				
	Pre-Test		Post-Test		p value
	Mean	Standard deviation	Mean	Standard deviation	
Knowledge	16.50	1.78	26.47	3.43	0,000
Attitude	13.95	2.15	27.45	5.45	0,000
Variable	Control Group				
	Pre-Test		Post-Test		p value
	Mean	Standard deviation	Mean	Standard deviation	
Knowledge	17.46	1.97	18.27	2.67	0.067
Attitude	13.37	1.86	13.93	1.87	0.053

Source: Primary data processed for 2023

Table 2 shows that there is a significant influence between knowledge and attitude values before and after with a significance value of  $p < 0.05$ , namely: combination group (counseling and peer education) knowledge  $p = 0.003$ , attitude  $p = 0.009$ ; counseling group knowledge  $p =$

0.001, attitude  $p = 0.030$ ; peer education group knowledge  $p = 0.000$ , attitude  $p = 0.001$  and there were no significant differences in the knowledge and attitude variables of students with a significance value of  $p > 0.05$  in the control group, knowledge  $p = 0.067$ , attitude  $p = 0.053$ .

**Table 3.** Differences in behavior scores between treatment groups

Kruskall Wallis test	Combination Group (counseling and peer education)	Counseling Group	Peer Education Group	Control Group	p value
	Mean	Mean	Mean	Mean	Mean
Knowledge	57.37	37.59	31.43	11.23	0.000
Attitude	47.57	41.23	49.76	11.01	0.000

Source: Primary data processed for 2023

Table 3 is based on the results of the Kruskal-Wallis test. The mean value in the combined group for knowledge is 57.37 and attitude is 47.57. Meanwhile, the mean for the knowledge in the counseling group was 37.59 and attitude 41.23, then the mean for the peer educator knowledge group was 31.43 and attitude 49.76. Then the mean for the knowledge control group was 11.23 and attitude 11.01 with a p-value of 0.000. Based on the research results of Susanto *et al.* (2016), life in Islamic boarding schools is that students live together in

one room with 10 to 25 students. The results of researchers' observations of student behavior that do not support clean and healthy living behavior include exchanging clothes, exchanging beds and sleeping blankets, towels are rarely dried in the sun, and mattresses and pillows not dried in the sun. As a result, various health problems occur, for example, stomach worms, diarrhea, toothache, skin problems including scabies, malnutrition, upper respiratory tract infections (ARI) and head lice (Susanto *et al.*, 2016).

**Table 4.** Differences in knowledge values and attitudes toward clean and healthy living behavior (PHBS) between groups

Mann Whitney test	Counseling Group	Peer Education Group	Control Group
<b>Knowledge</b>			
Combination Group	0.000*	0.000	0.000
Counseling Group		0.063	0.000
Peer Education Group			0.000
Mann Whitney test	Counseling Group	Peer Education Group	Control Group
<b>Attitude</b>			
Combination Group	0.000	0.000	0.000
Counseling Group		0.000	0.000
Peer Education Group			0.000
Mann Whitney test	Counseling Group	Peer Education Group	Control Group
<b>Knowledge</b>			
Combination Group	0.063	0.079	0.000
Counseling Group		0.332	0.000
Peer Education Group			0.000
Mann Whitney test	Counseling Group	Peer Education Group	Control Group
<b>Attitude</b>			
Combination Group	0.134	0.095	0.000
Counseling Group		0.424	0.000
Peer Education Group			0.000

\*p value <0.05 = there is a difference \*\* p value > 0.05 = No Difference

Table 4. Mann-Whitney test results for the knowledge and attitude variables show that the combination group scores (counseling and peer education) in the counseling group and the peer education group have the same delta value difference compared to the control group.

The results of the research show that there is an influence of the combination group (counseling and peer education), counseling group, peer education group and control group on the knowledge and attitudes of students regarding clean and healthy living behavior (PHBS) in Islamic boarding schools. After carrying out health promotion interventions in the combination group (counseling and peer education), it was found that there were

differences in the knowledge and attitudes of students regarding clean and healthy living behavior in Islamic boarding schools. Research by Makful and Pirawati (2016) showed the behavior of santri at the As-Syafi'iyah Girls Special Islamic Boarding School regarding the implementation of clean and healthy living behavior (PHBS), as well as the behavior or actions of santri regarding the implementation of clean and healthy living behavior (PHBS) There were 81 people (54.0%) who behaved poorly, while there were 69 students who behaved well (46.0%). Thus, it can be said that students' behavior toward PHBS is not good (Makful & Pirawati, 2016).

As educational institutions that have strong roots in Indonesian Islamic

society, in their journey, Islamic boarding schools have been able to maintain their existence and have a multi-functional and multi-aspect educational model. Santri is not only taught to be people who understand religious knowledge and general knowledge but also acquire the qualities of leadership, independence, simplicity, perseverance, togetherness, equality and other positive attitudes. In the future, it is hoped that this capital can give birth to a quality and independent society as a form of Islamic boarding school participation in the success of national development goals and play an active role in educating the nation as mandated by the 1945 Constitution (Amin, 2004). Santri are a transitional age group from late adolescence to early adulthood who are more independent in determining what behavior they will carry out. At this stage, teenagers will think more about plans and increase social interaction in the environment and live more independently. The concept of healthy students is related to PHBS in the Islamic boarding school environment which is a combination of clean and healthy living behavior (PHBS) in educational institutions and households. The main aim is to develop PHBS for students, educators and Islamic boarding school managers so that they are able to know and overcome various health problems in the Islamic boarding school environment and the surrounding environment (Efendi & Makhfudli., 2009).

## CONCLUSION

Educational and peer counseling group influence the knowledge and attitudes of students at Irsyadul 'Ibad Islamic Boarding School, Batanghari Regency. A combination of group, counseling group and peer education group can increase students' knowledge and attitudes toward clean and healthy living behavior in Islamic boarding schools. Several research variables have been examined in this research, but there are other factors that have not been studied that also influence student behavior. Therefore, more research is needed to examine other influencing factors.

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## Using the Theory of Planned Behavior to Explore Factors Associated with the Behavior of Consuming Blood Booster Tablets Among Adolescent Girls in Bantul Regency

Retno Heru Setyorini✉<sup>1</sup>, Era Revika<sup>1</sup>

<sup>1</sup> Sekolah Tinggi Ilmu Kesehatan AKBIDYO, Yogyakarta, D.I. Yogyakarta, Indonesia

✉Email: [retnoheruhs@gmail.com](mailto:retnoheruhs@gmail.com)

### ABSTRACT

**Background:** Providing iron and folic acid through the ingestion of blood booster tablets is an intervention to lower the prevalence of anemia in adolescents. However, just a small percentage of adolescent girls have consumed blood booster tablets as prescribed. **Aims:** To identify the factors related to the behavior of consuming blood booster tablets among adolescent girls in Bantul Regency based on the Theory of Planned Behavior. **Methods:** The cross-sectional study was conducted in Bantul Regency, a Special Region of Yogyakarta Province, between March and May 2023. A total of 381 adolescent girls aged 16-18 years participated in filling out questionnaires to collect data. The questionnaire includes socio-demographics, knowledge about blood booster tablets and anemia, attitudes, subjective norms, intentions, and behaviors of consuming blood booster tablets. Path Analysis was used to analyze the data with statistical significance ( $p$ ) at 0.05. **Result:** As a result, intention directly influences the behavior of consuming blood booster tablets ( $p < 0.001$ ). Subjective norms have a direct influence on the behavior of consuming blood booster tablets ( $p = 0.023$ ) and have an indirect influence through attitudes ( $p < 0.001$ ) and intentions ( $p < 0.001$ ). Attitude has an indirect influence on the behavior of consuming blood booster tablets through intention ( $< 0.001$ ), then the level of knowledge has an indirect influence on intention ( $p = 0.037$ ) and attitude ( $p = 0.032$ ). **Conclusion:** Adolescent girls will have good consumption behavior of blood booster tablets if they have a positive attitude, a high level of knowledge, subjective norms, and high intentions. These findings can be used to design health promotion models useful for increasing the consumption behavior of blood booster tablets. Further research is needed to find the right educational model to increase knowledge, attitudes, subjective norms, and intentions to consume blood booster tablets.

**Keywords:** Adolescent girls, Blood booster tablets, Theory of Planned Behavior

### INTRODUCTION

One of Indonesia's health issues is anemia. According to the Ministry of Health, Republic of Indonesia, anemia affects 32% of teenagers. This indicates that 3-4 out of every 10 teenagers have anemia (Ministry of Health Republic of Indonesia, 2021). In addition, the Health Service of Special Region of Yogyakarta noted a rise in the prevalence of anemia in teenage females from 37.1% in 2013 to 48.9% in 2018, with the age categories of 15-24 and 25-34 years having the highest anemia (Dinas Kesehatan Daerah Istimewa Yogyakarta, 2023).

Low hemoglobin content is a symptom of anemia. It is one of the most significant public health issues in the

world (Sundararajan & Rabe, 2021). According to the WHO, anemia affects 40% of children aged between six and 59 months, 37% of pregnant women, and 30% of women between the ages of 15 and 49 worldwide (World Health Organization, 2023). Iron deficiency is the primary cause of anemia in most cases (Vázquez *et al.*, 2019).

Anemia is a significant risk factor for women's and children's health and development. Anemia is a significant issue in developing nations because it has a negative impact not only on people's quality of life but also on national social and economic growth (Mantadakis *et al.*, 2020). In addition to affecting teenage physical development, performance, and immunity, anemia can have long-term

impacts on later age groups, particularly on women of reproductive age. A higher risk of pregnancy problems, including low birth weight, early birth, and infant death, may occur from this (Shaka & Wondimagegne, 2018). Additionally, the risk of stunting increases with impending birth, perpetuating the harmful cycle of malnutrition (Iftikhar, 2018).

In Indonesia, stunting continues to be a significant public health issue. Stunting prevalence is 24.4% in 2021 and will drop to 21.6% in 2022 by a 2.8% margin. Although it is anticipated that the national stunting rate will drop by 2.7% annually, significant efforts are still required to bring it down to 14% (Ministry of Health Republic of Indonesia, 2023).

One of the interventions to reduce the prevalence of anemia in adolescents is iron and folic acid supplementation through the administration of blood booster tablets. Giving blood booster tablets is prioritized to adolescent girls and women of childbearing age to prevent stunting (Kementerian Kesehatan Republik Indonesia, 2018). This supplementation is carried out by giving one blood booster tablet with a composition of 60 mg elemental iron and 400 mcg folic acid per week to adolescent girls aged 12-18 years.

In 2018, 76.2% of adolescent girls had received blood booster tablets within 12 months. However, only 1.4% of them took tablets as recommended ( $\geq 52$  tablets in one year) (Kementerian Kesehatan Republik Indonesia, 2022). Research in Ghana and India shows that, in general, several factors influence the behavior of consuming blood booster tablets among young women, including parental education and employment, awareness of anemia, knowledge about anemia, and programs for administering blood booster tablets (Dubik *et al.*, 2019). Side effects include stomach ache, nausea, vomiting, and dislike of blood supplement tablets. There are still girls who think that blood booster tablets cause weight gain, and may have side effects such as discomfort, stomach pain, and dizziness. Sometimes the unavailability of blood booster tablets, low awareness of the importance of blood booster tablets, and unintentional program implementation are other important factors (Priya *et al.*, 2016).

In Indonesia, factors that influence the behavior of consuming blood booster

tablets among adolescent girls include the motivation of adolescent girls to consume these supplements, and the motivation of teachers to provide education about anemia, and iron-folic acid supplementation to students (Apringsih *et al.*, 2020), access to information on iron-folic acid, knowledge, and use of the Cegah Anemia Remaja Indonesia (CERIA) application (Thifal *et al.*, 2023).

Ceria is an application launched by the Ministry of Health to increase adolescent girls' compliance with consuming blood booster tablets. The CERIA application is a means for recording and reporting data electronically for the consumption of blood booster tablets for adolescent girls, as a source of information for adolescent girls about blood booster tablets and anemia, as well as a reminder to take blood booster tablets every week.

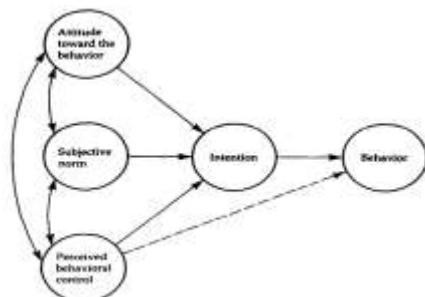
The Theory of Planned Behavior (TPB) was developed as an extension of the Theory of Reason Action (TRA) which emphasizes that the most important determinant of behavior is intention. Direct determinants of a person's behavioral intentions are attitudes toward behavior and subjective norms. TPB adds Perceived Behavior Control (PBC). Attitudes, subjective norms, and PBC will influence intentions and, in turn, will influence behavior (Ajzen, 2020). The TRA and the TPB focus on theoretical constructs related to individual motivation factors as determinants of the possibility of carrying out certain behaviors. TRA and TPB both consider the best predictor of behavior to be behavioral intentions, which, in turn, are determined by attitudes toward the behavior and social normative perceptions.

Several studies have tried to reveal the factors that influence the behavior of consuming blood booster tablets using the Theory of Planned Behavior. Research (Ningtyias *et al.*, 2020) reveals that behavioral control influences the intention to comply with taking blood booster tablets. Research (Puspitasari *et al.*, 2022) conducted in Madiun also revealed that better attitudes, subjective norms, perceived behavioral control, and intentions of young women will lead to better anemia prevention behavior.

Although there is research on adolescent girls who refuse to take blood-



boosting tablets, research in Bantul Regency has never been conducted, so the reasons behind this behavior of adolescent girls in Bantul Regency are still not fully understood. To improve the behavior of drinking blood tablets, developing programs that are more focused and targeted can be increased by understanding elements that directly or indirectly affect behavior. The Theory of Planned Behavior (TPB) serves as the theoretical foundation for this report's examination of the aspects that influence the consuming behavior of blood booster tablets (Figure 1).



**Figure 1.** Theory of planned behavior (Ajzen, 1991)

## METHODS

The research was carried out in nine (of 17) sub-districts in Bantul Regency between March and May 2023, with one school in each sub-district selected randomly.

Inclusion criteria include adolescent girls aged 16-18 years and who have menstruated. The sample size was calculated using the Lemeshow formula with an unknown population and with a confidence level of 95%, sampling error (d) 0.06, and estimated research proportion (P) 0.5; this method produced 267 respondents (Lwanga & Lemeshow, 1991). A random sampling technique was used for participant selection.

The research variables consist of one exogenous variable (level of knowledge) and four endogenous variables (attitude, subjective norm, intention, and behavior of taking blood booster tablets).

A questionnaire served as the research's tool for gathering data. The questionnaire was developed based on the four constructs of the Theory of Planned Behavior—attitude, intention, subjective norms, and behavior—as well as the construct of knowledge about blood-

boosting tablets in adolescent girls becoming the basis for the question grid in the questionnaire. Meanwhile, the variables studied included adolescent girls' knowledge about the meaning of blood booster tablets, the benefits of blood booster tablets, the meaning of anemia, the impact of anemia on adolescent girls, and how to prevent anemia. Knowledge is classified as high or low if the respondent's answer score is higher or lower than the median, respectively.

Attitude is a pleasant and unpleasant response to the behavior of taking blood booster tablets in terms of affective, cognitive, and conative aspects. It is categorized as positive or negative if the answer score is higher or lower than the median. Subjective norms are the perceptions or views of young women regarding other people's beliefs which influence their interest in consuming blood booster tablets as recommended and are also grouped into high or low. Meanwhile, the intention is the desire to take blood booster tablets regularly/irregularly is classified as high or low if the respondent's answer score is higher or lower than the median. Participants were asked to rate individual agreement with a 5-point Likert Scale on 50 questions. Favorable statements include 1=strongly disagree, 2=disagree, 3=somewhat agree, 4=agree, 5=strongly agree, while unfavorable statements include 1=strongly agree, 2=agree, 3=somewhat agree, 4= disagree, 5=strongly disagree. Apart from that, the questionnaire also produced data such as age, parents' education level, parents' employment status, history of anemia, and level of knowledge.

Cronbach's alpha was employed to assess reliability with findings of  $r_{\text{count}} > r_{\text{table}}$  (0.254), and the product-moment correlation formula was used to test the validity of the instrument with results of p-value 0.05 and  $r_{\text{count}}$  0.254.

Data collection was carried out from March to May 2023. Informed consent was carried out before data collection, and then questionnaires were given to 384 adolescent girls. School teachers were recruited and trained as facilitators who were responsible for distributing questionnaires to female students. A random sampling technique (lottery based on female students'

absence numbers) was used to select participants. No respondents refused to fill out the questionnaire, but three respondents filled it out incompletely so only 381 questionnaires were analyzed.

Path analysis in Stata 64 was used for the data analysis in this study. A system of linear equations serves as the foundation for the multivariate analysis method known as path analysis, which ensures that all cause-and-effect linkages are linear and additive. All models are recursive, the causal link is one-way, there is no two-way causal relationship, and the model includes all important causal factors (Ayuningrum & Murti, 2020).

Because the outcome variable is binary, the analysis was based on path analysis estimation using general structural equation modeling (GSEM) to estimate the determinants of consumption behavior of blood booster tablets which have a direct relationship with the outcome variable and indirect effects through mediators. One of the features of structural equation modeling is that it provides goodness-of-fit statistics to assess model fit. However, GSEM estimation using Stata software is not applicable for calculating goodness-of-fit indices. To overcome this problem, model fitting was implemented based on the principle that most path coefficients are significant at a 5% error level provided

that the observed and predicted frequencies match (Lombardi *et al.*, 2017).

Research ethical approval was obtained from the ethics committee of the Akbidyo College of Health Sciences Number: e-KEPK/Stikes Akbidyo/15/III/2023 which includes informed consent, anonymity, confidentiality, and ethical permission. Issues of data confidentiality and how the data will be stored after data collection were discussed, and all participants agreed in writing by signing an informed consent.

## RESULTS AND DISCUSSION

The results showed that 188 (49.3%) respondents were 18 years old, 371 respondents (97.4%) came from working parents, and 375 (98.4%) respondents had cell phones. Most respondents had parents with secondary education level, 158 (41.5%), and 349 (91.6%) had no history of anemia. Furthermore, 201 respondents (52.8%) had a good level of knowledge about the benefits of consuming blood booster tablets, 202 (53%) had a positive attitude, 245 (64.3%) had high subjective norms, 204 (53.5%) had high intentions, and 272 (71.6%) had good behavior in consuming blood booster tablets (Table 1).

**Table 1.** Characteristics of the Respondents

No	Variable	Total	Percentage (%)
1	<b>Age</b>		
	16 years old	141	37
	17 years old	188	49,3
	18 years old	52	13,6
2	<b>Parent's employment</b>		
	Employed	371	97,4
	Unemployed	10	2,6
3	<b>Parent's educational level</b>		
	Elementary	141	37
	Middle	158	41,5
	Higher	82	21,6
4	<b>History of Anemia</b>		
	Without anemia	349	91,6
	With anemia	32	8,4
5	<b>Gadget (cell phone)</b>		
	Have phone	375	98,4
	Do not have a phone	6	1,6
6	<b>Knowledge level</b>		
	Low	180	47. 2
	High	201	52,8
7	<b>Attitude</b>		
	Negative	179	47
	Positive	202	53

8	<b>Subjective norm</b>		
	Low	136	35.7
	High	245	64,3
9	<b>Intention</b>		
	Low	177	46,5
	High	204	53.5
10	<b>Consumption behavior of blood booster tablets</b>		
	Poor	109	28,4
	Good	272	71,6

Source: Primary Data 2023

The results of bivariate analysis showed that there was a significant relationship between adolescent attitudes (OR=3.00, 95% CI=1.88 to 4.77, p<0.001),

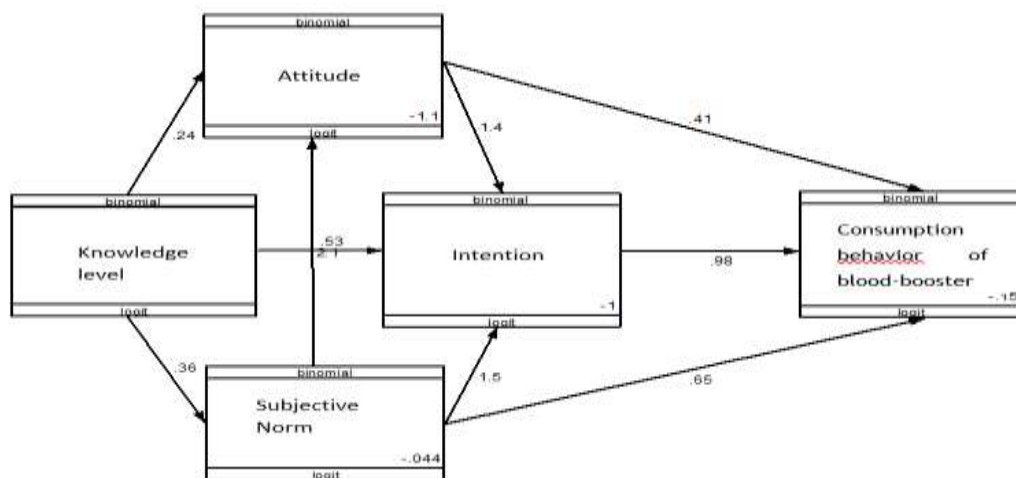
subjective norms (OR = 3.46, 95% CI=2.16 to 5.55, p<0.001) and intention (OR = 4.18, 95% CI=2.61 to 6.68, p<0.001) with consumption behavior of blood booster tablets (Table 2).

**Table 2.** Characteristics of the Respondents

Independent variable	Consumption behavior of blood booster tablets				OR	95% CI		p-value
	Poor		Good			Lower limit	Upper limit	
	N	%	N	%				
<b>Knowledge level</b>								
Low	50	13.13	130	34.12	0.21	0.59	1.44	0.73
High	59	15.47	142	37.28				
<b>Attitude</b>					3.00	1.88	4.77	<0.001
Negative	72	18.90	107	28.08				
Positive	37	9.72	165	43.30				
<b>Subjective Norm</b>					3.46	2.166	5.55	<0.001
Low	65	17.06	71	18.64				
High	44	11.55	201	52.75				
<b>Intention</b>					4.18	2.61	6.68	<0.001
Low	74	19.42	103	27.03				
High	35	9.19	169	44.36				

Figure 2 shows the structural model that has been estimated with Stata. Indicators that show the suitability of the model (goodness of fit) path analysis can be seen in Table 3 which shows the value of Akaike's Information Criterion (AIC)=

1768.58 and Bayesian Information Criterion (BIC)=1819,837, which means that the empirical model meets the specified criteria and is stated in accordance with the empirical data.



**Figure 2.** Structural model with estimation

Table 3 shows that blood booster tablets consumption behavior was directly influenced by high intentions ( $b=0.98$ ; 95% CI= 0.44 to 1.51;  $p<0.001$ ), and high subjective norms ( $b=0.64$ ; 95 % CI=0.08 to 1.20;  $p=0.023$ ), and indirectly influenced by subjective norms through high intentions ( $b=1.54$ ; 95% CI=1.01 to 2.07;  $p<0.001$ ), attitudes through high intentions ( $b=1.38$ ; 95% CI=0.85 to 1.91;

$p<0.001$ ), and level of knowledge through high intentions ( $b=0.52$ ; 95% CI= 0.03 up to 1.02;  $p=0.037$ ). In addition, the consumption behavior of blood booster tablets was influenced indirectly by subjective norms through positive attitudes ( $b=2.09$ ; 95% CI=1.63 to 2.55;  $p<0.001$ ), and the level of knowledge through positive attitudes ( $b=0.24$ ; 95% CI= -0.21 to 0.70;  $p=0.032$ ).

**Table 3.** Results of Path Analysis of Determinants of Consumption Behavior of Blood Booster Tablets

Dependent variable	Independent variable	b	CI 95%		p
			Lower limit	Upper limit	
<b>Direct effect</b> Consumption behavior of blood booster tablets	← High intentions	0.98	0.44	1.51	<0.001
	← High subjective norms	0.64	0.08	1.20	0.023
	← Positive attitude	0.41	-0.14	0.96	0.144
<b>Indirect effect</b> High intentions	← High subjective norms	1.54	1.01	2.07	<0.001
	← Positive attitude	1.38	0.85	1.91	<0.001
	← Highly knowledgeable	0.52	0.03	1.02	0.037
	← High subjective norms	2.09	1.63	2.55	<0.001
Positive attitude	← Highly knowledgeable	0.24	-0.21	0.70	0.032
	← Highly knowledgeable	0.35	-0.04	0.76	0.085

N Observation= 381

Log Likelihood = -872,49934

Degree of Freedom = 13

AIC =1768. 58 BIC= 1819,837

The research results showed a direct correlation between intentions and subjective norms on the consumption behavior of blood booster tablets. Furthermore, the research results also show that attitudes, subjective norms, and level of knowledge are indirectly related to the consumption behavior of blood booster tablets through intention, while subjective norms and level of knowledge are related indirectly through attitude.

The direct antecedent of the behavior in TPB is the intention to do the behavior; the stronger the intention, the more likely the occurrence of the behavior of the behavior (Ajzen, 2020). According to the TPB, attitudes toward the behavior determine behavioral intentions, subjective norms regarding the

behavior, and perceived behavioral control, each of which is represented by a separate but connected set of subcomponents. Subcomponents can help with behavior prediction and comprehension in terms of health (Sussman & Gifford, 2019). The chance that a behavior will result in the desired outcome and subjective assessments of the dangers and advantages of those outcomes both have an impact on behavioral intentions (Ajzen, 2020).

The behavioral intention examined in this research is the behavior of consuming blood booster tablets in the future based on feelings, experience/evaluation of previous experiences. In the current formulation of the theory, favorable attitudes and supportive subjective norms motivate one

to engage in the behavior, but the actual intention to do so is only formed when the perceived control over the behavior is strong enough.

The result of this study was in line with the research by Puspitasari *et al.* (2022) which examined factors that influence anemia prevention behavior in adolescent girls. The results of this study showed that a teenager's better attitudes, subjective norms, perceived behavioral control, and intentions will carry out better anemia prevention behavior.

Subjective norms are perceptions of what the majority of people believe to be acceptable behavior. This has to do with the notion that a person should act by the judgment or approval of those closest to him or her. Particularly, command and descriptive norms are thought to make up perceived norms (Ajzen, 2020).

Command norms in TPB are the name for TPB norms because they involve social approval felt by other people which motivates behavior through social rewards/punishments and distinguishes them from descriptive norms, namely perceptions of what other people do (Ajzen, 2012). The social pressure that people experience to engage in particular actions is thought to be the source of subjective norms. Subjective norms are usually items that assess the approval of those closest to someone's behavior (Conner, 2020).

The subjective norms studied in this research are the perceptions or views of young women regarding the beliefs of other people who are influential in their lives, such as friends, parents, teachers, and health workers, which will influence their interest in whether or not to take blood booster tablets. Adolescent girls who have high confidence that friends, parents, teachers, and health workers want young girls to be obedient in consuming blood booster tablets, tend to be obedient in taking blood booster tablets. Adolescent girls agree to take blood-boosting pills if their peers also do or approve of the action. Apart from that, respondents will agree to consume blood-boosting tablets if teachers and parents have a positive view of the positive influence of consuming blood-boosting tablets on their health.

The findings of this study demonstrated that subjective norms indirectly influenced blood booster

tablet-consuming behavior through attitudes and intentions. The higher the subjective norm of adolescents, the more positive their attitudes toward consuming blood booster tablets will be. In addition, the higher the adolescent's subjective norm, the higher the intention to consume blood booster tablets. This research is in line with research that analyzes factors related to anemia prevention with the results that attitudes, subjective norms, perceived behavioral control, and intentions of young women who are getting better will make anemia prevention behavior even better (Puspitasari *et al.*, 2022).

Attitude refers to the extent to which a person has an evaluation of the advantages or disadvantages of a behavior. This requires considering outcomes over behavior. Conner (2020) defines attitude as a learned disposition to respond consistently based on preferences for certain objects. This study is in line with research that analyzes the relationship between attitudes and adherence to consuming blood supplement tablets among adolescent girls in Bantul Regency with the result that there is a relationship between attitudes and compliance behavior to consume blood booster tablets among adolescent girls. Adolescent girls have a more positive attitude toward consuming blood supplement tablets (Rohani *et al.*, 2022).

Adolescents with a high level of knowledge tend to have high attitudes and intentions to consume blood booster tablets and will subsequently behave positively toward consuming blood booster tablets. This is in line with research by Alami *et al.* (2019) on the factors that affect Iranian adolescent girls' dietary behavior related to iron and vitamin D consumption based on the TPB. The findings of this study demonstrated that behavioral intention to use nutritional supplements was significantly influenced by knowledge.

A child who goes to school or receives education will have broader knowledge. However, those with low education does not mean they have low knowledge too. Increasing knowledge does not only come from formal education but also comes from non-formal education. This is seen from research (Singh *et al.*, 2019) which shows that

health education about anemia among adolescent girls in Delhi, which includes definitions, causes, signs and symptoms, and treatment, increases knowledge and treatment-seeking behavior. Similar to Singh *et al.* (2019), increasing compliance is also related to knowledge and awareness about anemia and its relationship with iron supplementation behavior. Students take part in educational sessions at school regarding dietary sources of iron and the benefits of iron and folic acid supplementation (Aggarwal *et al.*, 2020).

According to research (Khani Jeihooni *et al.*, 2021) the experimental group significantly improved in knowledge, attitudes, perceived behavioral control, subjective norms, behavioral intents, and nutritional performance after receiving educational intervention. Similarly, a study (Jalambadani *et al.*, 2018), showed that following instructions regarding iron supplements, participants' average knowledge, attitudes, perceived behavioral control, subjective norms, and intention categories dramatically rose for the intervention group. Other research shows health education about anemia increases knowledge and practice of iron supplementation in adolescent girls (Farah Yanisah & Widati, 2023).

There needs to be an effort to increase knowledge, attitudes, and practices in consuming blood booster tablets. This can be done through promotional activities. Research (Madestria *et al.*, 2021; Singh *et al.*, 2019) proves that the development of educational media intake of iron tablets through video along with the modification of iron tablet packaging has a significant influence on the knowledge, attitudes, and intentions of young women in the intake of iron supplementation.

These findings have implications for strategies to increase compliance with consuming blood booster tablets, by utilizing research results to provide education about anemia through increasing knowledge, attitudes, subjective norms, and intentions to consume blood booster tablets.

The use of a cross-sectional design, which prevents cause-and-effect links between observed variables from being demonstrated, is the study's limitation. The generalizability of this study may be

constrained by the fact that it only included adolescents between the ages of 16 and 18 (while adolescents between the ages of 12 and 15 additionally required additional blood booster tablets). It is necessary to research adolescent girls' perceptions of vulnerability and potential barriers to compliance with taking blood booster tablets.

## CONCLUSION

Behavior related to adherence to consuming blood booster tablets can be predicted using TPB. High subjective intentions and norms directly influence the consumption behavior of blood booster tablets in adolescent girls. Attitudes, subjective norms, and level of knowledge indirectly influence the consumption behavior of blood booster tablets. Therefore, TPB is an integrated theory to understand the consumption behavior of blood booster tablets in adolescent girls to improve adolescent reproductive health in Bantul Regency, Indonesia. It is necessary to strengthen the role of school teachers, community leaders, parents, and peers by providing information about the benefits of blood boosters to motivate teenagers to consume blood booster tablets regularly.

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## Mitigating Stunting in Semarang City, Indonesia: A Comprehensive Approach to Better Health and Well-Being

Krisseptiana✉<sup>1)</sup>, Nana Storada Dwi Martadi<sup>2)</sup>

<sup>1</sup> Department of Social Science, Faculty of Social and Political Sciences, Universitas Diponegoro, Semarang, Indonesia, 50275

<sup>2</sup> Department of Management, Faculty of Economics and Business, Universitas Dian Nuswantoro, Semarang, Indonesia, 50131

✉Email: [krisseptiana.disundip@gmail.com](mailto:krisseptiana.disundip@gmail.com)

### ABSTRACT

**Background:** Among the 29 districts and 6 cities in Central Java, Semarang City stands out as the urban area with the most substantial reduction in stunting prevalence over a year (2021-2022), from 21,3% to 10.4%, while numerous regions continue to grapple with challenges in lowering rates of stunting. **Aims:** This study aims to investigate Semarang City's comprehensive strategy for mitigating stunting. **Methods:** This study used a qualitative case study approach. Utilizing focus group discussions (FGD) and document analysis, representatives from 16 diverse sectors, including health, education, religion, social services, food security, and more, engaged in discussions aimed at synchronizing activities and policies to achieve the common goal of stunting reduction. Simultaneously, a comprehensive document analysis was conducted, reviewing relevant documents, reports, and policies across 16 districts in Semarang City. Data analysis employed Miles et al.'s interactive model, involving data condensation, display, and conclusion drawing/verification. **Results:** The success of stunting reduction in Semarang City is highlighted by relevant regulations, an updated and accurate statistical database, intensive cross-sector coordination, and a synchronized effort across diverse sectors. Furthermore, the city's prudent financial planning is evident through sufficient and on-target budget allocations dedicated to stunting reduction programs. **Conclusion:** The research concludes by stressing the importance of ongoing commitment, adaptability, and collaborative efforts to achieve the ambitious goal of zero stunting by 2024 in Semarang City, suggesting future studies focus on program effectiveness and long-term sustainability.

**Keywords:** cross-sector, database, financial planning, regulation, stunting

### INTRODUCTION

Malnutrition can be linked to inadequate nutrition or frequent and severe infections, particularly in underprivileged communities. Among the three types of malnutrition (stunting, wasting, and overweight), stunting is the most prevalent nutritional issue faced by toddlers on a global scale (Yani et al., 2023). Stunting is defined as a child's inability to achieve normal growth and development during the critical first 1000 days of life (*1000 Hari Pertama Kelahiran - HPK*), primarily attributed to chronic malnutrition (Arifin et al., 2023). Stunting mitigation refers to efforts and interventions aimed at preventing or reducing stunting in children under 5 years, addressing the critical period of

early childhood development (Siswati et al., 2022; Zaidi et al., 2020).

According to the Levels and Trends in Child Malnutrition Report of UNICEF (2023), the 2023 Joint Child Malnutrition Estimates (JME) indicate that the progress toward achieving the global nutrition targets set by the 2025 World Health Assembly (WHA) and SDG target 2.2 has been inadequate. Approximately one-third of all nations are making sufficient progress to meet the goal of reducing the number of children suffering from stunting by half by 2030, while around a quarter of countries lack sufficient data to assess their progress up to this point. Additionally, the report highlights that stunting impacted approximately 22.3 percent or 148.1 million children under the age of 5 worldwide in 2022. The vast

majority of these affected children resided in Asia, making up 52% of the global total, and in Africa, comprising 43% of the global total.

As the largest archipelagic nation in the world, Indonesia grapples with the challenge of addressing stunting across diverse regions, each with its unique socioeconomic and cultural characteristics. Stunting in Indonesia is a multifaceted problem with complex implications that extend beyond individual health, reaching into the very fabric of the nation's socioeconomic development. Concerns also exist regarding the precision of data pertaining to stunting prevalence in Indonesia. The results of the Indonesian Nutrition Status Survey (SSGI) revealed that the prevalence of stunting in Indonesia had decreased from 24.4% in 2021 to 21.6% in 2022 (Kemenkes, 2023). However, UNICEF (2023) noted that the prevalence of stunting in Indonesia was 31.0% in the very high category. Such substantial disparities in data can result in varying perspectives and subsequent approaches to addressing the issue of stunting in Indonesia. Hence, it is imperative for each region to enhance its stunting-related database to acquire more precise data, enabling the formulation of policies tailored to the unique circumstances of each city or district.

According to the 2022 Indonesian National Health Survey (Kemenkes, 2023), East Nusa Tenggara Province continues to have the highest stunting rate among the country's 34 provinces, standing at 35.3%. This is followed closely by West Sulawesi with a rate of 35% and Papua at 34.6%. The stark disparities in development across this vast archipelagic nation may account for why these three provinces exhibit the highest stunting rates, as they are located outside Java, the central hub of government. Nonetheless, it is worth noting that stunting remains a significant concern even within Java itself. In fact, Central Java Province, located on the island of Java, reports a high stunting rate of 20.8%. Among the 29 districts and dix cities in Central Java, Semarang City stands out as the urban area with the most substantial reduction in stunting prevalence over a year (2021-2022), from 21.3% to 10.4%.

Semarang City offers a unique case study for addressing stunting. Located in

Central Java, this bustling city is home to a diverse population and a rich cultural heritage. Yet, despite its many strengths, Semarang City faces a critical challenge: nearly one in every three children under five in the city is affected by stunting, which has profound and lasting effects on their physical and cognitive development. The consequences of stunting reach far beyond childhood, impacting individuals' ability to thrive, contribute to their communities, and participate in the workforce as adults. In response to this crisis, various stakeholders have joined hands to implement comprehensive and evidence-based strategies aimed at reducing stunting in Semarang. This article explores the multifaceted approach to stunting management in the Semarang city. It focuses on understanding how Semarang City manages stunting by looking at its comprehensive strategy involving nutrition, healthcare, education, and community engagement. This study aims to provide insights that align with Semarang's goal of creating a practical model for effective stunting management. The ultimate aim is to offer findings that can be applied in other regions of Indonesia and beyond, contributing to a broader effort to address the issue of stunting.

## METHODS

This research adopts a qualitative approach, employing a case study methodology to investigate stunting management in Semarang City. Data collection involved two primary methods: focus group discussion (FGD) and document analysis. The FGD was conducted by inviting representatives of 16 related institutions to discuss the synchronization of activities and policies undertaken by each agency with the aim of achieving a common goal—specifically, the reduction of stunting. The participants invited to engage in this FGD included: (1) the representative of relevant departments: Department of Health, Department of Education, Department of Religion, Department of Social Service, Department of Food Security, Department of Information and Communication, Department of Fisheries, Department of Women's Empowerment and Child Protection, Department of

Housing and Settlement, Department of Population Control, Department of Agriculture, and Department of Environmental Services; (2) public institutions: public hospital representatives; (3) educational institutions: university professors; (4) local government representatives: representatives from sub-district administrations and village heads; (5) and social and family welfare representatives: women representatives from family welfare empowerment institutions (PKK).

During the FGD, a total of 33 participants representing the previously mentioned institutions, actively engaged in the deliberations. The FGD participants were organized into three distinct groups, as follows:

**(1) Group 1 (10 members): Integrated Policy and Planning**

This group delved into discussions related to Integrated Policy and Planning. Its members included representatives from various departments: the Department of Health, the Department of Education, the Department of Agriculture, the Department of Women's Empowerment and Child Protection, the Department of Social Service, and the Department of Information and Communication.

**(2) Group 2 (12 members): Community Engagement and Implementation**

The second group focused on Community Engagement and Implementation. It comprised representatives from diverse backgrounds, including Public Hospital representatives, a university professor, Local Government representatives (Sub-district Administration), Department of Environmental Services representatives, and Department of Housing and Settlement representatives.

**(3) Group 3 (11 members): Cultural and Social Dynamics**

The third group addressed topics related to Cultural and Social Dynamics. Its members included a representative from the Department of Religion, the Department of Fisheries representatives, and women representatives from Social and Family Welfare (PKK).

This diverse group of participants brought a wealth of knowledge and perspectives to the FGD, contributing to a comprehensive understanding of stunting management in Semarang City. Informant

selection, conducted through purposive sampling, was meticulously guided by their roles, expertise, and active engagement in pertinent domains, aligning with the recommendations of each department head.

Simultaneously, document analysis comprised a comprehensive review of pertinent documents, reports, and policies pertaining to stunting management within 16 districts in Semarang City. The data collected included: (1) data related to the prevalence of stunted toddlers in Semarang City including information on the stunting rate and stunting distribution from the Department of Health; (2) regulations supporting the acceleration of stunting reduction in Semarang City from Bappeda; (3) other data pertinent to the acceleration program for reducing stunting in Semarang City from relevant departments. The data analysis occupied the interactive model by Miles et al. (2018) which includes three concurrent flows of activity: (1) data condensation, (2) data display, and (3) conclusion drawing/verification.

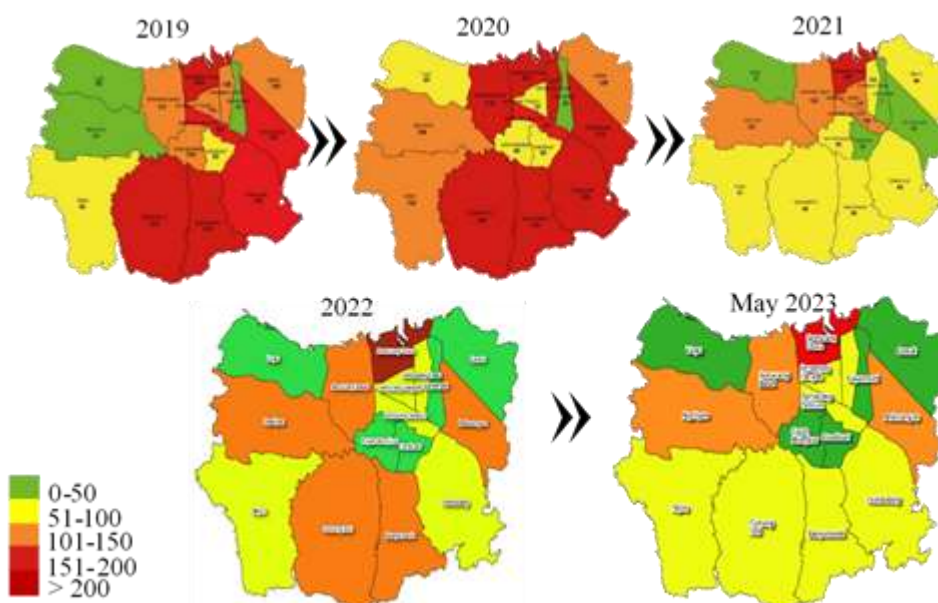
## RESULTS AND DISCUSSION

Semarang City, encompassing an area of 372.3 square kilometers, is organized into 16 sub-districts, further comprising 177 sub-districts. The geographical landscape of Semarang City is characterized by 1% coastal plains, 33% lowlands, and 66% hilly plains. In terms of population, the city currently houses approximately 1.81 million residents. To address the issue of stunting, Semarang City is home to 88,319 children under the age of five, with additional demographic details indicating 81,342 young women, 9,861 brides and grooms, and 23,503 pregnant women. The city's healthcare infrastructure is robust, featuring 37 community health centers, 32 hospitals, 1,631 integrated service centers, and 942 first-level health facilities (Dinas Kesehatan Kota Semarang, 2023). These facilities collectively contribute to the well-being of Semarang City's residents, offering a comprehensive network of healthcare services and resources.

Over a period of five years, Semarang City experienced a notable and highly significant reduction in the prevalence of stunting. However, there

were fluctuations in the numbers, with varying prevalence rates among districts and a substantial increase during the COVID-19 pandemic. The fluctuations in

stunting cases within Semarang City are visually elucidated in Figure 1.



**Figure 1.** The distribution of stunting cases in Semarang City (2019- May 2023)  
Source: (Dinas Kesehatan Kota Semarang, 2023)

Based on the results of observations, FGDs, document analysis, and source triangulation conducted during the research period, it can be identified that the success of reducing stunting in Semarang City can be attributed to several factors, namely: (1) relevant regulations; (2) updated and accurate statistical database; (3) intensive cross-sector coordination; and (4) sufficient and on-target budget allocation.

#### Establishing and Enforcing Relevant Regulations

Before the issuance of Presidential Decree No. 72 of 2021 focusing on stunting reduction in Indonesia, the Central Java provincial government prioritized stunting in its development agenda due to the 2019 Indonesian Nutrition Status Survey indicating a prevalence of 27.68%—above the UNESCO standard. In response, Governor's Regulation Number 34 of 2019 was

enacted to accelerate stunting prevention. In Semarang City, with a 2019 prevalence of 26.6%, a stunting discussion in October 2019 led to a consensus on priority targets, a five-year development plan, and increased funding. The onset of COVID-19 in 2020 disrupted these efforts, resulting in a spike in the stunting rate to 31%. This increased figure was obtained from data from the Semarang City Health Service, because, in 2020, SSGI did not conduct a survey due to the pandemic. Renewed coordination in September 2020 led to a commitment statement and subsequent Mayor's Decree No. 050/365/V/2021, establishing a Stunting Reduction Coordination Team (TPPS). This team operationalized Presidential Decree No. 72 of 2021, contributing to a remarkable reduction in stunting from 26.6% in 2020 to 10.4% in 2022. The process of formulating regulations and coordination efforts are depicted in Figure 2.

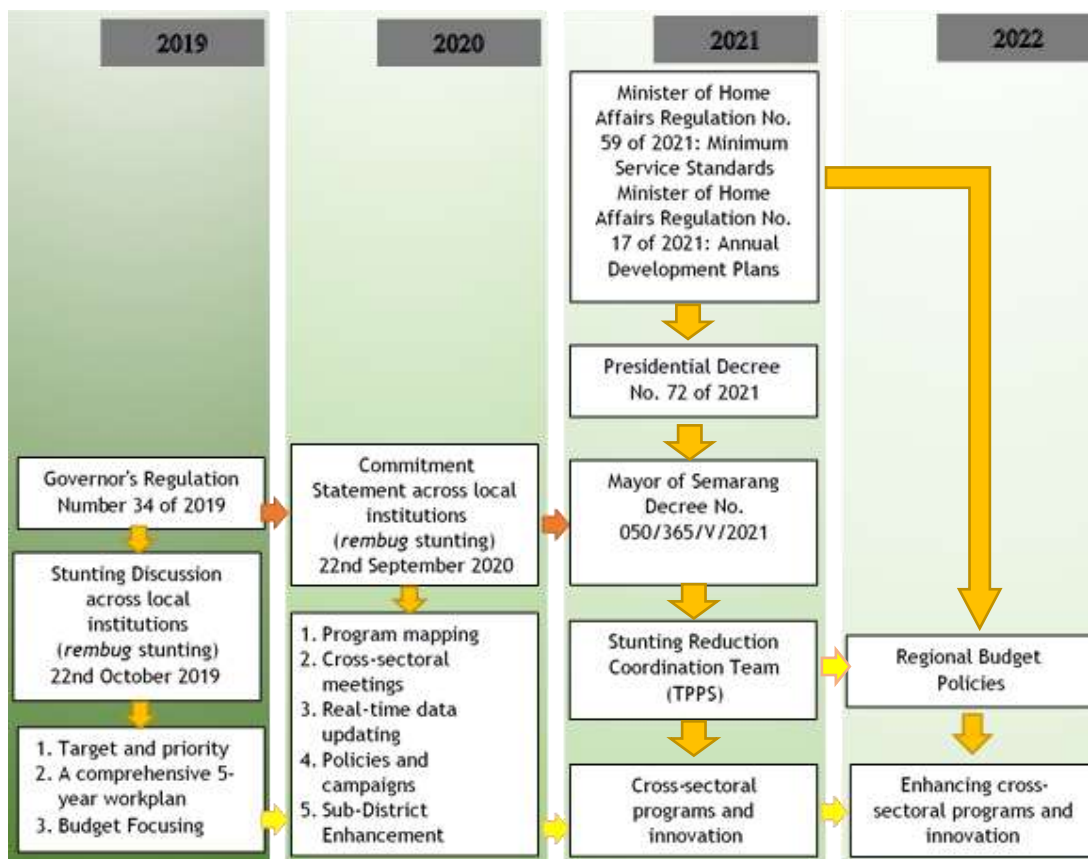


Figure 2. The Formulation of Regulations for the Management of Stunting in Semarang City

Motivations for collaboration vary across personal and organizational levels, as well as intrinsic and extrinsic factors, as noted by Brown *et al.* (2019) These motivations encompass innovation acceleration, efficiency, and sharing resources (Klus *et al.*, 2019), knowledge transfer (Nsanzumuhire & Groot, 2020), enhancing visibility or legitimacy (Zeimers *et al.*, 2019), and developing personal relationships while gaining mutual respect (Berendsen *et al.*, 2007). Before committing to collaboration, assessing the motivation and dedication of fellow collaborators is imperative. The protracted process of formulating and establishing commitment for sound regulations and policies plays a crucial role in governance, serving various purposes. This extensive process allows for public consultation and input, essential in democratic societies to involve citizens, businesses, and stakeholders in decision-making. Inclusivity ensures diverse perspectives are considered, potential unintended consequences are identified, and resulting regulations garner widespread support. He *et al.* (2022) recommend advocating for

the involvement of multiple subjects in crafting legal norms, altering the paradigm preceding legal regulation, and utilizing local legal norms to define the extent and standard of government data disclosure.

The legitimacy of governance, as highlighted by Christensen and Lægreid (2020), extends beyond effectiveness to include processes of creating meaning, encouraging participation, and fostering trust. Before engaging in collaboration, it is crucial to consider the perceived legitimacy of the collaborating group. Contrary to a common misconception that policies are inherently sound, challenges often surface during their implementation (Nisa *et al.*, 2021). The extended commitment-forming process provides an opportunity for negotiation and consensus-building among different interest groups. Policies emerging from collaborative efforts tend to be more resilient and adaptable, reflecting a balance between diverse needs and priorities. While a deliberative approach may seem time-consuming, it contributes to the creation of regulations that

withstand the test of time and serve the best interests of society as a whole.

#### Updated and Accurate Statistical Database

Many aspects of the analysis hinge on the proxy data available rather than direct measurements of constructs (Bhutta *et al.*, 2020). Numerous studies addressing stunting highlight a common challenge: the difficulty in obtaining pertinent data related to stunting (Hartotok *et al.*, 2021; Raffalli & Villalobos, 2021; Vaivada *et al.*, 2020). This limitation leads to the implementation of policies to address stunting that may be less aligned with the actual conditions observed in the field. Hence, strategies aimed at reducing stunting in the city of Semarang prioritize the accuracy and accessibility of data. The TPPS team consistently coordinates and performs monthly performance evaluations using data provided by the health service and population control service. In addition to monthly coordination, TPPS also engages in quarterly coordination for data collection with more intricate institutions. Every six months, updates on stunting prevalence data are reported to the Ministry of Home Affairs and the National Family Planning Coordinating Board (BKKBN). The database is systematically managed online by each sub-district, with real-time updates. The data for each sub-district encompasses 29 essential services items related to the health of young women, prospective brides, pregnant women, babies, toddlers, and families in general and 22 supply services items associated with family quality of life (Dinas Kesehatan Kota Semarang, 2023). Subsequently, these data serve as the foundation for policy formulation, ensuring that resulting regulations are both relevant and effective.

Maintaining an updated and accurate statistical database is essential for identifying high-risk populations and understanding the specific causes of stunting in different regions. This data enables policymakers to tailor interventions to address the unique challenges faced by communities (Bhutta *et al.*, 2020). Accurate data help in targeting resources efficiently, ensuring

that interventions are directed toward the areas and demographics most in need. This precision is crucial for optimizing the impact of limited resources and maximizing the effectiveness of stunting management strategies.

#### Intensive Cross-sector Coordination

According to Agranoff and McGuire (2003), collaborative public management involves coordinating within multi-organizational setups to address challenging issues beyond the scope of individual organizations. This collaborative approach, emphasizing reciprocity and public participation, goes beyond organizational boundaries and involves various sectors and stakeholders. Public administrators in collaborative efforts find themselves orchestrating multi-organizational partnerships to resolve inherently complex issues. O'Leary and Vij (2012) highlight the complexity of collaboration in public management, emphasizing the absence of a universal formula for success. Drawing on 14 case studies in nine countries, key influencing factors in collaborative endeavors are explored.

Several studies, including those Brown *et al.* (2019), Mäkinen *et al.* (2020) and Newman *et al.* (2019) emphasize the crucial role of a clearly defined and mutually agreed-upon mission or purpose as a key success factor in collaboration. Given the complexity of stunting, influenced by various determinants such as health, nutrition, sanitation, education, and socioeconomic factors, achieving intensive cross-sector coordination is paramount. Coordinated efforts across health, education, agriculture, and social welfare sectors enable a comprehensive approach addressing the root causes of stunting, as highlighted by Hartotok *et al.* (2021) and Surbakti and Ismail (2023). For instance, collaboration between the health and agriculture sectors can promote the production and consumption of nutrient-rich foods. Drawing from information obtained in the FGD, Table 1 summarizes the coordinated actions executed by 16 regional apparatus organizations and affiliated institutions in the primary sectors within the city of Semarang.

**Table 1.** Collaborative Actions Addressing Stunting by Regional Government Organizations and Related Institutions in Semarang City

No.	Organization/Institution	Factors	Program/Action
1	Department of Health	health	Specific interventions
2	Public Hospital	health	Pediatric assessment for nutritional problems
3	Department of Food Security	nutrition	ANAK HEBAT (Great Kid) Program to provide information on nutrient-rich foods tailored to children's growth and developmental stages
4	Department of Agriculture	nutrition	Social campaigning and optimizing the utilization of garden land as nutrition gardens
5	Department of Fisheries	nutrition	Supplying supplementary nutrition through fish-based food products
6	Department of Environmental Services	socioeconomic	Regulating food waste and food loss to redirect resources for meeting the nutritional requirements of stunted children.
7	Department of Social Service	socioeconomic	Providing essential food for vulnerable families: pregnant women and stunted children
8	Department of Population Control	socioeconomic	Establishing a family support team for approximately 53,000 at-risk families, implementing DASHAT program (the program of healthy kitchens to overcome stunting) with a budget of IDR 2 billion, and allocating IDR 600 million for stunting prevention initiatives.
9	Department of Women's Empowerment and Child Protection	socioeconomic	Educating Families on Parenting and Reinforcing the Family Integrated Service Centers ( <i>Posyandu</i> )
10	Department of Religion	socioeconomic	Implementing health-centric madrasah activity programs, promoting wellness in Islamic boarding schools, and executing the <i>Tugumuda</i> Program (Fit Productive Bride and Groom Towards Dream Family).
11	Sub-district administrations and village heads	socioeconomic	Engaging in stunting discussion initiatives and coordinating activities for stunting management
12	Department of Education	education	Implementing healthy school activity programs, conducting balanced nutrition literacy studies, and promoting early childhood education
13	University	education	conducting cadre training, data validation, and doing intensive scientific studies
14	Family Welfare Empowerment Institution (PKK)	education	Enhancing community education in preventive and promotive endeavors
15	Department of Information and Communication	education	Publications on stunting and information available on stunting via the website
16	Department of Housing and Settlement	sanitation	Implementing the construction of a local domestic wastewater treatment system

Source: Primary Data (2023)

The Semarang City Health Department has implemented specific interventions, such as the restructuring of the nutrition house into Rumah Pelangi Nusantara (*Pelayanan Gizi dan Penyuluhan Kesehatan Anak serta Remaja*) or Nutrition Services and Child Health Counseling for Adolescents in 2019. This initiative represents a holistic approach to addressing community nutrition issues in Semarang City. This program targets a diverse range of

beneficiaries, including pregnant and breastfeeding mothers, infants, toddlers, families with young children, early childhood participants, elementary school students, middle school students, and teenagers. The Pelangi Nusantara service program comprises:

- 1) Health Services for Toddlers with Stunting and Poor Nutrition at Rumah Pelangi Nusantara, consists of: (a) preventive and promotive efforts: nutritional education tour, nutrition

- ambassador program, nutrition garden initiatives, menu preparation for toddlers and pregnant women, (b) support services, encompassing the provision of community nutritionists, nutrition houses, and health promotion vehicles; and (c) curative services involve comprehensive health services for malnourished and stunted toddlers, including the stages of tracking malnourished toddlers, coordination, laboratory examinations, healing techniques, and ongoing monitoring and evaluation.
- 2) Since 2021, the Tanjungmas village in North Semarang, Semarang City, has served as a pilot project for integrating community empowerment and movements to address stunting. Chosen due to factors like susceptibility to flooding, high poverty rates, prevalent stunting, and reliance on fishing, the interventions include providing additional meals and snacks for stunted toddlers and pregnant women for three months, along with zinc syrup, pregnant milk, baby milk, and oil. Cadres strategically placed at five locations facilitate food distribution, with weekly reports ensuring thorough monitoring by health officials. By June 2023, 14 out of 79 stunted children in Tanjungmas achieved normal growth, and the number of pregnant women affected by anemia and chronic energy deficiency decreased by 50%.
  - 3) In 2022, an intervention program for providing additional food for 1367 stunted toddlers in 161 sub-districts of Semarang City was implemented by providing additional food three times per day by the Semarang City Department of Health and providing four cartons of powdered milk monthly by the Semarang City Department of Food Security. This program receives full support from the Semarang City government, with a funding allocation of 3 billion from the Department of Health and 3.4 billion from the Department of Food Security in the Regional Revenue and Expenditure Budget. Program monitoring is conducted by a team of 137 food monitoring cadres, a family support team, and 57 health workers. The 36.14% reduction in the number of stunted children through this program over a period of three months is illustrated in Figure 3.



**Figure 1.** The Decreasing Number of Stunted Children in 2022

- 4) Implementation of Sibening (*Semua Ikut Bergerak Menangani Stunting* - Collective Efforts in Addressing Stunting) in Tanjungmas. The primary objective of this program is to encourage external partners to collaborate in various activities for stunting management. These activities include providing additional food, implementing the stunting clown foster father program, conducting catfish cultivation programs, and organizing outreach programs. Several entities that have actively participated in these efforts include PT Angkasa Pura, PT Indonesia Power, PT Pertamina, PT Phapros, and various universities in Semarang City.
- 5) The culminating initiative at Pelangi Nusantara involves collaborating with educational institutions and professional organizations to disseminate the latest research findings and innovations aimed at addressing stunting. The Pelangi Nusantara program, characterized by its intensive and comprehensive



approach and involving various agencies and stakeholders, successfully decreased the stunting prevalence rate in the city of Semarang from 21.3% in 2021 to 10.4% in 2022 and, according to the latest data, 1.54% in June 2023. Subsequently, the Semarang City Government has set a target of attaining zero stunting by the year 2024.

#### Sufficient and on-target budget allocation

A well-structured budget is essential for the successful implementation of the Pelangi Nusantara service program, which encompasses various activities to address stunting and poor nutrition. This financial commitment reflects a dedication to community health, ensuring the program's success and positive outcomes. In the context of governance, accountability, as defined by

Bovens and Schillemans (2014), involves individuals or entities willingly providing details and justifications for their actions, with potential repercussions in the given context. Throughout the governance process, roles in accountability shift, fostering a collective sense of responsibility among participants (Læg Reid & Rykkja, 2022).

Collaborative efforts, addressing policy issues across boundaries, involve multiple stakeholders, such as national, regional, and local government entities, nonprofit organizations, and the private sector (O'Leary & Vij, 2012). Therefore, when considering participation in a collaborative arrangement, it is crucial to ascertain how the collaborative group will be held accountable to citizens and public officials. Table 2 delineates the Regional Policy and Budget support for each regional apparatus organization in the city of Semarang in 2023.

**Table 2.** Budget Allocation for Stunting Reduction Program in Semarang City

No.	Organization/Institution	Budget Allocation (IDR)
1	Semarang City Regional Development Planning Agency	61,227,999,256
2	Department of Population Control	15,014,939,875
3	Department of Health	3,895,710,080
4	Department of Women's Empowerment and Child Protection	146,895,300
5	Inspectorate	7,875,000
6	Department of Education	32,220,375,000
7	Department of Housing and Settlement	9,603,381,000
8	Department of Food Security	150,000,000
9	Department of Fisheries	275,863,130
10	Department of Agriculture	1,199,100,418
11	Department of Information and Communication	125,000,000
12	Department of Social Service	50,000,000
<b>Total Budget</b>		<b>123,917,139,059</b>

Source: Primary Data (2023)

The budget policy is integral to state financial regulation, serving as a vital tool for implementing economic policies, especially during institutional transformations. Efficient management of the budget for stunting reduction within the fiscal framework requires robust oversight and control mechanisms. This involves continuously developing a tailored control system to address stunting-related challenges, emphasizing specific target directions for regulating budgetary funds dedicated to stunting reduction initiatives (Chugunov & Titarchuk, 2020). The central focus is on the main priorities of budget policy, ensuring strategic allocation and responsible utilization of resources to

support overall economic goals (Shakhina & Kizi, 2023). In terms of stunting budget policies, the main priorities within the stunting budget policy are to facilitate the implementation of impactful interventions and interventions that are culturally and contextually relevant, contributing to the overall goal of reducing stunting prevalence rates in the target population.

It is crucial to acknowledge certain limitations within the study. One notable constraint is the limitation of data sources, particularly in relation to the newest programs and their effectiveness. This underscores the importance of continuous efforts to enhance data collection and analysis methodologies to

ensure a more comprehensive understanding of program outcomes. Future studies could delve deeper into the effectiveness of the newest programs, exploring their impact on stunting reduction. Additionally, a more in-depth investigation into the long-term sustainability and scalability of these strategies would contribute valuable insights for continued improvement in addressing stunting within the community.

## CONCLUSION

Semarang City's multifaceted strategies to mitigate stunting have demonstrated a comprehensive and proactive approach. The establishment and enforcement of relevant regulations, coupled with an emphasis on maintaining an updated and accurate statistical database, reflect the city's commitment to informed decision-making. The success of these initiatives is further underscored by intensive cross-sector coordination, ensuring a cohesive and synchronized effort across various domains. Moreover, the city's prudent financial planning is evident in the sufficient and on-target budget allocation for stunting reduction programs. This financial commitment has played a pivotal role in the success of interventions and has contributed significantly to the noteworthy reduction in stunting prevalence rates. Overall, the ongoing commitment to research, adaptability, and collaborative efforts will be instrumental in achieving the ambitious goal of zero stunting by 2024 in Semarang City.

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## *The Best Practices for Designing Built Environments to Promote Healthy Food Access and Dietary Behaviors in Low-Income and Underserved Communities*

Muhamad Ratodi<sup>1</sup>✉, Tien Zubaidah<sup>2</sup>, Mei Lina Fitri Kumalasari<sup>3</sup>, Esti Novi Andyarini<sup>3</sup>

<sup>1</sup> Architecture Study Program, Universitas Islam Negeri Sunan Ampel, Surabaya, East Java, Indonesia

<sup>2</sup> Environmental Sanitation Study Program, Poltekkes Kemenkes Banjarmasin, Banjarmasin, South Kalimantan, Indonesia

<sup>3</sup> Nutrition Study Program Universitas Islam Negeri Sunan Ampel, Surabaya, East Java, Indonesia

✉Email: [mratodi@uinsby.ac.id](mailto:mratodi@uinsby.ac.id)

### ABSTRACT

**Background:** The built environment can influence health outcomes, including access to good dietary options. **Aims:** The current study intends to thoroughly evaluate the literature on best practices for building environments that promote healthy food access and nutritional behaviors in low-income and underserved communities in Indonesia. **Method:** To discover relevant studies on this topic, a thorough literature review was done using databases from PubMed, Web of Science, and Scopus extracting. **Result:** The final analysis included 32 studies after removing duplicates and applying inclusion and exclusion criteria. Extracting and assessing data from the chosen research and thematic synthesis was applied. The data was extracted and processed into a detailed narrative that provided an overview of the best practices. **Conclusion:** According to the findings of the literature study, built environment design can have a considerable impact on healthy food availability and eating patterns in Indonesian communities. It might be possible to develop effective interventions that enhance health outcomes for all Indonesians by addressing these gaps in the evidence.

**Keywords:** built environment, dietary behaviors, food access, low-income communities

### INTRODUCTION

In low-income and underserved communities, pervasive food insecurity and poor diets pose significant public health challenges (Cooksey-Stowers *et al.*, 2020). The built environment plays a crucial role in shaping dietary habits and food access in these communities (Escaron, 2019; Rahmanian *et al.*, 2014). Limited stores and healthy food options contribute to suboptimal diets and heightened obesity rates, exacerbated by factors such as distance to grocery stores and transportation constraints (Atanasova *et al.*, 2022; Widener *et al.*, 2017).

Emphasizing healthy food access, research highlights that neighborhoods with more nutritious options exhibit lower obesity and chronic disease rates (Hallum *et al.*, 2020; Ziso, 2022). Moreover, the built environment significantly influences physical activity levels and overall health outcomes, with features like sidewalks,

bike lanes, and parks fostering more active communities (Barradas *et al.*, 2022).

The impact extends beyond physical health, as the built environment can affect mental health, especially in areas characterized by high noise, air pollution, and crime rates (Elf *et al.*, 2020; Weber *et al.*, 2022). Recognizing the importance of healthy food access and dietary environments, this paper reviews the literature on building such environments for low-income and underserved communities, acknowledging the growing public health focus on this issue.

Beyond food, healthcare accessibility is a vital concern in these communities, with limited access contributing to health disparities (Zhang *et al.*, 2017; Winkfield *et al.*, 2021). Designing physical environments to encourage healthy eating is an emerging field, drawing increased public health attention. Existing research, however, has

predominantly concentrated on individual-level interventions, such as nutrition education, rather than broader built environment initiatives (Green *et al.*, 2013; Rodriguez Mireles, 2023).

Acknowledging the intricate relationship between built environments and public health, this paper delves into the role of design in creating healthy and sustainable spaces. The research underscores the impact of the built environment on diet and food access, particularly for marginalized populations in low-income communities (Evans *et al.*, 2015). To address poor eating habits and food insecurity, extensive built environment initiatives are deemed essential, especially in areas facing challenges like food deserts, low mobility, and high food prices (Murrell *et al.*, 2022).

Research findings highlight the nutritional challenges faced by low-income and marginalized communities, often residing in food deserts without access to grocery stores (Ziso *et al.*, 2022). Studies reveal a correlation between living in food deserts and reduced consumption of fruits and vegetables, with an increased reliance on fast food and sugary drinks (Mousa & Freeland-Graves, 2022).

Promisingly, interventions such as new supermarkets and farmers' markets have shown positive effects on healthy food access and consumption patterns. For instance, the introduction of a new supermarket in a food desert led to increased fruit and vegetable consumption among residents (Cummins *et al.*, 2017). Similarly, farmers' markets in low-income neighborhoods were associated with increased fruit and vegetable consumption and reduced sugary drink intake (Aretz *et al.*, 2023).

Community gardens and urban agriculture emerge as grassroots solutions to improve food access and dietary habits in underserved communities. Research demonstrates that community gardens increase fruit and vegetable consumption among participants and enhance access to healthy food in the surrounding community (Alaimo *et al.*, 2008). Additionally, urban agricultural programs have been linked to improved nutrition and increased fruit and vegetable consumption (Süß, 2018).

Recent built environment initiatives, like the 2010 Healthy Food Financing Initiative and guidelines from the Centers for Disease Control and Prevention (CDC), reflect a growing commitment to promoting healthy food access through infrastructure development. This paper aims to contribute to this evolving field by reviewing the literature and proposing strategies to enhance food availability and diets through the built environment in low-income and underserved communities.

## METHODS

The current study examined the best practices for designing built environments that promote healthy food access and dietary behaviors in low-income and underserved communities. A comprehensive literature review was conducted to identify relevant studies on this topic. The following databases were searched such as PubMed, Web of Science, and Scopus. The search was conducted using the following keywords: "built environment", "healthy food access", "low-income communities", "underserved communities", "dietary behaviors", and "food deserts".

Inclusion criteria for the studies were: (1) published in peer-reviewed journals, (2) conducted in low-income and underserved communities, (3) focused on the impact of built environment design on healthy food access and dietary behaviors, (4) published in the English language, and (5) conducted between 2010 and 2022.

Exclusion criteria for the studies were: (1) conducted outside of low-income and underserved communities, (2) not focused on the impact of built environment design on healthy food access and dietary behaviors, and (3) conducted before 2010.

The initial results of the search were 467 studies. After deleting duplicates and applying inclusion and exclusion criteria, the final analysis contained 32 studies (see Table 1). Thematic synthesis was used to extract and evaluate data from the selected research.

**Table 1.** Breakdown of Initial Studies Based on Database Sources

Sources	Exclusion criteria			#of articles after excluded	
	Initial search	Conducted outside Low income and underserved communities	Not focus on Built Environment		Conducted before 2010
Pubmed	150	80	21	39	10
Scopus	180	113	45	15	7
WoS	137	70	36	16	15

The thematic synthesis involved the identification of key themes and concepts from the selected studies, followed by the development of descriptive and analytical themes. The extracted data were then synthesized into a comprehensive narrative that provided an overview of the best practices for designing built environments that promote healthy food access and dietary behaviors in low-income and underserved communities.

Limitations of the study include the reliance on published studies and the exclusion of non-English language studies, which may limit the generalizability of the findings. Additionally, the study was limited by the heterogeneity of the included studies, which made it challenging to conduct a meta-analysis.

**RESULTS AND DISCUSSION**

The findings from the literature review suggest that designing built environments to promote healthy food access and dietary behaviors can improve the health outcomes of low-income and underserved communities. Across North America, Europe, and Asia, several strategies have been identified that can increase access to healthy food options and promote healthier dietary behaviors.

In North America, community gardens and farmers' markets have been found to increase access to healthy food options in low-income areas (see Table 1). Strategies such as increasing the availability of healthy food options in corner stores and reducing the availability of unhealthy food options have also improved dietary behaviors in low-income areas. Developing food retail environments that are culturally appropriate and accessible can also improve access to healthy food options.

In Europe, designing aesthetically pleasing food environments that promote

social interaction has positively impacted dietary behaviors in low-income areas. Increasing the density of healthy food outlets in low-income areas and reducing the cost of healthy food options have also improved access to healthy food options (table 2).

In Asia, developing culturally appropriate food environments that are responsive to the needs of local communities has been found to improve dietary behaviors in underserved areas. Access to healthy food options has been increased by increasing the availability of healthy food options in public housing complexes and street food markets (table 3).

**Table 2.** Key findings in the North American region

Study	Key Findings
Wang et al., 2014	Access to healthy food options can be improved by developing community gardens and farmers' markets in low-income areas.
Krukowski et al., 2012	Strategies such as increasing the availability of healthy food options in corner stores and reducing the availability of unhealthy food options can improve dietary behaviors in low-income areas.
Solis, 2022	Access to healthy food options can be improved through the development of food retail environments that are culturally appropriate and accessible.

**Table 3.** The critical findings in European region

Study	Key Findings
Raghoobar et al., 2019	Designing food environments that are aesthetically pleasing and promote social interaction can positively impact dietary behaviors in

Afshin <i>et al.</i> , 2017	low-income areas. Reducing the cost of healthy food options and increasing the availability of healthy food options can improve dietary behaviors in low-income areas.
Ohri-Vachaspati <i>et al.</i> , 2019	Increasing the density of healthy food outlets in low-income areas can improve access to healthy food options.

**Table 4.** The critical findings in Asia region

Study	Key Findings
Karanja <i>et al.</i> , 2022	Developing food environments that are culturally appropriate and responsive to the needs of local communities can improve dietary behaviors in underserved areas in low and middle-income countries.
Siu <i>et al.</i> , 2019	Increasing the availability of healthy food options in public housing estates can improve dietary behaviors in low-income areas in Hong Kong.
Aloia <i>et al.</i> , 2013	Providing subsidies for healthy food options and promoting the availability of healthy food options in street food markets can improve dietary behaviors in low-income areas in India.

The findings from the literature review have important implications for future research and practice in Indonesia. While there is limited research on the impact of built environment design on healthy food access and dietary behaviors in Indonesia, the findings from studies conducted in other regions suggest that several strategies may be effective in improving access to healthy food options and promoting healthier dietary behaviors in low-income and underserved communities.

One potential strategy is to increase the availability of healthy food options in traditional markets (*pasar*) in low-income areas. According to a study by Huriah (2018), traditional markets in Indonesia are essential sources of food for low-income households but often need more healthy food options. Promoting the availability of healthy food options in

traditional markets may improve access to healthy food options in low-income areas.

Another potential strategy is to develop community gardens in urban areas, which has been found to increase access to healthy food options in North American communities (Gittelsohn *et al.*, 2013). Community gardening is already popular in rural Indonesia but less common in metropolitan settings. It can expand access to nutritious food options and encourage healthier eating patterns by encouraging the creation of community gardens in urban settings.

It may be necessary to create retail food environments that are culturally relevant and sensitive to the needs of local people since this has been shown to improve dietary behaviors in underprivileged areas (Karanja *et al.*, 2022). Traditional markets and street food vendors are significant food sources for many low-income households in Indonesia. It may be possible to alter dietary behaviors in low-income regions by collaborating with traditional market sellers and street food vendors to increase the availability of healthier food options.

Traditional markets (*pasar*) are an essential food source for low-income people and are a unique component of Indonesia's built environment. However, Huriah *et al.* (2018) point out that these markets frequently lack healthy food options, mainly fresh fruits and vegetables, essential for a healthy diet. Increasing the availability of healthy food alternatives in traditional markets through focused interventions like boosting the sale of fresh produce or incentivizing sellers to offer healthier options could be an effective technique for improving access to healthy food in low-income regions.

Community gardening in North America serves as a valuable resource for low-income households by offering access to fresh vegetables. Additionally, it fosters physical activity and encourages community involvement. Community gardening is prevalent in rural areas of Indonesia, but less so in metropolitan areas. Nevertheless, by implementing adequate infrastructure and garnering community support, community gardening can serve as a feasible solution to enhance the availability of nutritious food in urban regions. This can be achieved by introducing initiatives to establish new

grocery stores or farmers' markets in underserved areas that lack access to fresh and healthy food, thereby addressing the issue of food deserts. This may entail partnering with nearby enterprises or providing incentives to attract supermarkets to establish themselves in these communities, promoting sustainable practices through organic gardening methods that enable inhabitants to cultivate their own fresh vegetables. These gardens serve the dual purpose of offering access to nutritious foods and advocating for sustainable methods by reducing reliance on artificial pesticides and fertilizers. Additionally, they foster community cohesion by hosting frequent events like farmers' markets, cooking classes, and communal meals, which encourage residents to come together. These activities cultivate a feeling of togetherness among community members and generate chances for mutual experiences, exchange of knowledge, and social assistance. They also encourage physical activities by arranging recurring community events, such as farmers' markets, cooking lessons, or communal dinners, intending to unite people. These activities promote a feeling of togetherness and generate chances for people to share experiences, exchange knowledge, and receive social support.

In Indonesia's poor and marginalized neighborhoods, culturally appropriate food retail may encourage healthy eating. According to Karanja *et al.* (2022), traditional markets and street food vendors are vital to Taiwan's low-income populations' food environments. Dietary habits may improve in low-income Indonesian areas. Using traditional Indonesian dishes instead of fast food may also be a culturally relevant strategy to promote healthy eating. The best practices for constructing physical settings that enhance healthy food access and dietary behaviors include expanding access to healthy food options, supporting food equity, improving walkability, building community gardens, and improving transit options. For example, promoting food equity requires addressing structural gaps in the food system by eliminating barriers to healthy food access in low-income and underserved areas.

Finally, interventions focusing on built environment design may be

ineffective if not accompanied by education and awareness-raising efforts such as nutrition workshops and cooking classes, organizing community health fairs, and social media campaigns to ensure that individuals understand the importance of healthy dietary behaviors. This is essential considering the prominence of traditional foods and cultural activities in Indonesia, which may contribute to less healthful dietary habits. As a result, interventions should be multifaceted, addressing both the built environment and individual-level issues.

Overall, while there is limited research on the impact of built environment design on healthy food access and dietary behaviors in Indonesia, the findings from studies conducted in other regions suggest that several strategies may be effective in improving access to healthy food options and promoting healthier dietary behaviors in low-income and underserved communities. Further research is needed to identify additional strategies that are effective in the Indonesian context and to identify barriers and facilitators to implementing these strategies in practice.

### Best Practices

Based on the literature review, there are best practices for making the built environment contribute to human nutrition:

1. Increase access to healthy food options: Improve the availability and accessibility of healthy food options in low-income and underserved areas through interventions such as farmer's markets, community gardens, and urban agriculture. (Gittelsohn *et al.*, 2013; Wang *et al.*, 2014)
2. Enhance the walkability of urban areas: Develop infrastructure to promote walking and cycling in urban areas, including safe sidewalks and bike lanes, to increase physical activity and access to healthy food options. (Erlangga *et al.*, 2021; Muzayanah *et al.*, 2022)
3. Improve retail food environments: Work with traditional market vendors to promote the availability of healthy food options and improve the visual appeal of the market environment to encourage healthier food choices. (Carducci *et al.*, 2020; Huriah, 2018).



4. Encourage the community participation: Involve local communities in designing and implementing interventions to ensure that they are tailored to the unique needs and challenges of the community. (Aprile *et al.*, 2016; Muzayanah *et al.*, 2022)
5. Engage government and policymakers: Advocate for policies that promote healthy food access and support the development of infrastructure and programs that contribute to a healthy built environment. (Gittelsohn *et al.*, 2013; Wang *et al.*, 2014)

These best practices represent a starting point for designing interventions to improve healthy food access and dietary behaviors in low-income and underserved communities in Indonesia. However, it is essential to note that the effectiveness of these interventions may depend on factors such as cultural context, community engagement, and government support.

## CONCLUSION

In conclusion, the existing literature indicates that built environment design can significantly impact healthy food access and dietary behaviors in low-income and underserved communities. In Indonesia, improving healthy food access and dietary behaviors requires addressing the unique challenges and opportunities of the built environment. However, further research is needed to identify effective strategies for improving health outcomes and assess interventions' feasibility and long-term impact. By addressing these gaps in the literature, it may be possible to develop effective interventions that improve health outcomes for all Indonesians.

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## Socio-Cultural Study of Nutrition in Families of Stunted Toddlers in Coastal Communities in Jember Regency

Iken Nafikadini✉<sup>1</sup>, Leersia Yusi<sup>1</sup>, Globila Nurika<sup>1</sup>

<sup>1</sup> Faculty of Public Health, University of Jember, Jember, East Java, Indonesia  
✉Email: nafikadini@unej.ac.id

### ABSTRACT

**Background:** Cultures, traditions, or habits that exist in society, such as dietary restrictions and wrong eating patterns, can lead to increased nutritional problems, especially in toddlers, which ultimately impacts their growth and development. Low-income family parenting patterns in feeding and primary health care for toddlers can also increase the incidence of stunting in toddlers. This could be the cause of the stunting rate in the Jember Regency, especially in coastal areas. Dietary problems, including stunting, in coastal areas should be less likely to occur because the availability of high-protein animal foods such as fish is quite high, but Curahnongko Village is included in the stunting locus area in Jember Regency. **Aims:** This research aims to describe the socio-cultural nutrition and parenting styles of toddlers in Curahnongko Village. **Methods:** The study used qualitative and research methods with a case study approach. **Results:** The socio-culture during pregnancy in the coastal communities of Jember Regency regarding TTD consumption, routine check-ups, taboos during pregnancy, and visits to midwives are quite good. Socio-culturally during the breastfeeding period, it can be concluded that all informants carried out Early Breastfeeding Initiation (IMD). Socio-culturally during the feeding period for toddlers, all informants do not give food other than breast milk to babies when they are born. **Conclusion:** The socio-cultural aspect that appears to influence the occurrence of stunting is during the feeding period for toddlers, namely the frequency of children's snack consumption outside the home.

**Keywords:** Socio-cultural of Nutrition, Stunting, Coastal Communities

### INTRODUCTION

Stunting is a nutritional problem that occurs in children under five due to chronic malnutrition. This condition is characterized by stunted physical growth, especially in terms of height. The height measurement is based on the standards set by WHO, which is  $<-2SD$  of the standard median (World Health Organization, 2018). The impact of stunting on toddlers can occur in the short term and also in the long term. Short-term impacts that can be experienced are impaired intelligence and physical size that is not maximized or developed (Mathar *et al.*, 2023). The long-term impact on health is the development and productivity of individuals in later life. The adverse impact can be in the form of decreased cognitive abilities so that it is related to the achievement of learning achievement in children (Pratiwi, Sari, and Ratnasari 2021).

The prevalence of stunting based on Basic Health Research (Riskesdas) in 2018, Indonesia is the fifth highest in the world and second in Southeast Asia (Kemenkes RI, 2018). According to the 2022 Indonesian Nutrition Status Survey (SSGI) report, Jember Regency has the highest stunting rate in East Java at 34.9%. The area covers all areas in Jember including coastal areas which should have a low chance of stunting, due to the high availability of protein and zinc from marine products. Of the several coastal areas in Jember Regency, Curahnongko Village is included in the locus of stunting in Jember Regency.

Based on the high number of stunting cases, there are certainly efforts that have been made to overcome this problem. Many factors cause stunting in children. Socio-cultural factors in coastal areas can also affect the incidence of stunting specifically in public health behavior, both nutrition and health behavior during the first 1000 days of

life, pregnancy, breastfeeding, and 0-2 years of parenting. Socio-cultural differences in coastal areas are different from those in urban or other areas. Factors such as diet, childcare, access to food resources, sanitation practices, and social norms can influence child nutrition and health patterns.

Pregnancy is one of the factors that affect children's health. Food restrictions during pregnancy are often recommended for pregnant women. One of them is the main income of coastal areas is seafood. Pregnant women are prohibited from eating seafood such as squid, octopus, shrimp, and crabs, while these foods have a high protein content which is needed by pregnant women for fetal development. In the research of Ashriady *et al.* (2022) coastal communities believe that these seafood products can make children when born boneless, because these animals do not have bones, and are believed to make the placenta difficult to come out. This is contrary to fish and seafood.

The breastfeeding period is important for children to receive nutrition mainly from mothers without any additions. Breast milk has enormous benefits for the development of babies, so breast milk plays a very important role in preventing stunting in children. Children who are not exclusively breastfed have a 61-fold chance compared to children who receive exclusive breastfeeding (Sampe and Madi, 2020).

The feeding period for children is recommended starting at the age of 6 months. Food that enters the child's body becomes nutrients to promote growth and development. In addition, nutrients in nutritious foods increase metabolism in the child's body, so that it will avoid infectious diseases. Nutrients in food or poor feeding patterns will have a high chance of stunting in children (Rahman, 2018).

Families play a key role in determining the nutrition and health of children under five. Social and cultural factors within the family, such as education level, socioeconomic status, dietary behaviors, and nutritional knowledge can influence parenting, which in turn affects the level of stunting in children under five. The socioeconomic status of a family influences the

incidence of stunting because it is related to household decisions in choosing the food consumed (Saputri *et al.*, 2022). This must be supported by the level of family knowledge. Knowledge is closely related to education, if the family has high knowledge about nutritional needs, it will reduce the chance of stunting in toddlers (Ramdhani *et al.*, 2020).

Based on the high rate of stunting in Jember Regency, there is a need to design appropriate interventions for families of children under five in the coastal areas of Jember Regency. This is done by understanding the socio-cultural factors that contribute to stunting in the area. This research can provide in-depth insight into the role of socio-culture in nutrition, as well as provide a scientific basis for policies and programs that focus on stunting prevention.

Considering this scientific background, the study of the Socio-Cultural Study of Nutrition in Families of Stunted Toddlers in Coastal Communities of Jember Regency will provide a more comprehensive understanding of the problem of stunting and help formulate intervention strategies that focus on socio-cultural aspects to reduce the prevalence of stunting in toddlers in the region.

## METHODS

This research uses qualitative research methods with a case study approach. The main informants of this study were determined using purposive techniques. Informants in this study were mothers who had toddlers with stunting, totaling 10 informants. The place of this research was conducted in Jember Regency, precisely in the Coastal Region, namely in the working area of the Curahnongko Health Center, Tempurejo District, Jember Regency. This research was conducted from April to October 2023. Data collection techniques in this study used in-depth interviews and observation. Data analysis of this research is using thematic analysis (Thematic Analysis). Test credibility using triangulation techniques, namely testing the credibility of data by checking data to the same source but using different techniques (Sugiyono, 2017). This research has passed the ethical test by the Health Research

Ethics Commission of the Faculty of Dentistry, University of Jember with certificate number No.2076/UN25.8/KEPK/DL/2023.

## RESULTS AND DISCUSSION

### a. Socio-Culture during Pregnancy

Pregnancy cannot be separated from the socio-cultural aspects. Each region has a different socio-culture, which includes food restrictions, myths, and rituals. Based on the results of the study, showed that there are several community behaviors during pregnancy in coastal communities in Jember Regency.

#### 1) Consumption of Blood Additive Tablets (TTD)

Blood supplement tablets are needed to prevent anemia, especially in pregnant women who have higher nutritional needs. TTD contains 60 mg of iron and 0.25 mg of folic acid to meet the need for increased hemoglobin levels and red blood cell count during pregnancy. Nutritional adequacy during pregnancy can prevent anemia, the birth of LBW babies, and the risk of infant mortality. Based on research (Anggraini, Purnomo and Trijanto, 2018) that the more compliant the pregnant women are in consuming TTD, the higher the chance that the pregnant women will experience anemia during pregnancy. The results of research on 10 informants of pregnant women were 7 pregnant women who consumed TTD regularly, 2 pregnant women who rarely consumed TTD, and 1 pregnant woman who did not consume TTD for some reason.

*"...Yes, I always drink it. because every time I check with the midwife, I must be warned and must drink it, she said, so that I don't bleed" (IU 1).*

*"Drink it regularly, the midwife said, so that I don't get anemia during pregnancy" (IU 2).*

*"Yes, always because the midwife told me to, so I just obeyed" (IU 4).*

*"I always take it because the midwife told me to take it regularly. Maybe I don't have low blood pressure." (IU 5)*

Based on the interview excerpts above, it shows that the informants diligently took TTD because they received directions from the midwife during pregnancy check-ups. As revealed by IU1, the informant chose to consume TTD because she was always reminded constantly and given positive reasons when she regularly drank TTD by the midwife. It can be said that the informant consumed TTD because of the motivation from the midwife. Motivation is the impetus for someone to do something. Motivation can be obtained from family and health workers. This is in line with research conducted by (Baroroh and Dinengsih, 2023) that pregnant women with high motivation have compliance in taking TTD, while pregnant women with low motivation will have a 5-fold chance of not being compliant in taking TTD.

*"Yes, sometimes I drink it because I am afraid that if I drink it regularly, it will increase my blood pressure because I have a history of hypertension" (IU 3).*

*"Rarely because my blood is always normal. If I take it, I'll have high blood pressure and then go to the hospital, which will increase the cost." (IU 6)*

The results of the interviews above both informants have reasons for not consuming TTD regularly. IU 3 and IU 6 revealed that their blood pressure was within normal limits, so the informants considered consuming TTD unnecessary. Based on the informants' expressions, it can be seen that both informants have low knowledge about TTD. According to research (Rahmayanti, Martini and Nyandra, 2023) that there is a relationship between knowledge and compliance of pregnant women in consuming TTD during pregnancy, namely pregnant women with high knowledge will be more compliant in consuming TTD.

*"Never. When I was pregnant with my son, I couldn't take vitamins at all. I tried from the cheapest to the most expensive ones, but I couldn't take them. When I wanted to take it, I immediately felt nauseous and*

*vomited. So I never took vitamins while I was pregnant with this child" (IU 10).*

10 U revealed that the reason the informant did not consume TTD was because the informant felt that his body could not accept all types of vitamins he consumed. This is in line with research (Mughtar and Anggraeni, 2021) revealed that one of the factors that informants did not consume TTD was because the pregnant woman's body could not accept TTD properly and felt nausea and dizziness.

## 2) Routine pregnancy check-ups

During pregnancy, regular check-ups are needed to monitor the development and growth of the fetus and the mother's health in terms of weight gain, upper arm circumference (LILA), Hb status, blood pressure, and symptoms of eclampsia. Pregnancy check-ups can be done at the gynecologist, midwife, or the local *posyandu*. It is important for pregnant women to be aware of the importance of regular check-ups to avoid unwanted problems and can be treated immediately when problems arise.

*"Alhamdulillah, it is routine because pregnant women need to know the position of the baby. If you already know, you can immediately take action" (IU 2)*

*"Routinely check to the puskesmas because I want to know the development of the fetus" (IU 3).*

*"I always check every month at the puskesmas and participate in posyandu" (IU 4).*

*"Yes, always. So I can know the development of the child in the womb." (IU 8)*

Based on the interview excerpts above, explain that the informants conduct routine checks to see the development of the womb. Antenatal Care (ANC) services for normal pregnancies are at least 6x with details of 2x in Trimester 1, 1x in Trimester 2, and 3x in Trimester 3. At least 2x are checked by a doctor during the 1st visit in Trimester 1 and the 5th visit in

Trimester 3 (Ministry of Health, 2020). Based on the results of the interviews, show that all informants conduct routine checks to midwives, puskesmas, or posyandu.

*"Yes, I always check with my husband to know the condition of the fetus. I'm afraid it's breech or wrapped around the umbilical so I can find out early. Sometimes it is also recommended to have an ultrasound to know the condition of the fetus in the stomach" (IU1).*

*"Routine, thank God. Because my husband also supports me, so it's important to check" (IU7).*

Based on the interview excerpts above, both informants conducted routine checks with the support of their husbands. This proves that husband and family support in care during pregnancy is important for pregnant women. This is in line with the research (Safmila *et al.*, 2021) shows that there is a relationship between family support and Antenatal Care (ANC) visits for pregnant women and family support plays an important role in care during pregnancy which affects motivation to perform health behaviors.

## 3) Abstinence during pregnancy

Abstinence during pregnancy is synonymous with food consumed during pregnancy, which varies from region to region. Based on the results of the study, out of 10 main informants, 8 informants have no taboos during pregnancy, while the other 2 main informants have taboos.

*"There was a time when I was forbidden to eat fish and meat because I was afraid that the child would be fishy and I also often vomited when I ate it" (IU3).*

*"There was a time when it was not allowed to eat ice because the child could be big, he said, it was not allowed to eat spicy, afraid that the baby would be red too, people said" (IU 4).*

Based on the interview excerpts above, it shows that both informants abstain from food. IU 4 believes that pregnant women who eat ice can make

the baby big. This is in line with the research (Hartiningrum, 2020) shows that 61% of respondents have the perception that pregnant women who consume ice water are at risk of having a large baby. Consumption of ice causes a large baby is just a myth, but if ice consumption is accompanied by high-calorie sweet drinks, it increases the potential for fetal and maternal weight gain.

#### 4) Delivery at a Health Care Facility

The most accessible healthcare facility in terms of distance is the Puskesmas. In this study, 4 out of 10 informants chose to deliver at the Puskesmas, while the others chose to go to the hospital because of their own choice or referral from the Puskesmas.

*"For childbirth here, it's the puskesmas. It's close to home" (IU1)*

*"It was my husband who told me to give birth at the puskesmas and was handled by a midwife" (IU 2).*

*"At the community health center. Because it is guaranteed" (IU 6)*

*"Yes. The birth was at the Curahnongko Health Center. Directed by the midwife yesterday" (IU 9).*

In the interview excerpts above, informants chose Puskesmas for their childbirth for different reasons. As in IU 1 who chose Puskesmas health services because it was closest to home. This is in line with the research (Kristian, Saimin and Tosepu, 2022) shows that distance affects the search for health services, 62.2% of pregnant women studied chose the closest health service to make it easier and faster to get to the health service. The results of research by Mastuti and Febriyanti (2022) state that husband support and health workers have a positive correlation with the selection of birth attendants in health workers. Negative support from husbands and health workers has a risk factor (OR) of 10.4 and 9.1 for choosing non-health delivery assistants.

#### 5) Pregnancy and Childbirth Care at TBAs

The choice of care and delivery using TBAs is strongly related to local

socio-culture. The selection of TBAs over health workers is strongly influenced by the beliefs and customs of the local community (Robah *et al.*, 2023). In this increasingly modern era, health facilities and services have increased rapidly, which is different from the past. Regarding the selection of care and delivery in traditional healers in the village area, it is rarely used because there are already modern facilities scattered in the village areas. This study shows that pregnancy and childbirth care with TBAs is low, out of 10 informants of pregnant women, only 1 pregnant woman took care of TBAs. As shown in the following interview excerpt

*"I had two massages in the first and second trimester to adjust the position of the baby" (IU 4).*

The informant above revealed that the reason for visiting a TBA was to justify the position of the womb. The quotation from the interview above shows that the informant believes that the baby's position can be justified by the TBA. This is in line with research conducted by (Asrina *et al.*, 2018) shows that the reason for choosing a traditional birth attendant is that the informant believes that the traditional birth attendant fixes the baby's position to keep the baby's head down and can facilitate labor.

#### b. Socio-culture during the breastfeeding period

Breastfeeding is needed by children for growth and development. There are still many in certain areas or rural communities who still think that breast milk alone is not enough to meet the nutritional needs of children, therefore it is often found that babies aged 0-6 months are given other foods or drinks such as bananas, porridge, lembik rice, and others. In addition, which is often found in the community, working mothers are one of the reasons for not providing breast milk to children because they are busy and are replaced by formula milk. This can be influenced by a lack of knowledge, lack of social support (husband, family, community leaders, and health workers), and the socio-culture of the surrounding community. Exclusive breastfeeding for working mothers requires sufficient knowledge on how to

*pump* and store breast milk, support from husbands and families to provide breast milk when mothers work, support from community leaders and health workers to increase maternal motivation, and sociocultural support from the community that reinforces positive beliefs about the importance of breast milk for toddlers.

### 1) Early Breastfeeding Initiation (IMD) after Baby is Born

The results showed that the coastal communities of Jember Regency from all informants provided breast milk from birth because of the direction of the midwife who helped give birth.

*"Yes, because the doctor told me to" (IU 3)*

*"Yes, if you don't breastfeed, then what will the baby eat. I was told by the midwife that it's important" (IU 6).*

*"Yes, so after birth I immediately gave breast milk". (IU 10)*

Based on the quote above, the informant understands that Early Breastfeeding Initiation (IMD) after birth is very important to give to the baby. This knowledge is obtained by informants from health workers who provide direction directly after childbirth, this is in line with research conducted by (Hayati and Aziz, 2023) that there is a significant relationship between the role of health workers in breastfeeding infants, namely by increasing maternal behavior to breastfeed exclusively for up to 6 months and continuing breastfeeding until the baby is 2 years old and providing information related to lactation management.

### 2) Food Restrictions While Breastfeeding

Food restrictions for breastfeeding mothers are common among people in villages and cities. It is considered that the food or drink consumed by the mother is very influential on the breast milk given by the child. According to research (Oktarina and Wardhani, 2020) that people do food restrictions while breastfeeding to prevent babies from getting sick. For example, such as food restrictions on breastfeeding mothers in Madurese ethnic groups related to

abstinence from eating fish, because it is feared that it can make breast milk fishy. However, this is not correct because fish contains high protein needed by breastfeeding mothers.

*"Nothing, I eat everything as usual" (IU1)*

*"Nothing I eat everything according to what the doctor says" (IU3)*

*"There is no word that midwives can eat anything" (IU4)*

Based on the quotation above, shows that breastfeeding mothers in the coastal areas of Jember Regency already have positive knowledge and beliefs about dietary restrictions during breastfeeding. All informants revealed that they have no taboos on the food they consume daily.

### 3) Giving colostrum to babies for the first time

Colostrum is breast milk that comes out from the first day until the fourth or fifth day which is thick and more yellow than breast milk. Giving colostrum to babies provides many benefits for babies, but there are still people who do not know the importance of giving colostrum. Of the ten research informants, eight informants gave colostrum to their babies, and two informants did not give colostrum to their babies for several reasons.

*"Yes, it was given because the nurse told me to" (IU 1)*

*"Yes, it was given on the recommendation of doctors and nurses at the puskesmas" (IU2)*

*"Yes, because he said it was good what the midwife told him" (IU4)*

*"Oh that, yes mas. The midwife or doctor said yesterday that it was important" (IU 6)*

Based on the quotation above, it shows that informants gave colostrum to their children because of the direction of the health worker who handled the informant's birth. Two informants did not give colostrum to the baby because colostrum and breast milk did not come



out after birth, namely IU 3, and the other informant, IU 8, did not give colostrum because the baby was premature and therefore was not given breast milk after birth.

#### 4) Knowledge about the benefits of colostrum

Colostrum serves to boost the formation of the immune system and is used for active and passive immunization. (Sudargo, Aristasari and 'Afifah, 2018). In general, people without sufficient knowledge related to breast milk and colostrum will be afraid to give colostrum to their children because it is considered stale breast milk that is not suitable for consumption by infants.

Based on the results of the study above, most informants gave colostrum to infants because of the direction of health workers, but regarding the knowledge of the benefits of colostrum itself, most informants did not have sufficient knowledge regarding this matter. This can be seen from the following interview excerpt,

*"I don't quite understand"* (IU 4)

*"I don't know"* (IU 5)

*"I don't understand the benefits"* (IU6)

*"No, I didn't. Yes, yesterday I was just told by the midwife, directed, she said it was good for the child. Yes, I just obeyed"* (IU 10)

Of the 10 informants, seven revealed that they did not understand the benefits of colostrum, but three of them understood and explained when asked questions related to the benefits of colostrum.

*"Yes, I know, to form children's antibodies"* (IU2)

*"Improves immunity as far as I know"* (IU 3)

The interview excerpt above shows that both informants gave colostrum to their children because they knew about it. It can be said that most informants gave colostrum to infants due to directions from health workers without

knowing the benefits. According to research (Sulaimah, Annur and Lampung, 2019) that knowledge is the biggest factor in giving colostrum to children.

#### 5) Use of Formula Milk for Infants

Formula milk is chosen by parents as a breastfeeding companion or breastmilk substitute. Of the ten informants, five informants revealed that they never gave formula milk to their babies, while the other five informants gave formula milk for a reason.

*"Yes, sometimes when the milk doesn't come out, but after the milk comes out, I love breast milk"* (IU 3)

*"Always during the first month because the asthma comes out only when giving birth after a month it comes out again."* (IU 4)

*"Yes, always. My child mixes breast milk and formula. Because he was sick too, his bilirubin was high, so the doctor told him to add formula milk. My child was born small, but could still breastfeed, but finally, it was recommended to add formula milk to gain weight."* (IU 10).

Breast milk is the best food for babies. Babies born prematurely without medical problems should still be breastfed. Breast milk is a liquid that dynamically follows the baby's development, from early breast milk (fore milk) to late breast milk (hindmilk) whose fat content increases. Similarly, breast milk in premature babies contains a lot of cysteine, taurine, and lipase that increases fat absorption, long-chain polyunsaturated fatty acids, nucleotides, and gangliosides, as well as greater bioavailability of several types of mineral elements (IDAI, 2013). Giving PASI (formula milk) to infants born prematurely without being accompanied by good behavior towards hygiene and sanitation will further increase the risk of infectious diseases, especially food-borne diseases.

#### c. Socio-Cultural Issues in Toddler Feeding

Feeding toddlers can be found in modern times as it is today, it is closely related to the socio-culture of the local

community. Starting from the type of food and the amount/frequency of food given to toddlers.

### 1) Feeding other than breast milk to newborns

Based on the results of the study, all informants revealed that they never gave any food other than breast milk when the newborn was born.

*"No, I only gave formula milk and breast milk until the age of 6 months"* (IU 3)

*"No, no, no. The midwife said it was only allowed to be fed at 6 months old. I just followed her"* (IU 9)

*"No, it's not allowed by the midwife. They said to wait until the age of 6 months before they could be given food"* (IU 10)

Based on the interview excerpts above, the direction of health workers is highly considered and trusted by the informants. The midwife is a key person in the success of community behavior change.

### 2) Frequency of complementary feeding

Complementary food starts to be given to children when they are 6 months old. Frequency of complementary feeding to children in a day.

The normal frequency for complementary feeding is twice a day by six months of age, and the recommended serving size is 2-3 spoonfuls at a time (IDAI, 2018).

*"Twice, morning and evening so that it is full in addition to breast milk."* IU1

*"Twice a day usually because I also need to adjust to the age of the child. I'm afraid they'll get too full."*

Most informants gave two times. There were only two informants who stated to give complementary food two to three times a day. So it can be said that the majority of informants' frequency in providing complementary food to children is still safe. According to research (Wangiyana *et al.*, 2020) that there is a clear relationship between the frequency

and dose of complementary foods with the risk of stunting in children. The adequacy of complementary foods ensures that children's nutritional needs are met for growth and development.

### 3) Foods to Give to Toddlers

The food given to children must be gradual according to their age, in addition to the amount and composition of nutrients, the most important thing is the texture. The texture of complementary food should be gradual, as recommended by WHO so that children can adapt to passing the food introduction period well. Food is given starting from the softest texture, namely porridge, gradually lembik rice/team rice to regular food as well as adult food at the age of more than one year.

*"Usually I make it myself, sometimes I mash it into porridge using rice, spinach, moringa, eggs, tempeh, and so on"* (IU 2)

*"Usually SUN, but sometimes I also give rice, vegetables, eggs, liver"* (IU 3)

*"Rice, vegetables, chicken, eggs, that's it"* (IU 7)

Most informants revealed that the food given to their children is cooked or processed by the informants themselves and is by the feeding phase. By preparing homemade complementary foods, it is expected that the nutritional quality of breastmilk complementary foods will be better.

### 4) Tajen Water Giving

Tajen water has some benefits for the body, but not for giving to infants. This was known by the informants. Based on the research results, ten informants stated that they never gave tajen water to their children.

*"Tajen water is like the old days. It doesn't taste good. I don't even want to give it to my child."* (IU 2)

*"There is no such thing"* (IU 4)

The informants already have good knowledge and awareness about tajen water. Food beliefs that have been followed from generation to generation

are increasingly eroded with the wider range of information sources and the more educated the community is.

#### 5) Frequency of Consumption of Outside Snacks

Consumption of snacks outside in children is a natural thing. Every day children certainly do not just stay at home, but play outside the home so that children have a great opportunity to snack outside the home.

*"Sometimes if he wants to buy snacks, I don't buy them for him. Usually he likes to eat potato sticks and chocolate" (IU 2)*

*"Yes, usually the child asks for noodles, chocolate, wafers, potato, and snacks from the stall" (IU 4)*

According to research (Angraini *et al.*, 2019) the frequency of snacks in the high category is because children do not want to eat in the morning and, children prefer sweet and practical foods such as wafers and snacks. Based on research by Mulyaningsih *et al.* (2021) shows that there is a positive relationship between high frequency of snack consumption and the risk of children experiencing stunting. This is because snacks for children contain fat (59.6%) and energy (40%) but have a lower density of protein and micronutrients. Insufficient intake of micronutrients, such as calcium and vitamin A, adversely affects children's linear growth. Micronutrients are very important for child development because they have an important role in bone formation (calcium), bone length growth (zinc), and intrauterine increase in femur length (supplements) (Mulyaningsih *et al.*, 2021; Wamani *et al.*, 2007).

#### 6) Habit of Paying Attention to Nutritional Content on Packaging

The habit of reading or paying attention to the nutritional content on the packaging of food consumed is closely related to a person's knowledge related to nutrition. According to (Febrinasari and Riandani, 2023) limiting the consumption of food products in children is done if the mother has awareness and attaches importance to reading labels on the packaging of products consumed by children.

*"Never, I don't understand because" (IU 5)*

*"Yes, why not mas. I've never done it, I don't understand it" (IU 6)*

*"Never, don't understand what it's because of, how to read it" (IU 7)*

Based on the results of the study, all informants revealed that their children do snack behavior outside the home almost every day and informants as mothers do not pay much attention to the nutritional content of the packaging consumed by children. This is an opportunity for unsafe consumption behavior, not only about the potential entry of harmful food additives but also the potential for food to be unfit to eat because the expiration date is not considered.

## CONCLUSION

Based on the results of the research conducted, it can be concluded that the socio-culture during pregnancy in coastal communities in Jember Regency related to TTD consumption is quite good. 7 out of 10 informants consume TTD regularly, conduct routine pregnancy checks at the hospital, midwife, or posyandu, 8 out of 10 informants have no taboos during pregnancy, and 1 out of 10 informants have visited a traditional healer to fix the baby's position.

First, Socio-culture during the breastfeeding period can be concluded that all informants conducted Early Breastfeeding Initiation (IMD), did not have food restrictions during breastfeeding, 8 out of 10 informants gave colostrum to babies, 3 out of 10 informants had high knowledge of the benefits of colostrum in children, 5 out of 10 informants still gave formula milk to help consume breast milk. Second, Socio-culture in the feeding period of toddlers is that all informants do not give food other than breast milk to newborn babies, the frequency of complementary feeding for 8 out of 10 informants is twice a day and the other 2 are 2 to 3 times a day, all informants give their own processed foods such as chicken, eggs, tempeh and others. None of the informants had ever given taken water to their children, all informants revealed that

their children snacked outside the home almost every day, and all informants did not have the habit of paying attention to the nutrition on the food packaging consumed by their children. Third, the socio-cultural aspects that appear to affect the occurrence of stunting are during the feeding period of toddlers, namely the frequency of consumption of children's snacks outside the home. Fourth, based on these conclusions, suggestions that can be made by health workers include providing nutritional education about healthy snacks, reading nutrition labels on snack packaging, as well as technical training in making healthy snacks for children. Apart from that, it is also necessary to actively optimize collaboration in health programs between health workers and local community leaders. The potential for further research is to explore the relationship between snack consumption and the incidence of stunting.

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## Self-Esteem among Men Who Have Sex with Men Living with HIV: A Qualitative Study

Linlin Lindayani✉<sup>1</sup>, Melinda Patricia Ridzki<sup>1</sup>, Heni Purnama<sup>1</sup>

<sup>1</sup> Department of nursing, Sekolah Tinggi Ilmu Keperawatan PPNI Jawa Barat, Jl. Ahmad 4 No.32, Pamoyanan, Kec. Cicendo, Kota Bandung, Jawa Barat 40173

✉Email: [linlinlindayani@gmail.com](mailto:linlinlindayani@gmail.com)

### ABSTRACT

**Background:** HIV transmission in males, particularly in Indonesia, is increasing due to increased sexual activity among Men who have Sex with Men (MSM) groups. This is largely due to diminished self-esteem and reluctance to disclose their status, influenced by factors like power, virtue, relevance, and competence. **Aims:** The study investigates the self-esteem of MSM living with HIV and explores the factors that may influence their self-esteem. **Methods:** This study employs a descriptive qualitative study. The study used interviews and content analysis techniques to gather data on HIV individuals at the Public Health Center, specifically focusing on MSM. **Results:** The interview data revealed six themes: individualism, body image dissatisfaction, lack of motivation, lack of peer support, aspiration to be useful, and self-esteem needs. **Conclusion:** The study reveals that self-esteem in HIV-positive men is influenced by coping strategies, body image dissatisfaction, motivation, and peer support. It suggests helping others and enhancing library resources, regular investigations, and a specialized counseling program to improve self-esteem.

**Keywords:** HIV, MSM, self-esteem, qualitative study

### INTRODUCTION

HIV transmission among males who engage in sexual activity with other men (MSM), including homosexual and bisexual men, is increasing in Indonesia. The prevalence of MSM has risen from 20% in 2018 to 27.2% in 2021, a significant increase from 28.8% in 2022 (Arisudhana *et al.*, 2020). This increase is concerning as high-risk sexual behavior significantly impacts the spread of HIV. People living with HIV (PLWH) often face social stigma and discrimination due to their condition (Nyamaruze & Govender, 2020). Men who have sex with men often experience diminished self-esteem and reluctance to disclose their condition, leading to discomfort in social interactions (Nyamaruze & Govender, 2020). The increasing prevalence of MSM in Indonesia underscores the need for increased awareness and support for those affected by HIV.

Self-esteem is an assessment of an individual's self-worth, starting in infancy and evolving due to life experiences. High self-esteem individuals perceive good attributes and strengths, while low self-

esteem focuses on flaws. Self-esteem is crucial for shaping self-concept, especially among those living with HIV/AIDS (PLWHA), supporting health aspirations, and developing interpersonal openness. PLWHA often undergo a transitional period to acknowledge their illness (Nyamaruze & Govender, 2020). Self-esteem among PLWHA can be viewed from three perspectives: affective, cognitive, and behavioral. The affective perspective considers emotions during social adaptation, while the cognitive perspective focuses on problem perception and problem-solving abilities (Saefulloh *et al.*, 2017). A study by (Runiari, 2018) found that HIV/AIDS patients in Jombang district often suffer from low self-esteem due to shame, negative body image, societal role loss, unemployment, and diminished social connections. In Ghana, men who have sex with men (MSM) also experience higher levels of low self-esteem due to embarrassment and depression. (Handayani & Susanti, 2019) found that MSM often feels inferior in social orientation and self-expression. (Nyamaruze & Govender, 2020) found that

MSM may feel inferior due to perceived deviations in their body image, such as ideal body weight and skin conditions. Poor self-esteem can lead to various reactions, including adaptable self-actualization and identity loss (Stuart, 2021). Those with low self-esteem develop a positive self-concept, while those with poor self-esteem struggle to adapt effectively and may experience a diminished sense of identity (Saefulloh *et al.*, 2017). PLWH who identify as men who have sex with men may experience negative consequences due to low self-esteem and negative coping strategies, leading to melancholy, anger, resentment, and intentional disease spread. Poor self-esteem can cause hopelessness, a shift in self-perception, and a lack of self-respect, contributing to depressive symptoms (Arisudhana *et al.*, 2020). This study aims to explore self-esteem among men MSM living with HIV/AIDS. The research focuses on conceptualizing self-esteem among MSM and provides valuable insights for MSM. The study emphasizes the importance of practical experiences to improve the writer's proficiency in evaluating self-esteem in mainstream media. Further research is needed to further advance interventions targeting MSM.

## METHODS

### Study design

The study employs a qualitative design to comprehend a social phenomenon and its perspectives, utilizing descriptive data from observed behaviors through written or spoken words.

### Sample

The study examines men with HIV using purposive sampling, selecting participants over 18 years old based on cooperativeness and positive HIV history, and exclusions include those without a history or decreased consciousness. A total of 6 samples were interviewed following the saturated data.

### Data Collection Procedures

An ethical clearance was obtained from STIKEP PPNI Jawa Barat (III/098/KEPK/IV/2023). Research ethics in nursing research involve ethical obligations like obtaining informed consent, ensuring anonymity, and maintaining confidentiality to protect

participants' identities and information, as they directly involve human subjects. A researcher conducted a study on men with sex with men living with HIV at a community health center. They used semi-structured interviews to gather data from a balanced sample. The study aimed to understand the experiences of MSM living with HIV/AIDS. The interviews were conducted in 45-to-60 minutes, with an orientation phase, working phase, and termination phase. The data was then analyzed to identify patterns, make informed decisions, and address any unanswered questions.

### Data Analysis

Content analysis is a method used by researchers to create impartial descriptions of a subject. It involves formulating research questions, selecting relevant sources, using purposive sampling, systematically examining and interpreting content, and collecting data from a sample document. This study involved selecting, coding, categorizing, identifying themes, and interpreting data based on the proposed theoretical framework (Arafat, 2019).

## RESULTS AND DISCUSSION

The interview data revealed six themes: individualism as a coping mechanism, dissatisfaction with body image, lack of motivation in achieving a life goal, lack of peer support, aspiration to be useful, and self-esteem needs.

### Theme 1: Individualism as a coping mechanism

The study explores the role of individualism as a coping method, focusing on both positive and maladaptive responses. Participants indicated a greater focus on self-improvement when facing challenges, indicating individualism as a coping mechanism.

### Pertains to individuals

Individualistic tendencies are often displayed when faced with a problem, as demonstrated in the following statement.

*"... subsequently, there exist individuals who have the propensity to induce negative emotions, thereby justifying the inclination to independently address the issue at hand, refraining from seeking*

*assistance from external sources..."*  
(P2, a 20-year-old)

#### **Favorable reaction**

The subject prefers exercising as a positive response to problems, as it boosts their energy levels, as expressed in the following statement:

*"...When a problem arises, I often find solace in physical activity. By engaging in exercise, I can enhance my energy levels and address the issue more effectively."* (P1, 24-year-old)

#### **Pertains to closed selection**

The subject often struggles with obtaining sputum samples for laboratory analysis, leading to a closed disposition towards research to subdue their ego, but these difficulties do not cause depression:

*"I tend to conceal my problems, but now I suppress them to protect my self-esteem." Per standard protocol, it was necessary to undergo a tuberculosis (TBC) screening before the initial encounter. At that juncture, I began to experience a subtle shift in my emotional state, wherein I perceived a diminished sense of depression and instead experienced a little melancholy"* (P5, 22-year-old)

#### **Theme 2: Dissatisfaction with body image**

The study identifies factors contributing to body image dissatisfaction, such as diminished self-assurance, dissatisfaction with physical appearance, perceived deviations from societal beauty standards, and unmet attractiveness expectations.

#### **Did not confident**

The research participants reported feelings of insecurity due to variations in body image, particularly regarding physical attributes like a leg wound:

*"I lack confidence when I wear shorts like that, especially considering the size of my slender physique. It does not bother me, but I feel insecure because of my thinness."* (P5, 22-year-old)

#### **Discontentment with body image**

The study revealed that the respondent experienced a sense of perpetual inadequacy due to dissatisfaction with their body image, as evidenced by the following statement:

*"...When I focus on my body image, I do not feel sufficiently content. For instance, I have a scar (indicating a wound on my leg)." (P3, 22-year-old)*

#### **A discernible physical distinction exists**

The person has persistent dissatisfaction due to several physical differences, as exemplified by the statement:

*"...owing to my slender physique, numerous scars, and the lack of symmetry in my body shape."* (P3, 22-year-old)

#### **Physical attractiveness standards that do not align with societal expectations**

The individual expresses a lack of confidence in their ability to achieve flawless performance, as evidenced by the following statement:

*"...additionally, I experience a sense of inadequacy in presenting myself in well-dressed attire to enhance my appearance."* (P3, 22-year-old)

#### **Theme 3: lack of motivation in achieving a life goal**

This study explores the role of intention in determining motivation and hope in achieving life objectives. Participants indicated that genuine intentions were crucial for achieving desired outcomes, emphasizing the importance of motivation in achieving goals.

#### **Deficiency in the drive to attain a desired outcome**

The participants in this study experienced a decline in motivation to pursue a desired outcome, as expressed in the following statement:

*"...thus, I experienced a subsequent loss of motivation, similar to that, where my aspirations seemed within reach, but the following day, the situation was not the same. This pattern occurred most of the time,*



and consequently, I had to rely on my efforts to regain motivation and pursue my goals..." (P5, 22-year-old)

#### **Intention plays a crucial role in determining the effectiveness of endeavors**

The individual asserts that genuine intentions are crucial to accomplishing a goal. This sentiment is expressed in the following statement:

"...if, for instance, there is a particular objective that one aspires to attain, it is imperative to revisit the initial intention behind desiring its achievement. If, upon reflection, it becomes evident that the intention was not genuine from the outset, then the time invested in pursuing said goal has been rendered futile. Consequently, the individual's current aspiration is to regain composure and redirect attention towards the necessary action." (P4, 25-year-old)

#### **Theme 4: Lack Of Peer Support**

The study revealed a lack of peer support, leading to undervaluation and inadequate treatment. Participants reported feeling disliked by their peers and only receiving favorable treatment when they expressed their thoughts.

##### **Underappreciated**

The subjects under investigation in this research are frequently undervalued, as indicated by the following statement:

"...often underestimated by individuals and individuals exhibit a lack of trust in my abilities..." (P4, 25-year-old)

##### **Poor treatment**

The individual experiences unfavorable treatment from their peers, as indicated by the statement:

"...specifically due to factors that diminish self-esteem, it is evident that my friends do not satisfactorily treat me..." (P1, 24-year-old)

##### **Disliked by acquaintances**

The individual perceives a sense of animosity from their acquaintances due to their tendency to consume installments, as expressed in the following statement:

"...I possess a proclivity for consuming installments, which engenders disdain towards me..." (P4, 25-year-old)

#### **Theme 5: trying to be a useful person**

The endeavor to be helpful individuals within the context of this study encompasses bestowing advantages upon others. Participants in the study expressed their desire to persist in their efforts to be helpful individuals, as they believed it had the potential to augment their self-esteem.

##### **Bestowing advantages to others**

The individual consistently strives to be a person of utility, as evidenced by the following statement:

"I possess the ability to provide value to others, positively impact individuals, and influence them. I derive a sense of worth from my capacity to assist others and dedicate my time to their needs." (P4, 25-year-old)

The subject further expounded upon the principles of reciprocity in interpersonal interactions, as seen by the following extract from the interview:

"... individuals engage in a reciprocal exchange of resources, whereby they both receive and provide support. For instance if I am treated kindly by the community, I reciprocate that kindness..." (P4, 25-year-old)

#### **Theme 6: The need for self-esteem**

The present study incorporates self-esteem needs, encompassing emotions, cognitions, and autonomy, as essential for navigating various challenges.

##### **Emotions**

The patient experiences a sense of worth when they can contribute positively to others, as expressed in the following statement:

"I feel a sense of value when I can assist individuals." (P4, 25-year-old)

##### **Epistemological beliefs**

The individual expresses confidence in their ability to successfully navigate

and overcome the various challenges they encounter, as seen by the statement:

*"...I am confident in my capacity to navigate this trial successfully, and..."*  
(P3, 22-year-old)

#### **Autonomy**

The individual has the belief that they can successfully attain a particular objective without any assistance from others, as indicated by the statement:

*"...engaging in solitary efforts, others don't have to be aware of this endeavor."* (P3, 22-year-old)

The study reveals that individuals with HIV/AIDS use various coping strategies to manage anxiety, including internalizing emotions and experiencing heightened anxiety during examination. These strategies include individual capabilities, social support networks, material resources, and positive personal beliefs. Inadequate anxiety management can lead to dangerous behavior and decreased self-esteem (Stuart, 2021). Participants with HIV/AIDS also express dissatisfaction with their body image, leading to decreased self-confidence. This disparity affects their perception of their ideal selves and may result in skin disorders causing sores and discomfort.

The study reveals that HIV/AIDS patients' primary life goal is treatment, but lack of desire and commitment hinders its realization. They experience a dynamic psychological state, fluctuating between hope, resilience, stress, depression, and inadequacy. Internal variables can cause discontent and psychological tension, impacting their well-being (Remien *et al.*, 2019). The study revealed that lack of peer support can lead to adverse treatment, social ostracism, and feelings of inferiority among individuals, which is consistent

with previous research suggesting that social support can enhance self-esteem and mitigate depression in men with HIV, resulting in similar psychological well-being to those without HIV (Pardede *et al.*, 2020; Purnamawati *et al.*, 2022), which suggests that social support can enhance self-esteem among men with sex with men living with HIV and mitigate depression. Elevated self-esteem in individuals with HIV can lead to similar psychological well-being as those without HIV.

The study investigates the impact of HIV/AIDS on self-esteem in individuals with the condition. It suggests that these individuals often engage in behaviors to boost their self-esteem, such as showing kindness and providing support during treatment. The research also reveals that these individuals prioritize their personal lives, leading to increased social withdrawal and a reduced tendency to self-reflection about their positive attributes (Runiari, 2018). This is particularly evident in those recently diagnosed with HIV. The study explores self-esteem in people with low self-esteem in PLWHA, revealing that they prioritize their personal lives, leading to increased social withdrawal and external influence. This low self-esteem reduces self-reflection about positive attributes, especially in this population.

The study investigates self-esteem among MSM living with HIV using an interview methodology. It aims to identify potential self-esteem issues using a learning model, which serves as a screening tool for those susceptible to severe psychological difficulties. Early-life low self-esteem levels can prevent depression in individuals with HIV, enabling holistic nursing management that considers biological, social, psychological, and spiritual dimensions. Future research should explore factors impacting self-esteem among individuals with HIV.

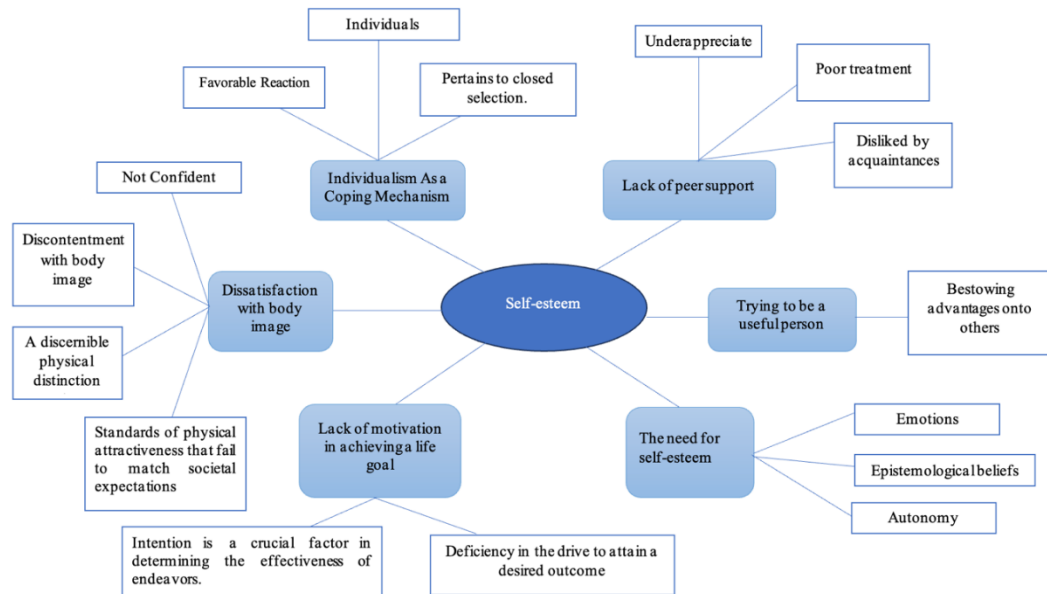


Figure 1. Thematic theme

## CONCLUSION

The study reveals that the self-esteem of HIV-positive men with sex with men is influenced by individual coping strategies, body image dissatisfaction, lack of motivation, and peer support. It suggests that individuals can improve their self-esteem by helping others rather than enduring negative peer experiences. Educational institutions should enhance library resources by incorporating case studies on self-esteem in HIV-affected men. The Community Health Center should conduct regular investigations into self-esteem, focusing on HIV-positive individuals. A specialized counseling program is recommended to foster self-esteem among HIV-positive MSM. Future research should explore the specific self-esteem requirements of HIV-affected individuals to better understand self-esteem determinants.

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## Maternal Factors as Determinants of Stunting in Children under the Age of Five: Scoping Review

Anna Uswatun Qoyimah<sup>1)</sup>, Zahroh Shaluhayah<sup>1)</sup>, Sri Winarni<sup>2)</sup>

<sup>1</sup> Health Promotion, Faculty of Public Health, Diponegoro University, Semarang, Central Java, Indonesia

<sup>2</sup> Biostatistics and Demography, Faculty of Public Health, Diponegoro University, Semarang, Central Java, Indonesia

✉Email: [annauswatun151@gmail.com](mailto:annauswatun151@gmail.com)

### ABSTRACT

**Background:** Chronic malnutrition during a child's early years leads to stunting, a condition that can harm both their mental and physical development. Studies have indicated a correlation between parenting styles and stunted growth in children that the nutritional knowledge and practices of mothers significantly affect the dietary habits of toddlers. The perspectives and cultural convictions of mothers are significant but have received limited attention as factors that influence the nutritional well-being of children and adolescents. **Aims:** This review examined maternal factors as determinants of stunting in children under five. **Methods:** Three databases were used to search for literature, namely PubMed, Scopus, and Google Scholar. The key to the search is as follows: "maternal" or "mothers" and "factor" and "stunting" or "stunted" or "growth disorder" and "toddler" or "children under five." The material displayed in search engines is selected based on inclusion and exclusion criteria. **Result:** This review was done on nine articles that were screened and analyzed out of 1,450 articles. The articles come from Nepal, India, Indonesia, Ghana, Congo, Uganda, Lebanon, and the Central African Republic. The type of research articles was cross-sectional and case-control. **Conclusion:** This review has provided an overview of maternal factors contributing to the prevalence of stunting. These factors include maternal employment, the educational status of mothers, maternal body mass index, the diversity of the mother-child diet, maternal exposure to mass media, and maternal age.

**Keywords:** Children under five, maternal factors, scoping review, stunting

### INTRODUCTION

Chronic malnutrition during a child's early years leads to stunting, a condition that can harm both their mental and physical development. Moreover, it can have long-term consequences by impacting the transmission of malnutrition to future generations and contributing to poor birth outcomes in the next generation. Stunting serves as an indicator of insufficient care and upbringing during the early stages of life and is associated with difficulties in learning and community involvement. Consequently, the prevalence and degree of stunting serve as valuable metrics for evaluating a population. They can monitor children's progress within that population as they grow over time (Siswati *et al.*, 2022). In 2022, there were 148.1 million children below the age of five who

exhibited stunted growth globally. The prevalence of stunting in 2022 was 22.3% among all children under five years old worldwide (UNICEF *et al.*, 2023). In Indonesia, the prevalence of stunting was decreased to 21,6% (Ministry of Health Republic Indonesia, 2023).

Stunting among children below the age of five often goes unnoticed, as distinguishing between a stunted child and a typically developing child in this age group can be challenging. The period before a child turns five is crucial for shaping the quality of their physical and intellectual development, emphasizing the importance of maintaining good nutritional health. When a child experiences stunting during this critical phase, they may encounter difficulties in achieving their optimal height in subsequent years. This can result in impaired cognitive and psychomotor

development, reduced intellectual capacity, heightened susceptibility to chronic diseases, and decreased future productivity (Diana & Yusandra, 2022).

Fundamentally, the well-being and survival of children are closely connected to the health of their mothers. Parenting practices influence dietary patterns, including inappropriate feeding behaviors. Studies have indicated a correlation between parenting styles and stunted growth in children. The nutritional knowledge and practices of mothers significantly affect the dietary habits of toddlers (Diana & Yusandra, 2022). A considerable proportion of health problems stem from the identification of unhealthy behaviors, particularly when it comes to children, as these behaviors are often linked to the beliefs, actions, or lack thereof, of mothers (Zoungrana *et al.*, 2014). The perspectives and cultural convictions of mothers are significant but have received limited attention as factors that influence the nutritional well-being of children and adolescents (Adeomi *et al.*, 2022).

Building upon the findings from previous research, the objective of this study is to gather a comprehensive understanding of the maternal factors that contribute to stunting by reviewing various relevant sources and literature.

## METHODS

We conducted a scoping review to examine the maternal factors influencing stunting in children under five. A scoping review is a method employed to comprehensively explore relevant literature from various sources, shedding light on the specific research problem at hand. This review was conducted by three authors. In this review, the authors were responsible for evaluating the abstract, the title and full-text of potential articles for inclusion. The scoping review process, as outlined by Arkset and O'Malley (2005), involves several key steps: (1) defining the research question or the purpose of the review, (2) searching for pertinent literature, (3) selecting relevant literature, (4) mapping and organizing collected data, (5) summarizing and reporting the results, and (6) seeking expert consultation.

The initial search for literatures was implemented on three electronic

databases, namely PubMed (biomedical sciences), Scopus (multidisciplinary), and Google Scholar (multidisciplinary). The databases were selected to be comprehensive and to cover a broad range of disciplines. The search format uses PEO (Population, Exposure, Outcome). The search format used in the literature search was based on the research topic, namely, P= children under five; E= maternal factors; and O= stunting. The key to the search is as follows “maternal” or “mothers” and “factor” and “stunting” or “stunted” or “growth disorder” and “toddler” or “children under five.”

Based on the first search results using keywords found 1,252 literatures from PubMed, 148 literatures from Scopus, and 50 literatures from Google Scholar. Additionally, the authors chose the retrieved materials from search engines under specific inclusion and exclusion criteria. Inclusion Criteria: articles published in English and those published between 2019 and 2023, articles as the result of the research or original research, free-full text accessed articles, document/report/guideline from the WHO or certain formal institution. Exclusion Criteria: opinion and commentary articles, review letters and book reviews, irrelevant articles

## RESULTS AND DISCUSSION

Figure 1 depicts the search results from 1,450 literature sources obtained through the research database using the specified search strategy. According to the sources, the authors retrieved 1252 from PubMed, 148 from Scopus, and 50 from Google Scholar based on the specified keywords. Subsequently, a screening process was employed to select articles that aligned with the scoping review's objectives regarding maternal factors contributing to stunting among children under the age of five. The authors guided the selection process by evaluating the alignment of the title, abstract, and content with the review's objectives. This article selection process adhered to the PRISMA-ScR guidelines.

The pieces of literature were extracted using the Mendeley Desktop application. The number of articles after the duplication checks and removal of not fully accessed articles was 545. Then, the

filtering of article title and abstract was done manually. Four hundred and forty-eight articles were excluded after the screening because they were irrelevant to the scope of stunting determinants among children under five. After re-selecting manually, the authors found 97 articles. Thirty-nine of them did not contain maternal factors and three of them were a review. Then, 56 articles were found,

14 articles did not fit the population, 26 articles had wrong exposures, and seven articles had wrong outcomes. In the end, nine articles (seven articles from PubMed, an article from Scopus, and an article from Google Scholar) met the criteria for extraction and underwent quality assessment before being included in the data charting process.

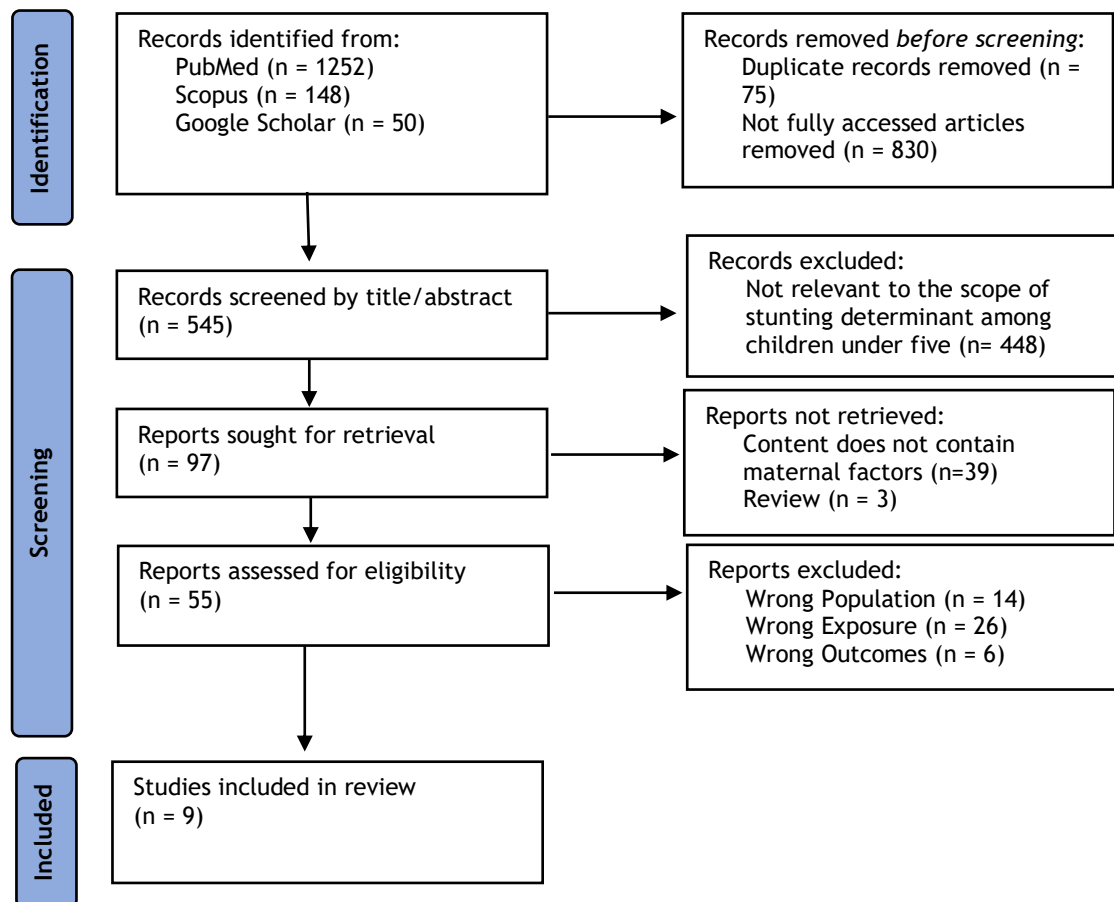


Figure 1. Article Selection Process

### Data Charting

Nine articles have been assessed, then extracted by entering the main

criteria including research title, author, year, country, purpose, research type, and research results.

Table 1. Data Charting

Title	Database	Country	Objective	Type of Research	Result
Maternal risk factors for underweight among children under five in a resource limited setting: a community based case control study (Sigdel <i>et al.</i> , 2020)	PubMed	Nepal	To address the maternal risk factors of underweight children	A case control study	The findings indicated that children born to illiterate mothers had 1.48 times higher odds of being underweight when compared to children whose mothers were not illiterate. Furthermore, children with mothers who had

					zero income had 5.13 times higher odds of being underweight.
Decomposing acute malnutrition by educational inequality of mother's among under five children in Jammu and Kashmir (Tariq <i>et al.</i> , 2023)	Scopus	India	To analyze the prevalence of acute malnutrition concerning educational disparities among mothers	A cross-sectional study	The study revealed a greater incidence of stunting in children with uneducated mothers in contrast to those with educated mothers. The findings illustrate a reduced risk of stunting in children whose mothers are literate.
Factors related to stunting incidence in toddlers with working mothers in Indonesia (Laksono <i>et al.</i> , 2022)	PubMed	Indonesia	To examine factors associated with the occurrence of stunting in toddlers with employed mothers	A cross-sectional study	The study indicated that mothers in the 19-29 age group have a 1.461 times higher likelihood of having severely stunted toddlers compared to those in the 30-45 age group.
The targets for stunting prevention policies in Papua, Indonesia: What Mothers' Characteristics Matter? (Wulandari <i>et al.</i> , 2022)	Google Scholar	Indonesia	To assess the maternal characteristics that are most suitable for informing stunting prevention policies	A cross-sectional study	The findings revealed that mothers who completed senior high school, junior high school, primary school or lower were more likely to have stunted children compared to mothers with a college education.
The epidemiology of undernutrition and its determinants in children under five years in Ghana (Boah <i>et al.</i> , 2019)	PubMed	Ghana	To assess the prevalence of wasting, underweight, and stunting, as well as investigate the factors influencing them	A cross-sectional study	A maternal body mass index in the normal or overweight/obese category, along with high maternal autonomy and a middle-class wealth index, were linked to a reduced likelihood of undernutrition in children. Conversely, factors associated with an increased likelihood of child undernutrition included low birth weight (<2.5 kg), a minimum dietary diversity score (MDDS), and being a higher (4th) birth order child.
Feeding patterns, mother-child dietary diversity and prevalence of malnutrition among under five children in Lebanon: A cross-sectional study based on retrospective recall (Abi Khalil	PubMed	Lebanon	To retrospectively analyze the feeding patterns of toddlers and the dietary diversity of mothers and children.	A cross-sectional study	The results showed a strong correlation between the dietary diversity of children and their mothers. The regression analysis revealed that a high maternal DDS was associated with approximately two times increase in the children's DD. When



*et al.*, 2022)

the household belonged to the highest income bracket, children's DD increased by around 12 times.

Influence of maternal exposure to mass media on growth stunting among children under five: mediation analysis through the Water, Sanitation, and Hygiene Program (Huo <i>et al.</i> , 2022)	PubMed	Congo	To investigate the relationship between maternal exposure to mass media and stunting in children	A cross-sectional study	Mothers' exposure to the internet and television in the Democratic Republic of Congo has been shown to significantly reduce the risk of stunting in children by 5% and 10%, respectively.
Maternal employment and child nutritional status in Uganda (Nankinga <i>et al.</i> , 2019)	PubMed	Uganda	To investigate the correlation between maternal employment and the nutritional status of toddler	A cross-sectional study	The findings indicated that children whose mothers had secondary education had a reduced likelihood of experiencing stunting and being underweight when compared to children whose mothers had no formal education.
Factors associated with stunted growth in children under five years in Antananarivo, Madagascar and Bangui, Central African Republic (Vonaesch <i>et al.</i> , 2021)	PubMed	Central African Republic	To assess and compare the factors linked to stunting in two relatively unexplored urban areas within sub-Saharan Africa	A case control study	In both locations, having a formal maternal education reduced the risk of stunting. Conversely, short maternal stature and having a household head who was different from the parents were associated with an increased risk of stunting. In Antananarivo, continuing breastfeeding was linked to a reduced risk of stunting.

### 1. Maternal Employment

Several studies have explored the impact of maternal employment on child care and child nutrition. Certain studies have proposed that maternal employment might decrease the available time for child care as a result of work-related demands (Ohonba *et al.*, 2019). Nevertheless, alternative research suggests that the amount of time spent at work does not necessarily lead to a reduction in the time allocated to physical and interactive child care. In fact, earnings from employment can have a positive impact on child nutrition and overall health (Brauner-Otto *et al.*, 2019).

Maternal employment has implications for both child and maternal health, with key pathways including income levels and childcare practices.

Income generated and managed by women plays a crucial role in contributing to the finances allocated for child and household nutrition and healthcare. Additionally, the financial status of mothers has been identified as a risk factor associated with underweight in children under the age of five. Studies have shown that children whose mothers have no income are over three times as likely to be underweight compared to

those whose mothers receive a monthly income (Sigdel *et al.*, 2020).

## 2. Educational Status of Mothers

Importantly, the findings revealed that the likelihood of stunting was lower among children whose mothers had received primary, secondary, or higher levels of education than children whose mothers had not received any formal education (OR 0.78, 95% CI 0.62-0.97 and OR 0.64, 95% CI 0.47-0.88, respectively) (Nankinga *et al.*, 2019). The results illustrated that children born to more educated women tend to exhibit better nutritional outcomes than those whose mothers do not have formal education. This can be partially attributed to the enhanced autonomy, health knowledge, and empowerment typically associated with educated women. Educated women often have better access to nutritional information, which influences their feeding practices, dietary choices, and healthcare-seeking behavior. This knowledge leads to healthier food selections, including increased consumption of vegetables, fruits, and legumes. Furthermore, education encourages the utilization of vital healthcare services, providing benefits to both children and their mothers (Yabancı *et al.*, 2014).

Furthermore, education can delay the age at which women have their first child, particularly among those who attain secondary education (Bongaarts *et al.*, 2017). This delay in childbearing is likely to result in better child health outcomes. Higher levels of education not only empower mothers to offer improved nutrition to their children but also enhance their understanding of the benefits and drawbacks associated with enhanced nutrition (Tahangnacca *et al.*, 2020a).

## 3. Maternal Body Mass Index

Maternal BMI has a significant impact on a child's nutritional status both during the pre- and post-pregnancy phases. When a woman is undernourished during pregnancy, it can impact the fetus, categorized as having a thin BMI, and is at a heightened risk of experiencing adverse growth shocks, which can lead to intrauterine growth restrictions (Black *et al.*, 2013). Additionally, undernourished women encounter various challenges,

including challenges with breastfeeding, decreased cognitive abilities, and reduced energy levels, all of which can hinder their capacity to provide adequate care for their children. The link between maternal undernutrition and unfavorable nutritional outcomes has been well-documented in Rwanda (Habyarimana, 2016).

## 4. Mother-Child Dietary Diversity

According to the WHO and UNICEF, Dietary Diversity (DD) measures the range of foods or food groups consumed within a defined time frame, reflecting a household's ability to access a variety of foods. DD acts as a surrogate indicator for assessing the adequacy of nutrients in the diets of mothers and children, especially concerning micronutrient intake, which is a crucial aspect of diet quality. For women, achieving the minimum criteria for a healthy diet involves consuming five or more food groups in the preceding 24 hours, while children should consume four or more food groups (Bosha *et al.*, 2019). Moreover, for children aged 6-59 months, there was a significant lack of dietary diversity among mothers and children, accompanied by a high prevalence of both stunted and overweight children.

A previous study investigated the agreement between child dietary diversity and maternal and the factors influencing this agreement. The findings found that the proportion of discordance was low ( $p = 0.03$ ), indicating that when mothers consumed a greater variety of food groups, their children were more likely to meet their dietary diversity requirements, and vice versa. With an increase in the dietary diversity of mothers, there was a notable rise in the percentage of children (aged 0-59 months) who met this criterion (Abi Khalil *et al.*, 2022).

## 5. Maternal Exposure to Mass Media

In the Democratic Republic of Congo, prior research found that mothers' exposure to television and the internet could notably decrease the risk of their children experiencing stunting. Maternal exposure to mass media is an indirect determinant of stunting. In low- and middle-income countries in Asia, like Bangladesh and India; children were at a higher risk of severe stunting if their mothers had never been exposed to mass media (Rahman, 2016). One plausible

explanation for this phenomenon is that mothers can access valuable information about nutrition and childcare through mass media. Mass media may serve as a primary avenue for health intervention and education.

Literature indicated that people's behavior is directly impacted by mass media, and this influence intensifies with advancements in mass media (Zarocostas, 2020). Published works have explored the potential of mass media to disseminate health knowledge and encourage corresponding behaviors (Naugle & Hornik, 2014). Mothers possessing enhanced maternal knowledge are better equipped to grasp the advantages and disadvantages of improved nutrition, adopt appropriate breastfeeding practices, and ensure equitable access to nutritious foods (Tahangnacca *et al.*, 2020b). These factors are crucial in mitigating stunting levels, as identified in previous studies (Pillai & Maleku, 2019).

## 6. Maternal Age

Maternal factors, including age, have been associated with child health outcomes (Annim *et al.*, 2015; Nigatu *et al.*, 2018). A study conducted in India specifically emphasized that the age at which a mother first marries and her age at delivery are influential factors in child stunting. It was found that getting married at a younger age among mothers was correlated with an increased risk of having severely stunted children (Sethi *et al.*, 2018). Studies addressing stunting have shown that children born to older mothers (age 35-49) have lower odds of stunting compared to children born to younger mothers (age 15-24) (OR 0.69, 95% CI 0.56-0.86). Conversely, older mothers tend to have healthier children than their younger counterparts (Nankinga *et al.*, 2019). Children born to older women are less likely to experience stunting compared to children born to younger mothers.

Early pregnancy can negatively affect fetal development, as the growing fetus demands substantial nutrients, necessitating the mother's own nutritional well-being. Additionally, young mothers often lack access to antenatal care services and may not consult with healthcare professionals because of their limited knowledge and lower levels of education. Consequently, young mothers

face a higher risk of giving birth to babies with low birth weight. Furthermore, the psychological immaturity of young mothers can impact their child's upbringing (Kusrini *et al.*, 2021; Laksono & Megatsari, 2020). Moreover, young mothers may struggle to provide exclusive breastfeeding due to low milk supply, which can result in child stunting (Kusrini *et al.*, 2020).

## CONCLUSION

This review has provided an overview of maternal factors contributing to the prevalence of stunting. These factors include maternal employment, the educational status of mothers, maternal body mass index, the diversity of the mother-child diet, maternal exposure to mass media, and maternal age. The occurrence of this condition is influenced by socioeconomic status, as well as beliefs. A thorough understanding and a comprehensive approach are essential in evaluating maternal factors as determinants of stunting, given that stunting is inherently multifactorial and interrelated. This review has also summarized the challenges faced by mothers dealing with stunted children and their role in addressing this issue. Illiterate mothers who lack formal education, or are unemployed often encounter difficulties in providing adequate nutrition for their children. Undernourished mothers with low BMI potentially impact their child's nutritional status.

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## *Identification of Symbols in Indonesian Traditional Fairy Tales as a Health Promotion for the Prevention of Non-Communicable Diseases Diabetes Mellitus and Hypertension*

**Chelomitha Malindra Purnamayanti<sup>✉1)</sup>, Farhaiza Ramadhania<sup>1)</sup>, Rahelia Demak Siahaan<sup>1)</sup>, Rina Pertiwi<sup>1)</sup>, Yunika Tri Yulianti<sup>1)</sup>, Susy Katikana Sebayang<sup>2)</sup>**

<sup>1</sup> Public Health Study Program, Faculty of Health, Medicine, and Life Sciences, Universitas Airlangga

<sup>2</sup> Department of Health, Medicine, and Life Sciences, Faculty of Health, Medicine, and Life Sciences, Universitas Airlangga

✉Email: [chelomitha.malin.purnamayanti-2019@fkm.unair.ac.id](mailto:chelomitha.malin.purnamayanti-2019@fkm.unair.ac.id)

### ABSTRACT

**Background:** Non-communicable diseases are one of the groups of diseases with the highest causes of death in the world. This was shown by data from WHO that in 2023, around 74 percent of the causes of death in the world are non-communicable diseases that kill 41 million people per year. This is due to the lack of public understanding of the influence of risk factors for non-communicable diseases on the incidence of non-communicable diseases and complications that can be caused by non-communicable diseases. Therefore, the use of traditional Indonesian fairy tale symbols in health promotion media for the prevention of non-communicable diseases can be used as an alternative solution to overcoming this challenge. **Aims:** This study aims to identify, examine, and synthesize symbols in traditional Indonesian fairy tales that have the potential to they can be developed to improve health messages to prevent non-communicable diseases, especially diabetes mellitus and hypertension. **Method:** The method used in this study was a Literature Review with a narrative review study design. The steps taken are to gather all the fairy tales with inclusion criteria are fairy tales that have symbols about non-communicable diseases and exclusion criteria are incomplete fairy tales, and then do the screening, identifying symbols, analyzing symbols, and selecting potential symbols. **Results:** Of the 21 relevant titles of Indonesian traditional fairy tales and legends, 85 symbols were identified. From the analysis of the meaning of each symbol, 16 symbols were found that have the potential to be used as promotions for the prevention of non-communicable diseases, diabetes mellitus, and hypertension, with 10 different symbol categories spread across 7 provinces in Indonesia. **Conclusion:** there are many symbols from traditional Indonesian fairy tales that have the potential to they can be used to increase the effectiveness of delivering health messages as an effort to promote the prevention of non-communicable diseases diabetes mellitus and hypertension. These symbols can be made into health messages nationally and can be flexibly used to create health messages in each region.

**Keywords:** Non-Communicable Disease, Prevention, Symbol

### INTRODUCTION

Non-communicable diseases (NCDs) are one of the groups of diseases with the highest causes of death in the world. In 2023, WHO (World Health Organization) data shows that non-communicable diseases are the cause of death in the world around 74% or can kill as many as 41 million people per year (WHO, 2023). Non-communicable diseases are not diseases that can be passed from person

to person which in their course take a long time and slowly develop into more severe and show symptoms. The incidence of non-communicable diseases is increasing day by day. There is a tendency to increase the prevalence of non-communicable diseases such as diabetes, hypertension, stroke, and joint disease/rheumatism/gout as shown by Riskesdas data in 2007, 2013, and 2018.

Along with the times, there are changes in lifestyle, the increasing

population, and increasing life expectancy, these are closely related to the increasing incidence of non-communicable diseases. A diet that is high in calories, low in fiber, high in salt, high in sugar, and high in fat is then followed by a sedentary lifestyle, coupled with a movement pattern that lacks physical activity, stress, and lack of rest also triggers hypertension and diabetes mellitus among the people of Indonesia (Purwanto, 2022). Thus, efforts to control and prevent non-communicable diseases need to change behavior through innovation.

Nationally, the results of Riskesdas 2018 show the proportion of the population with hypertension is 34.11%. The rate of hypertension in women (36.85%) is higher than in men (31.34%). The prevalence of hypertension cases is slightly higher in urban areas (34.43%) than in rural areas (33.72%). The prevalence of hypertension increases with age (Ministry of Health of the Republic of Indonesia, 2019). Meanwhile, the prevalence of diabetes in Indonesia based on a doctor's diagnosis over the age of 15 years has increased from 2013, from 1.5% to 2.0% in 2018. However, the prevalence of diabetes according to the results of blood sugar examinations increased from 6.9% in 2013 to 8.5% in 2018, but only 25% of people with diabetes know that they have diabetes (Ministry of Health RI).

CERDIK is a health promotion program to familiarize clean and healthy living behavior as an effort to control risk factors for non-communicable diseases. SMART behavior includes regular health checks, get rid of cigarette smoke, exercising frequently, balanced healthy diet, adequate rest, and manage stress. Routine health checks are an examination of risk factors for non-communicable diseases that can be carried out through the Integrated Development Post (Posbindu) for non-communicable diseases in villages/kelurahan and Puskesmas. While eliminating cigarette smoke is done through the establishment of smoke-free areas in schools, this is an effort to reduce the prevalence of smokers 18 years. Efforts to control non-communicable diseases will not succeed if they are only carried out by the Ministry of Health without the support of all levels, such as government, the private sector, professional organizations,

community organizations, and even all levels of society (Ministry of Health of the Republic of Indonesia, 2019).

However, the efforts that have been made to prevent and control the risk factors for this non-communicable disease have unfortunately not been optimal. This can be seen from the lack of public understanding of the risk factors for non-communicable diseases to the incidence of non-communicable diseases and the possible complications that non-communicable diseases can cause (Kurniasih, 2020). In general, they believe that non-communicable diseases are caused by genetic factors, the disease of parents, or the disease of the rich. To increase public understanding of risk factors, prevention efforts and possible complications caused by non-communicable diseases can be carried out by delivering health messages through various health promotion media.

Based on the results of the study, the limitations and lack of media that convey health information in the community such as posters or other media are some of the challenges and obstacles in controlling non-communicable diseases in semi-urban areas (Reskiaddin *et al.*, 2020). The national health message related to the prevention of Non-Communicable Diseases (NCD) can be strengthened and more effective by using traditional Indonesian fairy tale symbols that have taken root in the community. Traditional stories, legends, and fairy tales are told and passed down verbally to mold a child's character. The values in the stories tend to shape the mindset and behavior as well as the growth of the child's personality. Traditional fairy tales are created with various purposes, including recording stories, sagas, or important events in the community that have occurred, character building for the inheriting generation, and instilling moral and cultural values, and ethical knowledge in the community (Nugraha, 2022). Children then carry the moral messages contained in fairy tales into adulthood and then retell them to their children. It is not uncommon for fairy tales and legends to also involve diseases, one of which is non-communicable diseases. Storytelling method is a form of activity that can be carried out when providing learning to children. Pangestuti (2021) states that storytelling is an



effective method so that children do not become bored, and can even make learning very enjoyable for children. Handayani (2023) mentioned that children can be influenced very easily through stories or fairy tales.

Humans are also known as "homo symbolism", which means that humans are biological creatures who often adapt and communicate with their physical and social environment by using symbols found in their lives (Hendro, 2020). A study that discusses the symbols in the folklore "Tana Lawu" found the symbol "Lightning". In the passage "they agreed and promised to match their children when they grew up, at that time lightning thundered as if the sky would fall when they promised". The results of this study indicate that the code of symbols in folklore as a text marker can bring the reader into the world of symbols, signs, and symbols and their meanings.

This can be implemented in health promotion where the symbols contained in folklore can inform the public about health, especially non-communicable diseases. But until now there has been no study about this. Therefore, this research gap can be used to analyze symbols in fairy tales that can be used in health promotion against non-communicable diseases such as diabetes mellitus and hypertension.

From the description of the background, this study aims to a) identify symbols contained in traditional Indonesian fairy tales related to health promotion of non-communicable diseases; b) assess the context and meaning of symbols in traditional fairy tales circulating in the community to improve health messages for preventing non-communicable diseases and c) synthesizing potential symbols that can be developed to improve health messages as an effort to prevent non-communicable diseases, especially diabetes mellitus and hypertension. This study will produce a list of symbols of potential and deeply rooted in culture that can be used by governments, health professionals, and the general public to design strong and entrenched health messages to communities at risk for diabetes mellitus and hypertension.

## METHODS

The method applied in identifying symbols found in traditional Indonesian fairy tales is the Literature Review method with narrative review study design. Stage the first one conducted by gathering all fairytales in Indonesia from the Internet and library area. The symbol was searched online with Google machine to find literature using keywords such as "Traditional Legend", "Traditional Tale", "Traditional Story" and "Folk Story" that appear on the first 10 pages, then the search results of each keyword in the data and collected. The inclusion criteria are the Fairy tale symbolizing a non-communicable disease, and the exclusion criteria is an incomplete fairy tale. Fairy tale quest is also conducted offline in the library area on rack book fairytale. After fairy tales are collected, the next stage is to do a screening to exclude duplication of fairy tales, that come from abroad, and fairy tales that have nothing to do with disease. All fairy tales that meet the inclusion criteria are then re-read to find the symbols contained in the tales. Furthermore, the symbols found are re-examined and consolidated to find differences with the results of reading and identifying the previous symbols, so that a complete list of symbols is obtained. From the symbols that have been collected then an analysis of the meaning of each symbol is carried out. From all the meaningful symbols, then the selection of which symbols have the potential to be used as an effort to prevent non-communicable diseases, diabetes mellitus, and hypertension.

RESULTS AND DISCUSSION

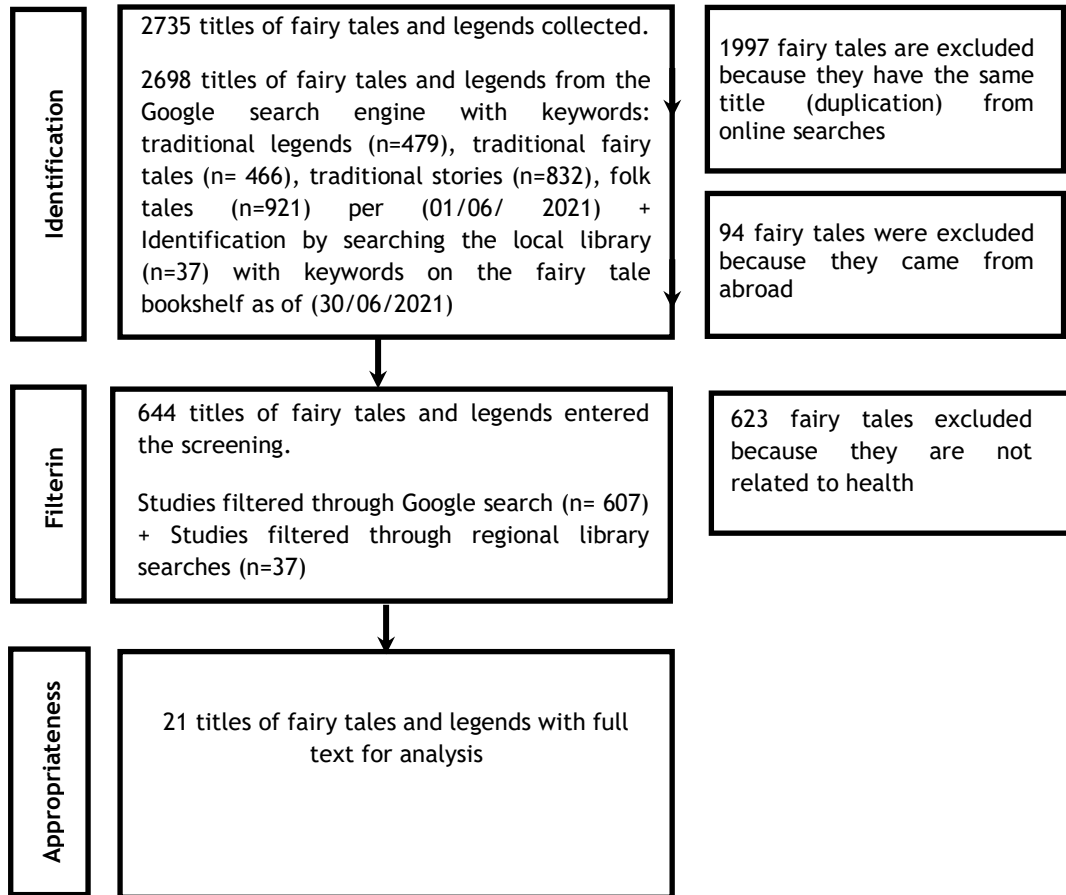


Figure 1. Search Results

A search through the Google search engine on June 1, 2021, resulted in 479, 466, 823, and 921 titles of fairy tales and legends with a total of 2698. A search in the regional library on June 30, 2021, yielded 37 titles related to fairy tales, and no fairy tale titles were found come from abroad or the title of the same fairy tale. Thus, 2735 titles were identified. From a total of 2735 fairy tale titles identified, it turns out that 94 fairy tale titles originated from abroad and 1997

fairy tales with the same title (duplication) from online searches and must be removed. There are 644 fairy tale titles, of which 623 fairy tale titles are not relevant to health, so they must be removed. There are several symbols in fairy tales related to non-communicable diseases such as diabetes mellitus and hypertension. The symbols are categorized into groups based on the meaning of each symbol.

Table 1. List of Potential Symbols that can be used for Efforts to Promote Prevention of Non-Communicable Diseases Diabetes Mellitus and Hypertension

Symbol Category	Symbol	Meaning of Potential Symbols for Prevention of Non-Communicable Diseases Diabetes Mellitus and Hypertension
Disease prevention	Healthy food	Anything that enters the body will greatly affect the system in the body and determine health conditions. By eating healthy foods and planning the right diet, it is important to maintain a healthy body and prevent non-communicable diseases, such as diabetes and hypertension.
	Checking food	Checking all food intake that will be consumed is important to prevent non-communicable diseases. Do not overconsume sugar, salt, and fat every day. Check for each intake of

		sugar, salt, and fat to be consumed, and make sure it does not exceed the recommended limit. We recommend increasing the consumption of fruits and vegetables.
Disease	Wounds that cause odor	One of the advanced health problems experienced by people with Diabetes Mellitus is wounds that are difficult to heal and some of these wounds cause an unpleasant odor. High blood sugar levels make it difficult for the body to fight bacteria. As a result, the wound does not heal and causes an unpleasant odor
	Paralyzed	Patients with Non-Communicable Diseases need to have determination and hope for recovery. Because the strongest healing comes from within.
	Teluh disease, trance, wounds	Apart from having a family medical history that can cause non-communicable diseases, many other factors predispose a person to non-communicable diseases, which are none other than an unhealthy lifestyle, such as smoking, poor eating habits, minimal physical activity, and consumption of beverages. alcoholic.
Dead cause	Arrogant	The arrogant nature of people who always feel they are healthy and are reluctant to have health checks can cause the disease to worsen and cause death.
Causes of disease	Old beggar	The old beggar is symbolized as someone who can give illness (curse) to others when someone does not do something good which in this case is to prevent illness.
	Self arrogance	The arrogant nature of people who always feel they are healthy can be the cause of disease, where people are reluctant to carry out health checks if there are no serious complaints experienced. In fact, by conducting routine health checks, apart from being able to detect health problems early, it can also prevent disease complications.
Healer	Hereditary medicine	In addition to medical treatment as an effort to get treatment and healing, the treatment process can be carried out with traditional medicine that is carried out from generation to generation. Medical treatment and traditional medicine are considered as all effort that could conducted to increase degrees of health Public so that the presence of traditional healers and doctors can go hand in hand in society regardless of which one party is superior to the other.
	3 drops of blood	If a person has a non-communicable disease, it not only causes illness, physical disability, to death but also often results in financial burdens for the family. The sacrifice that the family makes in this regard is something very extraordinary.
Struggle	Long journey to get medicine	The healing process takes a long time because the process leads to Healing. Trying to recover quickly is a form of struggle to achieve that healing.
	You have to swim to the middle of the river to get bangkawali flowers	The healing process takes a long time because the process leads to Healing. Trying to recover quickly is a form of struggle to achieve that healing.
Good trait	Love each other	If there are relatives who are suffering from non-communicable diseases, we should be able to love each other by providing moral support in the form of enthusiasm and attention as well as sending food so that the sufferer can recover quickly.
Bad trait	Arrogance	Arrogance is a bad trait that exists in people who always feel they are healthy. This trait makes people feel that they are fine and reluctant to get a health check-up.
Where to find medicine	coral cave	Non-communicable diseases are chronic diseases with a long duration with a generally slow healing process or clinical condition control. However, a person with a non-communicable disease can be able to obtain a better health condition, by consistently carrying out a better lifestyle and routinely carrying out health checks, the control and healing

process is not impossible.

Of the 21 titles of fairy tales and legends, 85 symbols were identified. From the analysis of the meaning of each symbol, 16 symbols were found that have the potential to be used as promotions for the prevention of non-communicable

diseases of diabetes mellitus and hypertension with 15 different symbol categories. Of the 15 symbols, the symbol of pride is the one that appears the most, which is 3 times. In addition, each symbol only appears 1 time.

**Table 2.** List of Regional Origins that Have Potential Symbols That Can be Used for Promotion of Non-Communicable Disease Prevention Efforts Diabetes Mellitus and Hypertension

Fairy Tale Origin	Fairy Tale Title	Symbol category	Found Symbol
Jambi	The origin of the name of the village of Kemingking	Causes of disease	old beggar
			Self arrogance
Central Java	Coral Bolong	Where to find medicine	coral cave
	The Legend of the Origin of Mosquitoes	Disease	Paralyzed
		Dead cause	Proud
		Healer	3 drops of blood
Swamp Dizziness	Disease	Wounds that cause odor	
East Java	Jaka Budug and Putri Kemuning	Disease prevention	Healthy food Checking food
East Kalimantan	Mr. Century of Traditional Medicine	Healer	Hereditary medicine
Nanggroe Aceh Darussalam	Banta Seudang	Struggle	Long journey to get medicine You have to swim to the middle of the river to get bangkawali flowers
		Bad trait	Arrogance
South Sulawesi	Lamadukelleng	Disease	Teluh disease, trance, wounds
(Fable)	Squirrels love each other with hard fish	Good trait	Love each other

Table 2 shows that 7 provinces have potential symbols that can be used as an effort to promote the prevention of non-communicable diseases diabetes mellitus and hypertension. The symbol of arrogance is the symbol that most often appears 3 times, but all three come from different regions and categories. The symbol of arrogance in the disease-causing category comes from Jambi province, pride in the death-causing category comes from Central Java province, and pride in the bad character category comes from the province of Nanggroe Aceh Darussalam. These sixteen potential symbols are scattered in the western part of Indonesia and eastern Indonesia with 4 symbols. Meanwhile, potential symbols originating from the eastern part of Indonesia are only found in the province of South Sulawesi.

Previously, there had never been other research that examined the application of symbols from traditional Indonesian fairy tales that were applied

to deliver health messages, especially to promote the prevention of non-communicable diseases diabetes mellitus, and hypertension. When in fact these symbols are very capable and potential to develop into a way to deliver health messages to the public. Because symbols are part of reality that functions as communication and becomes the basis for mutual understanding to be understood. The highest value of a symbol lies in the substance with which the idea is presented. This means that the use of symbols in delivering a health message will be easier to understand and accept with a mutually agreed meaning.

Several studies analyze the symbols found in many fairy tales such as in the story "Datoe Lancang-Putri Kayan", where there is a crow symbol which is interpreted as a sign that there is a war going on, a knight's clothing symbol which indicates that someone who wears it is a warrior who is ready to fight, a chopstick symbol which is interpreted as a typical

Dayak tribe weapon (Hakim, 2019). In addition, in Dayak Kanayatn folklore in the Bajare dialect, the symbols found are grouped into 3 categories, namely symbols that reflect human relationships with God (Jubata), human relationships with humans, and human relationships with nature (Sinto *et al.*, 2019). Whereas in Muna Folklore, the symbol found is the diamond symbol which is symbolized as a provision for life (Kasriani, 2016). Other stories such as Sampuren Sindates contain the symbol *sige grahgah* (giant crab) whose appearance is marked by the change from the dry season to the rainy season (Sinamo, 2021).

From the research above, it can be seen that there are many symbols found in traditional Indonesian fairy tales. However, no one has studied symbols that have the potential to be used to increase the effectiveness of delivering health messages to promote the prevention of non-communicable diseases of diabetes mellitus and hypertension, so this study will focus on things that have not been studied. Apart from being able to serve as a national health message, potential symbols can also be applied to increase the effectiveness of health messages in promoting the prevention of diabetes mellitus and hypertension non-communicable diseases found in this study, and can be flexibly used to create health messages in each region. The use of symbols in fairy tales in health promotion can also be an effective tool used to improve community literacy skills narrated through social and cultural values in fairy tales (Rahman, 2022).

This study produces potential symbols that have close ties to community culture that can be used by local governments and related parties to be applied to increase the effectiveness of health messages in each potential symbol origin area. The application of symbols as an effort to increase the effectiveness of health messages in health promotion media can be disseminated directly to the public through health facilities and other public facilities/places. These potential symbols can be used as a basis for designing strong health messages including awareness to regulate diet, pay attention to nutritional intake consumed,

However, this study still has a weakness, namely that it cannot be directly applied in the field as a health

message carrier, so further studies are needed to see the effectiveness of delivering health messages using symbols in traditional Indonesian fairy tales. This study is needed to test whether there are changes in knowledge, attitudes, and potential changes in people's behavior towards health messages received before and after observing the media with health messages made using symbols in traditional Indonesian fairy tales.

## CONCLUSION

Based on the above discussion, it can be concluded that there are many symbols from traditional Indonesian fairy tales that have the potential so that they can be used to increase the effectiveness of delivering health messages as an effort to promote the prevention of non-communicable diseases diabetes mellitus, and hypertension. Of the 21 relevant titles of traditional Indonesian fairy tales and legends, 85 symbols were identified. The analysis of the meaning of each symbol found 15 symbols that have the potential to be used as a promotion for the prevention of non-communicable diseases diabetes mellitus and hypertension with 10 different symbol categories spread across 7 provinces in Indonesia. These symbols can be made into health messages nationally and can be flexibly used to create health messages in each region.

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## A Scoping Review: Unveiling the Benefits of ACF on Tuberculosis Control

Saroh✉<sup>1</sup>, Bagoes Widjanarko<sup>1</sup>, Zahroh Shaluhiah<sup>1</sup>

<sup>1</sup> Diponegoro University, Semarang, Central Java, Indonesia  
✉Email: saroh@students.undip.ac.id

### ABSTRACT

**Background:** Tuberculosis (TB) ranks among the top ten infectious diseases and causes of death worldwide. The implementation of active case-finding TV is crucial in achieving the objectives of the World Health Organization's End TB strategy. **Aims:** This review aims to determine the role of active case finding in TB control in the community with high-burden TB. **Methods:** This review used databases Pubmed, Research Gate, Ebscohost, Science Direct, and Scopus. The search for articles used the main keywords community, active case finding, AND tuberculosis. The articles were selected in English, with a five-year time interval between 2019 to 2023. The type of article subject area included medicine, health, health care, environmental science, and social science. The documents were from journals and articles. The text availability was free full text. **Results:** This review was done on 3.561 articles screened and analyzed out of 6. The articles were originated from Cambodia, China, India, and Africa. This scoping review describes the effect of ACF in the community on TB control (cohorts and cross-sectional) in high-burden TB. Results from 5 articles including 6 studies indicated that that ACF in the community was significantly associated with TB control. One of the studies revealed that studies in which ACF reported a non-significant association. **Conclusion:** This review summarized that ACF provides greater benefits compared to the PCF strategy, especially in high-risk populations and those with limited access to healthcare facilities. It promotes prompt diagnosis and treatment, improves treatment outcomes, minimizes health complications, and reduces the social and economic impact of TB.

**Keywords:** Active Case Finding, Community, Tuberculosis

### INTRODUCTION

Tuberculosis (TB) is an infectious disease that can be transmitted and is a significant contributor to poor health, ranking among the top causes of global mortality. Approximately 1.5 million people died due to tuberculosis (WHO, 2022). Before the COVID-19 pandemic, TB held the distinction of being the primary cause of death attributed to a single infectious agent, surpassing even HIV/AIDS in its impact. TB is brought about by the *Mycobacterium tuberculosis*, which spreads when individuals afflicted with TB release bacteria into the air, such as through coughing. While the illness commonly targets the lungs (known as pulmonary TB), it can also impact other locations (WHO, 2022). The symptoms of TB depend on the location of the lesions. They may manifest clinically as follows: persistent cough for more than two weeks, productive cough, coughing up

blood-tinged sputum, potential chest pain, and shortness of breath. Other accompanying symptoms include malaise, weight loss, decreased appetite, chills, fever, and night sweats. Several groups of people are at a higher risk of developing TB. These include individuals with HIV and other immunocompromised conditions, those on long-term immunosuppressive medication, smokers, heavy alcohol consumers, children under the age of 5 and the elderly, individuals in close contact with someone with actively infectious TB, those in settings with a high risk of TB infection (e.g., correctional facilities, long-term care facilities, and healthcare workers (Kemenkes RI, 2020).

Cases that have been un-identified and un-reach or cases that are detected-un-notified by the program, become a source of tuberculosis transmission in the community (Kemenkes RI, 2019). It is estimated that a quarter of the global

population has been exposed to TB, but some people avoid testing, while others recover from the infection. In 2022, only 40% of contacts under the age of 5 underwent household contact investigation, and for those above 5 years old, it was only 3% (WHO, 2022).

Traditionally, TB cases are reported and passively notified when people with TB present themselves to a health facility. The tuberculosis prevention program has transformed its case detection strategy, not only passively through promotional activities but also intensive and active case finding (ACF) based on families and communities. This approach—focuses on delivering quality services under the established standards (Kemenkes RI, 2019). The implementation of active case finding TV is crucial in achieving the objectives of the World Health Organization's End TB strategy in high-burden TB (Sumner *et al.*, 2019)

Several studies have provided evidence of the impact that ACF can have on controlling TB. ACF is often associated with the systematic screening of active TB in populations at risk, typically involving screening activities conducted outside of healthcare facilities. However, in this compilation of evidence, we considered interventions commonly carried out beyond health facilities, such as screening populations in the community or specific settings (World Health Organization, 2021).

More and more studies have assessed ACF. However, the effect of ACF on TB control in communities is unclear. Recent studies have focused more on the antecedents, components and influencing factors for ACF policy development and implementation. Therefore, further studies to examine the effect of ACF in the community for TB control are needed to allow a robust interpretation of the results (Biermann *et al.*, 2019).

## METHODS

This review was conducted and designed in September 2023. We conducted a scoping review based on the following research question: What is the effect of active case finding in the

community for tuberculosis control? The relevant articles were obtained from reputable journal databases including Pubmed, Research Gate, Ebscohost, Science Direct, and Scopus. The search for articles used the main keywords: community AND active case finding AND tuberculosis. The articles were in English, with a selected time interval of five years between 2019 to 2023. Type article subject area included medicine, health, health care, environmental science, and social science. The kind of documents were journals and articles. The text availability was free full text. We included any type of research from countries with high burden TB Cambodia, China, India, and Africa. There was a PRISMA flow diagram to guide reporting.

## RESULTS AND DISCUSSION

Searches in Pubmed, Research Gate, Ebscohost, Science Direct, and Scopus yielded 3562 citations (excluding duplicates,  $n= 2.447$ ). Of these publications, 217 were excluded after the initial screening of titles and abstract information. A total of 6 articles were selected for this study after the full text was reviewed (the reasons were generally: 187 articles mismatched with inclusion criteria and 24 articles did not focus on active case finding. The detailed process of study research is shown in Figure 1.

Of the six articles for scoping review, one is cohort studies, four cross-sectional study and one cross-sectional and descriptive survey. Three studies were conducted on the Afrika population, two studies on the Indian population, and one study on the Chinese population. The majority of studies used structured questionnaires, CXR, GeneXpert test, and sputum smear to diagnose TB. Screening visits were conducted by trained community health workers, trained medical undergraduate students, community volunteers, and the public health team. We identified the benefits of ACF in the community. The characteristics of the selected studies are shown in Table 1.



Articles identified through database searches (n= 3561). Pubmed (n=221), Research Gate (n=74), Ebscohost (n=918), Science Direct (n=2084) dan Scopus (n=264),



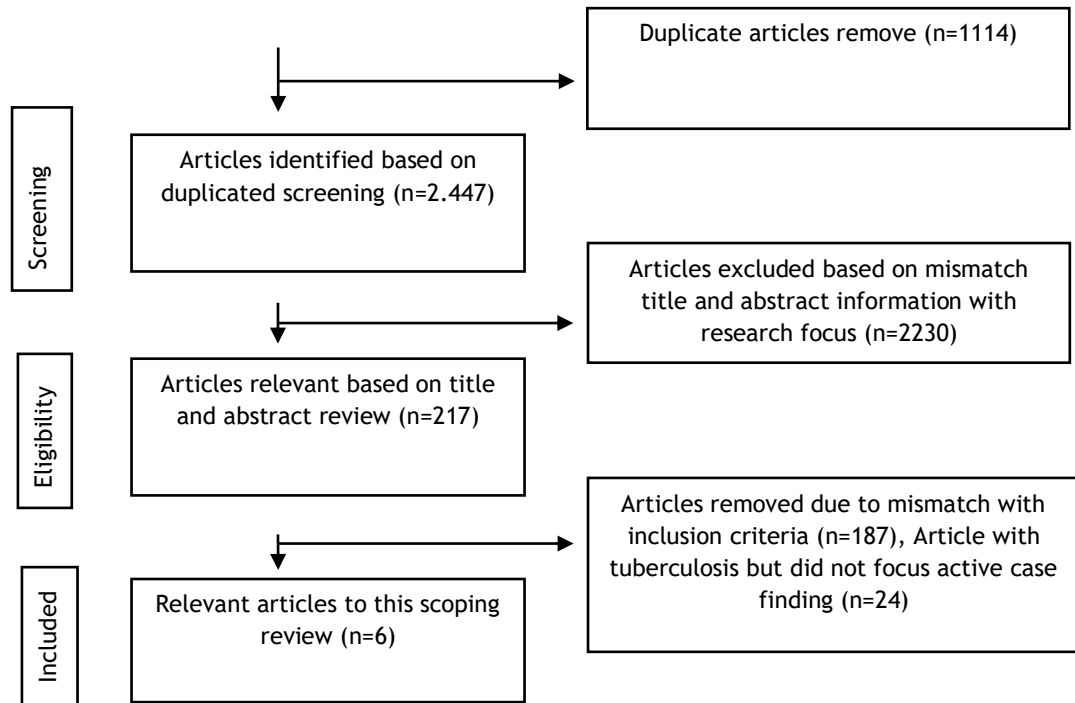


Figure 1. PRISMA Flow diagram for reporting scoping review

Table 1. Characteristics of the selected studies

References	Study Design	Sampling	Result
Role of Community- Based Case Finding in Screening Tuberculosis in Yunnan Province China (Chen et al., 2019)	Cohort study between 2013-2015	Multi stage cluster sampling and randomly sampled 10 counties in 10 provinces throughout the nation based on population size and TB prevalence level.	In this study, screening visits were conducted by Trained Community Health Workers (CHW) using standardized questionnaires, chest X- Ray (CXR) and sputum smear result to diagnosed. The total number of individuals visited was 97.521. A total of 12.007 individuals exhibited symptoms and/or belonged to high-risk groups. Among them, 11.991 had abnormal CXR results and underwent sputum examination. The result 66 individuals were diagnosed with active TB. The incidence of TB is 18.7/100.000 in the general population, and the incidence of TB 416.4/100.000. From 2013- 2015 high risk population diagnosed with TB included: elderly, people with diabetes mellitus, people with HIV/AIDS, close contact with index cases, and people with a history of a previous TB case. The implementation of ACF is not effective in the general population. ACF proves beneficial for high-risk groups, requiring fewer screenings to identify a TB case compared to Passive Case Finding (PCF). Additionally, the ACF strategy led to a

<p>Active Case Finding of Tuberculosis Among Household Contact of Newly Diagnosed Tuberculosis Patients: A Community-Based Study from Southern Haryana (Chawla <i>et al.</i>, 2020)</p>	<p>A community-based cross-sectional</p>	<p>The study incorporated 55 index cases along with 356 household contacts. Individuals who did not meet the specified case definitions or were unwilling to provide written consent were excluded from the study. Every person involved was treated with courtesy, and the confidentiality of their information was upheld.</p>	<p>reduction in patient delay. The researcher carried out home visits and interacted with the relevant index case and their household contact to establish a connection. Following an explanation of the study's purpose and objective, along with addressing any questions they might have had, written consent was acquired from both the index case and household contacts (with parental/guardian consent when the contacts were minors) before they participated in the study. Information was gathered through a semi-structured questionnaire. A total of 55 index cases and 356 household contacts underwent screening. Among them, 43 showed positive symptoms of TB, and 7 had a positive result in the sputum smear test. Screening household contacts for ACF is a viable and effective approach that has the potential to lead to earlier diagnosis and treatment of active TB. This, in turn, can reduce the severity of the disease and decrease its transmission. Additionally, it may play a role in enhancing treatment outcomes, minimizing health complications, and mitigating the social and economic impact of TB.</p>
<p>Community-Based Active Tuberculosis Case Finding in Pastoralist Communities of North Eastern Uganda (Isaac <i>et al.</i>, 2019)</p>	<p>A community-based cross-sectional</p>	<p>In this study, 385 adults were enrolled. Participants considered of individuals aged 15 years and above residing in densely populated environments with poorly ventilated houses.</p>	<p>Trained medical undergraduate students, assisted by community health workers, conducted door-to-door visits to screen available household members for TB symptoms as defined in the intensified case finding (ICF) form, such as cough, unintentional weight loss, fever, night sweats, or hemoptysis. If a client reported any symptoms, they were classified as presumptive cases and underwent clinical assessment. All consenting adults aged 15 years or older with a positive TB symptom screen were interviewed using a standardized questionnaire in the local language. They collected the specimens at home, picking one sample on the spot to laboratory procedure. The total respondents were 385, with 143 showing symptoms indicative of TB. Out of these, 84 were able to produce sputum for examination and 11 new cases of TB were identified (37,5% of positive cases involve the elderly), with 8 of them confirmed through the GeneXpert test. The positive results were notified within a median time of 3 days from sputum collection. Subsequently, all confirmed cases were closely monitored and promptly started on treatment. ACF for TB, which involves an initial sensitive symptom screening followed by GeneXpert testing, enhanced the detection of TB cases. This approach also reduced the turnaround time, leading to the timely initiation of TB treatment for patients.</p>

<p>Community-Based Active Tuberculosis Case Finding Using a Symptom-Based Screening Tool in The Volta Region Ghana (Ntow et al., 2021)</p>	<p>A community based cross-sectional</p>	<p>High-risk and low-risk districts were determined with the use of the 2014-2017 annual review of TB control documents. Proportional sampling was employed to determine the number of eligible participants from two districts to be included in the study, taking into account their populations, to constitute the overall calculated sample size of 332.</p>	<p>A structured questionnaire was administered to eligible individuals randomly selected in the study by the public health team. The questionnaire collected demographic and TB risk data (cough of more than 2 weeks with or without additional symptoms: cough of any duration with at least one systemic symptom of TB, such as night sweat, weight loss, fever or hemoptysis, and HIV positivity for anyone with TB systemic symptoms). Individuals who met these criteria were considered as having presumptive TB and sputum was collected for examination. In Ghana, GeneXpert is the first-line testing technique an MTB/RIF GeneXpert assay detected <i>M. tuberculosis</i>. In this study, the total screened population was 1.025 (high risk 670, low risk 355), Non-presumptive TB 693 (high risk 400, low risk 293), Presumptive TB 332 (high risk 251, low risk 81), sputum not produced 18 (high risk 10, low risk 8), sputum produced 314 (high risk 241, low risk 73), Total GeneXpert positive 6 (high risk 4, low risk 2). Despite being laborious and requiring significant capital, ACF in communities through house-to-house screening is likely to yield better detection of TB cases compared to screening during communal gatherings.</p>
<p>Is it Feasible to Carry Out Active Case Finding for Tuberculosis in Community Based Settings? (Mani et al., 2019)</p>	<p>A community-based, cross-sectional and descriptive survey</p>	<p>This study encompassed all individuals in the study area who expressed a willingness to participate. Houses that remained locked after two visits throughout the survey period were not considered. The study was conducted in January 2018</p>	<p>Trained undergraduates assessed the demographic characteristics and presence of presumptive symptoms and signs related to TB. Presumptive TB was operationally defined as the presence of one or more of the following symptoms (cough for more than 2 weeks, fever, recent weight loss, hemoptysis, chest pain, and loss of appetite). If an individual was found to have any one of the presumptive symptoms, they were motivated to undergo a sputum examination. After educating the presumptive cases to bring out mucopurulent sputum rather than saliva, pot samples were collected by the survey team in the household. The second container was given to the presumptive case to collect early morning sputum, which the survey team collected the same the next day. Of the 6606 populations surveyed, the number of presumptive TB identified was 55, the number of presumptive cases did not undergo any investigation 4, some presumptive cases underwent at least one investigation 51, sputum collected 37, sputum positive TB 1, Chest X-Ray 25, suggestive of TB 1, Gene X Part 1. So, the total number of active TB cases is 2. The prevalence in the present study is lower, which may be linked to a higher socioeconomic status, improved living conditions, and convenient access to</p>

Case Finding of Tuberculosis Among Mining Communities in Ghana (Ohene et al., 2021)	Cross-Sectional Study	The TB screening initiative was provided solely voluntarily for all community members aged 15 and above who expressed their willingness to take part. A total of 10.441 individuals from 78 communities in 21 districts were screened across the three regions of Brong Ahafo, Ashanti, and Western. On average, 226 people underwent screening each day.	healthcare facilities. Implementing ACF for TB is viable, as long as the health system allocates sufficient human resources and establishes effective referral linkages to support peripheral centers. One week before the team arrived in the community, the district's TB focal person, in cooperation with community volunteers, engaged in community mobilization through diverse methods such as door-to-door awareness campaigns and announcements on the community radio. A TB symptom screening was conducted through a questionnaire assessing the presence or absence of symptoms such as cough, fever, sputum production, chest pain, weight loss and night sweats. Except for pregnant or potentially pregnant women and those unable or unwilling to undergo chest X- ray, everyone underwent digital X- Ray examination. Digital X- ray images categorized findings into three groups: normal, abnormal suggestive of TB, and abnormal but unlikely to be TB. Individuals with abnormal X- ray findings suggestive of TB, those reporting a cough of at least 2 weeks or any duration with at least one other symptom, and those unable to undergo X- ray or identified as HIV- positive were presumed to have TB. They were requested to provide a spot sample of sputum, which was then transported to designated laboratories with GeneXpert machines for testing. A total number of community members screened was 10.441, Chest X- ray done 10.329, the presence of 1 or more symptoms 3.319, Chest X- ray suggests TB 1.448, Presumed TB among number screened (X- ray suggests TB or presence of cough and at least one other symptom 2.389, Number tested out of presumed TB 2.250, Bacteriologically positive out of number tested 95, Rifampicin resistant 5. The elevated risk of TB in artisanal mining communities and among miners, as demonstrated in this study, underscores the necessity to focus on these populations through outreach programs, especially considering that they may reside in remote or challenging-to-access- areas.
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This scoping review describes the effect of ACF in the community on TB control (cohorts and cross-sectional) in high-burden TB. Results from 5 articles including 6 studies indicated that that ACF in the community was significantly associated with TB control. One of the studies revealed that studies in which ACF reported a non-significant association.

Our results provide evidence of the association between ACF are recommendation for TB control which provides greater benefits compared to the PCF strategy, especially in high-risk populations and those with limited access to healthcare facilities. It promotes prompt diagnosis and treatment, improves treatment outcomes, minimizes health

complications, and reduces the social and economic impact of TB.

Numerous studies have confirmed that ACF in a community especially among household contact and high-risk groups could be used as an effective TB case detection. Several research has indicated that the ACF strategy enhances the detection of TB cases in high-risk populations, particularly among individuals who are HIV- positive and those with diabetes mellitus (DM) (Lorent *et al.*, 2014; Mtwangambate *et al.*, 2014; Rivera *et al.*, 2017). According to the guidance from WHO, it is recommended to prioritize ACF in populations with a high prevalence of TB. Certain groups identified with elevated prevalence include individuals who are in close contact with households, those living with HIV (PLHIV), and individuals incarcerated in prison facilities (World Health Organization, 2021). Under normal circumstances, infections can be fought off. In high-risk group conditions, there is a weakening of the immune system that progressively damages white blood cells. The declining immunity affects the immune system's inability to combat ongoing infections. This conditions facilitate opportunistic infections, including the Mycobacterium tuberculosis (Cahyati W, 2019). In the PCF strategy, residing in rural areas posed a risk factor for both patient and diagnostic delay.

A study undertaken by Gupta *et al.* in Maharashtra, India, revealed that 3.45% of individuals in close contact with TB patients exhibited symptoms indicative of TB. Subsequently, one-third of these symptomatic individuals were diagnosed with active TB, indicating a prevalence of 1.15% among the households of index cases. This approach enabled the identification of an additional 4.51% of cases in addition to those already detected among the index cases (Gupta *et al.*, 2016). Research conducted in Chennai, India, revealed a 5.3% overall prevalence of active TB among household contacts (Nair *et al.*, 2016). The yield for identifying active TB cases through contact investigations varied from 0% to 6.9% among household contacts in countries with a high burden of TB (Jia *et al.*, 2014). Identifying other populations with high prevalence necessitates accurate baseline prevalence and incidence rates, along with mapping areas

characterized by heightened transmission ("hotspots"). Optimal selection of populations in specific locations is crucial for the effectiveness of ACF, and reliable data play a fundamental role in making informed decisions regarding population selection. In instances where prevalence survey data is lacking, available programmatic data can be utilized for modeling to identify these specific population groups (World Health Organization, 2021). The incidence of TB in the community decreased by over 40% compared to the rates before the intervention of ACF (Corbett *et al.*, 2010).

Various potential mechanisms underlying the benefit of ACF in the community for TB control were reported in other studies. ACF provides benefits for collaboration between the community and healthcare services in the early detection and treatment of TB. The result revealed bacteriologically confirmed TB cases within an average of three days from the collection of sputum. This represented a significantly reduced processing time compared to the commonly reported delay of 7-10 days, particularly in community settings. The positive clients were actively monitored and commenced treatment by community health workers. If clients provided telephone contacts, they were contacted and encouraged to initiate treatment at the healthcare facilities (Isaac *et al.*, 2019). ACF addresses challenges in reaching vulnerable communities, lowers the overall expenses associated with diagnosis and treatment, decreases significant financial burdens, and eliminates the financial obstacles hindering the pursuit of TB healthcare. ACF is regarded as a tool for mitigating the broader socioeconomic impact of TB (World Health Organization, 2021).

This review minimizes health complications and reduces the social and economic impact of TB. Early studies showed that the research revealed a decreased percentage and likelihood of households facing catastrophic costs in the ACF when contrasted with the PCF. This discrepancy might be attributed to the elevated levels of unemployment and income loss observed in the PCF, consequently magnifying the socio-protective impacts of ACF (Vo *et al.*, 2021).

One of the studies revealed that the method used to identify ACF did not explain the presence of heterogeneity between studies. An explanation may be that the ACF methods are linked to a higher socioeconomic status, improved living conditions, and convenient access to healthcare facilities (de Sousa *et al.*, 2018)

## CONCLUSION

This review has summarized that there were ACF provides greater benefits compared to the PCF strategy, especially in high-risk populations and those with limited access to healthcare facilities. It promotes prompt diagnosis and treatment, improves treatment outcomes, minimizes health complications, and reduces the social and economic impact of TB. In the other hand, ACF is not impactful when implemented in a setting general population, higher socioeconomic status, improved living conditions, and convenient access to healthcare facilities. ACF has significant effects on the community when accompanied by collaboration between healthcare professionals, the community, and the availability of necessary tools.

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