

Development of Cross-Sector Collaboration Indicators for Accelerating the Reduction of Stunting in South Sulawesi, Indonesia

Balqis Balqis^{1*}, Suci Rahmadani², Muh. Yusri Abadi³, St. Rosmanely⁴, Arif Anwar⁵, Laksmi Trisasmita⁶, Ni Made Viantika Sulianderi⁷, Faizal Fahmi⁸, Arsunan Arsin⁹, Muh. Amri Arfandi¹⁰, Nur Annisa Hamka¹¹, Amaliah Amriani. AS¹²

¹Department of Health Administration and Policy, Faculty of Public Health, Hasanuddin University, Makassar, South Sulawesi, Indonesia, balqis.nazaruddin@unhas.ac.id

²Department of Health Administration and Policy, Faculty of Public Health, Hasanuddin University, Makassar, South Sulawesi, Indonesia, sucirahmadani@gmail.com

³Department of Health Administration and Policy, Faculty of Public Health, Hasanuddin University, Makassar, South Sulawesi, Indonesia, yusriabdi@gmail.com

⁴Department of Health Administration and Policy, Faculty of Public Health, Hasanuddin University, Makassar, South Sulawesi, Indonesia, strosmanely@gmail.com

⁵Department of Biostatistics, Faculty of Public Health, Hasanuddin University, Makassar, South Sulawesi, Indonesia, arifanwar@gmail.com

⁶Department of Nutrition Science, Faculty of Public Health, Hasanuddin University, Makassar, South Sulawesi, Indonesia, laksmitrisasmita@gmail.com

⁷Department of Agricultura, Faculty of Agricultura, Hasanuddin University, Makassar, South Sulawesi, Indonesia, viantikasulianderi@gmail.com

⁸The National Population and Family Planning Agency (BKKBN), Makassar, South Sulawesi, Indonesia, faizalfahmi@gmail.com

⁹Department of Epidemiology, Faculty of Public Health, Hasanuddin University, Makassar, South Sulawesi, Indonesia, arsunan@unhas.ac.id

¹⁰Department of Epidemiology, Faculty of Public Health, Mulawarman University, Samarinda, East Kalimantan, Indonesia, amriarfandi2000@gmail.com

¹¹Department of Health Administration and Policy, Faculty of Public Health, Hasanuddin University, Makassar, South Sulawesi, Indonesia, nurannisahamka@gmail.com

¹²Department of Health Administration and Policy, Faculty of Public Health, Hasanuddin University, Makassar, South Sulawesi, Indonesia, amaliahamrianias@gmail.com

*Corresponding Author: E-mail: balqis.nazaruddin@unhas.ac.id

ARTICLE INFO

Manuscript Received: 12 Augst, 2024

Revised: 22 Oct, 2024

Accepted: 24 Oct, 2024

Date of Publication: 05 Nov, 2024

Volume: 4

Issue: 3

DOI: [10.56338/jphp.v4i3.5924](https://doi.org/10.56338/jphp.v4i3.5924)

KEYWORDS

Stunting;
Collaboration;
Cross-Sector;
Indicator

ABSTRACT

Background: To reduce stunting, the government of Indonesia, which has the fifth-highest prevalence of stunting in toddlers, launched the National Strategy for the Acceleration of Stunting Prevention (StraNas Stunting). Despite involving multiple sectors, stunting rates remain high. This research aimed to develop cross-sector collaboration indicators to assess the effectiveness of cross-sector efforts in reducing stunting.

Method: This qualitative study utilized a rapid assessment procedure (RAP) to generate cross-sector collaboration indicators through in-depth interviews with five key informants and four experts. The recurring themes from these interviews were identified as indicators, which were further refined. In the second phase, quantitative analysis was conducted with 50 respondents to test the developed indicators using Confirmatory factor analysis (CFA) methods.

Result: A total of 15 indicators and 41 sub-indicators of cross-sector collaboration were developed across five key dimensions: governance, administration, autonomy, mutuality, and norms. Confirmatory Factor Analysis (CFA) was performed to validate the indicators, with the results showing that the Average Variance Extracted (AVE) for each dimension was greater than 0.5, and the Composite Reliability (CR) exceeded 0.7. These findings confirm the validity and reliability of the developed indicators.

Conclusion: As recognized by experts, the theory of cross-sector collaboration has been further advanced by the cross-sector collaboration indicators generated in this study. Additionally, these indicators, which were based on five dimensions of collaboration, may be used to assess cross-sector performance for the Stunting Acceleration Program in Indonesia. The framework of this study for defining and assessing collaboration was expected to provide a foundation for further research.

INTRODUCTION

Due to the profound impacts that stunting has on human resources, a number of countries, including Indonesia, have made it a priority to address this issue. Growth failure, delayed cognitive and motor development, metabolic disorders, reduced intelligence, and lowered future productivity are several potential consequences of stunting. In terms of the economy, stunting also has implications, causing economic losses of 2–3% of the gross domestic product (GDP) (1). In 2017, Indonesia's GDP was reported at Rp. 13,000 trillion, with stunting estimated to have caused losses of Rp. 260 to 390 trillion. According to UNICEF, Indonesia has the fifth-highest number of stunted toddlers globally and is among the countries in Southeast Asia with the highest stunting rates, even higher than some impoverished countries in Africa (2).

The number of stunted children globally was estimated to be 159 million, with an estimated 9 million of them from Indonesia and under the age of five (3). Consequently, this makes stunting a major public health problem. According to the World Health Organization (WHO), this indicates a "high" prevalence rate of 30.8% for toddlers and 29.9% for children under five. In addition, stunting rates have decreased in recent years, despite remaining significantly lower than the national target of 28% (4)(5).

The Indonesian government aims to reduce the stunting prevalence rate to 14% by 2024. It was reported that the stunting rate was 24.4% in 2021; therefore, a 2.7% annual reduction is required to achieve the target (6). Moreover, South Sulawesi Province has a higher prevalence of stunting than the national average, with a rate of 27.4% in 2021 (6)(7). Based on the results of basic health research (Riskesmas), this province has a fluctuating prevalence of stunting over time, but it remains high when compared to other regions of Indonesia (4). There was a significant variation in the distribution of toddlers' nutritional status among the 24 regencies or municipalities in the province, with only one regency or municipality falling into the "good" category and the remaining 18 regencies or municipalities falling into the "chronic+acute" category. This suggests that stunting reduction in South Sulawesi Province is a top priority (8). The novelty of this research lies in the development of indicators to evaluate cross-sector collaboration in addressing stunting. Currently, there is no specific instrument created by the government to measure such collaboration. This research fills that gap by providing a framework for assessing how sectors work together in stunting reduction. This is also crucial for BKKBN, as the leading sector for stunting reduction acceleration in South Sulawesi, in its efforts to effectively coordinate and evaluate cross-sector contributions.

The government of Indonesia has made various initiatives to prevent stunting. One of the implemented programs is to monitor child weighing at Posyandu (Integrated Health Service Posts) and provide interventions to them throughout their first 1,000 days of life (1,000 HPK) (9). Moreover, it is necessary to improve the quality of sustained care since these efforts have not been fully implemented. Furthermore, at a ministerial-level coordination meeting, the central government made stunting reduction a priority and decided that a cross-sectoral approach is essential at both the central and regional levels. This demonstrated how committed the government is to reducing stunting. One of the key strategies implemented by the Indonesian government to reduce stunting is cross-sector collaboration, also referred to as collaboration or convergence in stunting terminology. This is evidenced by Presidential Regulation (Perpres) No. 72 of 2021 concerning the acceleration of stunting reduction, which is holistic, integrative and of high quality through coordination, synergy, and synchronization among stakeholders (10). The Perpres also distinguishes between specific and sensitive interventions. Specific interventions are managed by the Ministry of Health to directly address the causes of stunting. In addition, sensitive interventions implement a convergence (cross-sector collaboration) approach to address the indirect causes of stunting (11).

Data from the Ministry of Health demonstrated that sensitive interventions with cross-sector involvement contributed to a 70% reduction in stunting prevalence (12). This underscores the importance of cross-sector collaboration in reducing stunting. Moreover, the government has a long history of promoting cross-sector involvement, as evidenced by Presidential Regulation No. 42 of 2013 concerning the national movement for accelerating nutrition improvement. Additionally, the issuance of Presidential Regulation No. 72 of 2021 concerning the acceleration of stunting reduction indicates a renewed commitment to strengthening institutional structures for convergence (10,13). To date, evaluations have focused on assessing the achievements and goals of each agency, failing to consider the collaborative role in accelerating stunting reduction. This aforementioned kind of evaluation

is crucial to determining the extent of cross-sector involvement and identifying areas for improvement. Currently, there is no evaluation instrument capable of measuring whether sensitive interventions through cross-sector collaboration have an impact on reducing stunting rates. This is necessary to ensure that the collaborations implemented in South Sulawesi are effective and worthy of continuation in the long term. In addition, this study aimed to develop valid indicators to assess and evaluate the performance of cross-sector collaboration in accelerating stunting reduction.

METHOD

This qualitative study employed a rapid assessment procedure (RAP) design to develop indicators and measurement methods for cross-sector collaboration in the stunting acceleration program. Conducted in Makassar, South Sulawesi, from February to April 2023, the study aimed to create effective collaboration indicators applicable at both the municipality and regency levels, with Makassar chosen due to its central role as the provincial capital.

The process of developing these indicators involved several critical steps. Initially, a comprehensive literature review was conducted to identify relevant variables and indicators, resulting in a draft interview guide. This guide was used for in-depth interviews with five key stakeholders directly involved in the stunting reduction efforts, as well as four experts in the field, representing key regional apparatus organizations (OPDs). The collected data were further refined through document reviews and expert discussions to ensure the indicators were comprehensive and applicable.

The five key dimensions of collaboration—governance, administration, autonomy, mutuality, and norms—were selected based on their significance in previous studies, particularly the theoretical framework developed by Thompson and Perry (2006). This framework outlines these five dimensions as essential to successful cross-sector collaboration. Additionally, to test the reliability and validity of the indicators generated in the qualitative phase, a quantitative analysis was conducted with data collected from 50 respondents, including members of the OPD stunting reduction task force in South Sulawesi. These data were analysed using Confirmatory Factor Analysis (CFA) to determine the validity of the developed indicators. Content analysis was used to identify recurring words and themes from the interviews, which were then used to generate and refine the indicators. This process, combined with expert validation, helped ensure that the indicators were robust and well-grounded in theory.

RESULTS

In-depth interviews conducted with five informants have resulted in the formulation of 15 cross-sector collaboration indicators for the stunting reduction acceleration program in South Sulawesi Province. The following indicator development findings were obtained through further analysis based on the five collaboration dimensions pertinent to stunting reduction acceleration:

Governance Dimension

The governance dimension examines institutional involvement in the stunting acceleration program, including knowledge access and active participation. Based on theories by Gray, Thomson & Perry, and Ansell & Gash, indicators include joint decision-making in rule development for inter-institutional collaboration. According to the interviews, the significance of regulations in governing the stunting acceleration program, particularly presidential and governor's regulations, was emphasized. Moreover, a thorough comprehension of these regulations by the involved institutions is essential. The resulting indicators can be seen in Table 6.

Administration Dimension

The administration dimension comprises tools and resources aiding collaboration in the stunting reduction acceleration program. According to theoretical frameworks by Gray, Thomson & Perry, and Ansell & Gash, indicators included role clarity and responsibilities, communication channels, and activity monitoring mechanisms. According to the interviews, vital aspects of the stunting reduction program's administration were emphasized. Moreover, key considerations include effective communication channels, such as cross-sector coordination meetings, and a clear

division of roles and responsibilities among collaborating agencies within the stunting reduction team. The resulting indicators can be seen in Table 6.

Autonomy Dimension

The third collaboration dimension assessed agencies' autonomy in utilizing their potential for collaboration within the stunting reduction acceleration program. Based on theories by Gray, Thomson & Perry, and Ansell & Gash, indicators included mission clarity and organizational understanding of program activities. According to the interviews, the significance of agencies' programs, activities, and budgeting in the autonomy dimension of the stunting reduction acceleration program was emphasized. The corresponding indicators were explained in detail in Table 6.

Mutuality Dimension

The fourth dimension of cross-sector collaboration in the stunting acceleration program is mutuality, which reflects mutual support and benefit among the collaborating agencies. According to theories by Gray and Thomson & Perry, indicators encompass resource exchange, the influence of agency activities, and effective communication. According to the interviews, key aspects of mutuality in the stunting reduction acceleration program, including resource utilization (e.g., collaboration between a university team skilled in data analysis and the Health Department with stunting-related data) and joint activities (e.g., agencies serving as resource persons in related activities), were highlighted. Moreover, mutual respect among agencies is vital for optimal expertise utilization. The corresponding indicators were explained in detail in Table 6.

Norms Dimension

The fifth collaboration dimension is trust, which signifies trust developed among collaborating agencies in the stunting reduction acceleration program. Based on theoretical reviews by Gray, Thomson & Perry, and Ansell & Gash, indicators encompass mutual trust, reliance on other agencies, sanctions for non-performance, and long-term personal relationships. The following informant quotes provide contextual insights. According to the interviews, the critical role of trust among agencies in the norms dimension of the stunting reduction acceleration program was emphasized. Trust minimizes sectoral ego in agencies and enhances commitment, all of which is crucial for the effective implementation of the program. Commitment and reward are other elements of implementing the acceleration program.

After the stakeholder interviews were done, a document review was conducted to validate the compiled indicators. This process involved cross-referencing data from in-depth interviews with regulations at national and local levels, as well as guidelines. The reviewed documents highlight Indonesia's robust regulatory framework aimed at accelerating stunting reduction through cross-sectoral collaboration, known as "convergence." Presidential Regulation No. 72 of 2021, along with supporting guidelines and handbooks, emphasizes the integration of stunting reduction programs into local planning and budgeting, the importance of strong legal frameworks, and the need for coordinated efforts across various levels of government. In South Sulawesi, Governor Regulations and Decrees further localize these national efforts, demonstrating a commitment to reducing stunting by enhancing institutional frameworks and promoting collaborative actions between provincial and local governments. Additionally, the Regulation of the National Population and Family Planning Agency (BKKBN) underscores the importance of integrated nutrition interventions and multisectoral collaboration, providing guidelines for the development and implementation of stunting reduction programs. The convergence guidelines and the Handbook of Indicators for the Acceleration of Stunting Reduction 2021-2024 offer detailed stages and measurable targets for ensuring the effectiveness of these initiatives across different administrative levels, reinforcing a cohesive national effort. The document review results revealed an alignment between the findings from in-depth interviews and the existing documents, which enhances the validity of the developed indicators.

In the last step of indicator development, three experts with diverse expertise engaged in discussions. Moreover, indicators created from in-depth interviews were presented with a focus on measuring cross-sectoral

collaboration in the stunting reduction acceleration program. Furthermore, the experts provided input, particularly on the content of the indicators to be developed. The following are the summarized results of the expert discussion:

Governance Dimension

Table 1. Expert Confirmation Results on the Governance Dimension

Indicators Created from Interviews with Stakeholders	Expert Confirmation
1. Membership	"..... I think this indicator is already suitable; the issue of membership is stipulated in Presidential Regulation No. 72 of 2022 and also in the Governor's Regulation. It can be checked under the regulations. However, it is essential to understand whether they are aware of these regulations and whether they comprehend their functions within them....." - Expert 1, interview, April 3, 2023
2. Institution regulations	
	"..... To discover whether the stunting acceleration team functions or not, it requires examining the legal aspect because there are functions and roles for the stunting acceleration team here....." Expert 2, interview, April 4, 2023

Experts confirmed that the governance dimension indicators align with program implementation. Additionally, it is crucial to regulate membership and ensure collaborators understand their role in the stunting reduction acceleration team. Moreover, indicators related to institutional regulations were considered suitable for program management. Furthermore, experts emphasized the importance of legal aspects in light of the functions and roles of the team.

Administration Dimension

Table 2. Expert Confirmation Results on the Administration Dimension

Indicators Created from Interviews with Stakeholders	Expert Confirmation
1. Communication Channels	"..... It is important to add clarity of authority (clarity of lines of authority) to the clarity of roles and responsibilities indicator. This clarity of authority is what can make them work....." - Expert 1, interview, April 3, 2023
2. Clarity of Roles and Responsibilities	

Experts confirmed that the administration dimension indicators align with institutional governance processes. They stressed the critical role of coordination in defining roles and responsibilities between agencies. Moreover, expert input enhanced the role clarity and responsibility indicator with the addition of a new sub-indicator, which is clarity of authority. In addition, experts emphasized the importance of understanding agency jurisdiction for effective implementation.

Autonomy Dimension

Table 3. Expert Confirmation Results on the Autonomy Dimension

Indicators Created from Interviews with Stakeholders	Expert Confirmation
1. Planning	".....Before entering into program development, planning is essential. An indicator for planning should be added because every sector preparing the program should have a grand design. The planning of each agency should contribute to addressing stunting...." - Expert 1, interview, April 3, 2023
2. Activities and programs	
3. Budget	

Indicators Created from Interviews with Stakeholders	Expert Confirmation
	<p>".....Monitoring and evaluation should be crucial to determining whether the activities are in line with the target of accelerating stunting reduction, with a focus on a family approach. We need to ensure that each agency's components return to their initial state, which is the grand design of planning, so that different grand designs do not emerge....." – Expert 1, interview, April 3, 2023</p>
	<p>".....The budget is already in line with the planning, and the expectation is that allocated funds can be shifted to complete activities contributing to stunting...." - Expert 2, interview, April 4, 2023</p>

Experts confirmed that autonomy dimension indicators are suitable for utilizing the potential of collaborating agencies. They highlighted the significance of analyzing the planning of collaborating agencies before program development. In addition, the experts stressed the need for evaluation to align activities with stunting reduction targets, resulting in the addition of two indicators in this dimension, which are program planning and monitoring and evaluation.

Mutuality Dimension

Table 4. Expert Confirmation Results on the Mutuality Dimension

Indicators Created from Interviews with Stakeholders	Expert Confirmation
<ol style="list-style-type: none"> 1. Resource Exchange 2. Joint Activities 3. Mutual Respect 	<p>"..... Human resource exchange is essential, but do they have a system for human resource exchange? How does it work, and are there standard operating procedures (SOPs) for it? If it's not done systematically, the point is lacking. They may exchange human resources as they wish, but without any standards. There should be a mechanism for when and where it's done. Here, they need to identify what kind of training or exchange is needed....." - Expert 1, interview, April 3, 2023</p>

Indicators in the mutuality dimension were validated as suitable based on expert confirmation. They emphasized that in order to align with stunting reduction program requirements, it is crucial to have clear and standardized systems for the exchange of human resources. As a result, a new indicator, "system and mechanism for the exchange of human resources," was developed to address these requirements.

Norms Dimension

Table 5. Expert confirmation Results on the Norms Dimension

Indicators Created from Interviews with Stakeholders	Expert Confirmation
<ol style="list-style-type: none"> 1. Trust 2. Commitment 3. Reward 	<p>"..... Trust means that there must be mutual trust between the participating institutions, because without trust among the collaborating institutions, commitment and motivation will not be effective....." - Expert 1, interview, April 3, 2023</p> <p>".....The type of trust being referred to is the trust of the involved institutions. This is important because without trust, institutions cannot engage in activities, attend coordination meetings, or simply send representatives to meetings without any follow-up....." - Expert 3, interview, April 5, 2023</p>

Expert confirmation validated that the developed indicators in the norms dimension align with collaborative program norms. Key indicators of norms have a significant impact on the commitment and motivation of collaborating institutions.

The five collaboration dimensions generated 15 cross-sector collaboration indicators for stunting reduction acceleration. Moreover, sub-indicators provide further details about each indicator, clarifying its intent. The following table includes descriptions of all developed indicators:

Table 6. Indicators of Cross-Sector Collaboration for Accelerating Stunting Reduction in South Sulawesi Province

No	Dimension	Indicators	Sub-indicators (Instrument)
1	Governance	a. Membership	1) Understanding membership within the stunting reduction acceleration team
		b. Institution regulations	2) Knowledge about the rules underpinning membership in the stunting reduction acceleration team 3) Knowledge about the rules governing interagency relationships (institutional rules) 4) Involvement in the creation of institutional rules 5) The Secretariat's role in disseminating institutional rules
2	Administration	a. Communication Channels	1) Communication channels for discussing stunting reduction activities and plans. 2) Benefits of information from stakeholder coordination meetings. 3) Interagency meetings for stunting reduction program discussions. 4) Invitations to interagency meetings on stunting reduction activities. 5) Attendance at meetings related to the stunting reduction program. 6) Importance of interagency meetings for the stunting program. 7) Discussions on interagency coordination for stunting reduction. 8) Importance level of interagency meetings for the stunting program. 9) Involvement of external institutions in stunting-related coordination meetings.
		b. Clarity of Roles and Responsibilities	10) Awareness of the roles and responsibilities (core tasks and functions) of each sector in implementing the stunting reduction acceleration program. 11) Clarity of authority in implementing the stunting reduction acceleration program.
3	Autonomy	a. Planning	1) Synchronization of planning with the stunting reduction acceleration action plan 2) Synchronization of stunting reduction planning and regional planning 3) Participation in the planning activities for the stunting reduction acceleration program
		b. Activities and programs	4) Availability of stunting reduction programs in each institution/agency 5) Inclusion of stunting programs in the activity planning of the department/agency 6) Development of stunting reduction acceleration programs in each agency initiated by program target focus

No	Dimension	Indicators	Sub-indicators (Instrument)
			7) References used in the development of stunting reduction acceleration programs in each agency
			8) Identification of program activities based on the 64 indicators of the stunting reduction acceleration program
		c. Budget	9) Allocation of budget sources for the stunting reduction acceleration program in each institution/agency
			10) Synchronization of planning and budgeting
		d. Monitoring and evaluation	11) Implementation of monitoring and evaluation with assessment of stunting targets
			12) Involvement in program evaluation
4	Mutuality	a. Utilization of resources	1) Human resource exchange (such as speakers and trainings) among institutions/agencies in the implementation of the stunting reduction acceleration program.
			2) Benefits of assistance from the human resource exchange (speakers and training) obtained from other institutions/agencies.
			3) Urgency of assistance (human resources, information, or others) from other institutions/agencies
		b. System and mechanisms of resource exchange	4) Availability of standard operating procedures for the human resource exchange.
			5) Identification of the needs of institutions/agencies for the human resource exchange
		c. Joint Activities	6) The influence of the activities of other institutions/agencies on the activities of one's own institution/agency. <i>(such as training conducted by the Department of Health for the Department of Education and training by the Department of Social Affairs related to impact mitigation)</i>
		d. Mutual Respect	7) Feeling valued for the performance achieved during cross-sector meetings (feelings such as providing ideas or opinions).
5	Norms	a. Trust	1) Handling of the stunting reduction acceleration program is carried out through collaboration between cross-sectoral parties.
			2) Finding solutions to problems encountered at interagency meetings (cross-sector meetings).
			3) The need for sanctions against agencies that do not fulfill their commitments or functions in the collaboration of stunting reduction programs
		b. Commitment	4) Participation in the involvement of our agency/institution in stunting reduction acceleration activities.
		c. Reward	5) Awarding those who show a positive trend or improvement

DISCUSSION

This study outlined cross-sector collaboration assessment indicators in stunting management, which may be used as a guide for evaluating sensitive nutrition interventions in Indonesia. These interventions require cross-sector collaboration. The study identified 15 indicators and 41 sub-indicators applicable for evaluating the collaborative convergence program accelerating stunting reduction in Indonesia. Notably, autonomy, which focuses on planning, programs, and budgets, emerged as a key differentiator from previous research on collaboration indicators. According to previous research, autonomy was defined as the level of independence or self-reliance that individuals or groups have within a collaboration (14). In the context of collaboration, autonomy refers to the extent to which

individuals or groups have control over tasks, decisions, and steps they take in the collaboration (15,16). Moreover, Thomson and Perry emphasized the importance of a mission to maintain identity and reduce tension (15,17). Furthermore, the findings in this study underscored the importance of planning with a shared grand design, while executed differently by each institution, must align with the jointly designed planning structure. The developed indicators can be implemented through partnerships with the leading sector, specifically the National Population and Family Planning Board (BKKBN) in South Sulawesi. These indicators will serve as tools for evaluating cross-sector collaboration in stunting reduction efforts. It is anticipated that these indicators will be formally adopted by the governor as a standard evaluation tool, which could then be established as a best practice model for other provinces to follow. Each dimension of cross-sector collaboration in accelerating stunting reduction was explained in detail as follows:

Governance

This study assessed the governance of the stunting reduction acceleration team in South Sulawesi Province, with an emphasis on team membership and members' understanding of the regulations governing interagency relations. The regulations for the team are outlined in South Sulawesi Governor's Decree Number 446/II/2022 and Presidential Regulation of the Republic of Indonesia Number 72 of 2021 on stunting reduction acceleration. In addition, Thomson and Perry defined governance as the collaborative decision-making process of establishing rules and directing the behaviors and relationships of agencies (15).

Previous studies on collaborative governance underscored key aspects. Stakeholder participation in achieving goals was emphasized in some studies (16). According to other studies, accountability is a crucial element in good governance (18). Moreover, Bovaird suggested deeper participatory involvement (19), and Saz-Carranza's research highlighted the importance of rules in collaboration (20). Furthermore, research indicated that adherence to explicit rules enhances collaboration effectiveness. The indicators proposed by collaboration experts are in line with those in this study, particularly regarding rules and membership. For instance, agencies' understanding of rules and regulations and socialization are sub-indicators under rules and membership.

Administration

This study evaluated the administrative dimension of the stunting reduction acceleration team's collaboration, focusing on communication channels, coordination meeting outcomes, discussions on stunting reduction acceleration programs, and the involvement of other agencies in these meetings. In other words, administration in this study refers to the tools used to support institutional processes in collaborative program implementation (21). Moreover, this study identified communication channels in coordination and informal meetings, along with role clarity and responsibilities, as key indicators in this dimension. In collaborative theory, the administrative dimension plays a vital role in ensuring effective and efficient collaboration. It covers aspects of collaboration management, including organization, processes, policies, management, communication, and technology (16).

Previous studies have investigated the administrative dimension of collaborative theory from diverse perspectives. For example, Ansell and Gash, as well as Sørensen and Torfing, conducted studies that examined the administrative dimension of collaborative governance theory (16,22). Moreover, Stoker's research investigated the administrative dimension of collaborative theory from the perspective of public value theory (23). Additionally, other studies have identified specific indicators of the administrative dimension in collaborative contexts. For instance, Carayannis and Campbell's study, which focused on organization, processes, and communication, highlighted the pivotal elements for cross-disciplinary collaboration in the administrative dimension (24). Meanwhile, Nambisan and Sawhney's research, which focused on inter-organizational collaboration, underscored the significance of management, communication, and technology within the administrative domain (25). Similarly, Klijn and Koppenjan's study, which investigated intergovernmental collaboration, emphasized the critical elements of organization, processes, and policies (26). This study concluded that organization, processes, policies, management, communication, and technology are the crucial dimensions of administration in collaboration. These

dimensions were interrelated and mutually influential. In addition, all of the findings were in line with previous research, with the exception of one distinctive indicator: role clarity and responsibilities.

Autonomy

In this study, independence refers to the capacity of institutions to effectively collaborate with others in the acceleration of stunting reduction programs by utilizing internal resources. Moreover, this study assessed independence through program planning, the presence and focus of stunting activities, synchronization of planning and actions, institutions' participation in program activity evaluation, budget allocation for the program, and alignment of planning and budget allocation. In collaborative theory, independence plays a pivotal role in ensuring effective collaboration. It involves organizations retaining their identities, visions, and missions. According to Barbara Gray, high independence promotes success by enabling organizations to participate fully in collaboration while maintaining their unique identities and visions (14).

Gray defined organizational independence as preserving an organization's identity and vision (14). Moreover, according to Thomson and Perry, there are two types of independence: organizational (maintaining identity and vision) and process independence (retaining control over the collaborative process) (15). This study highlighted context-specific differences in health management, particularly within the acceleration of stunting reduction programs, as well as identified shared aspects of independence from previous research. Additionally, this study underscored the significance of shared planning, program alignment, budget synchronization, and collaborative evaluation among collaborating institutions. Despite variations in execution, these measures ensure alignment with the jointly agreed-upon grand design of planning, all aimed at the common goal of accelerating stunting reduction.

Mutuality

In this study, mutuality refers to the mutual support and benefit among collaborating institutions in the acceleration of stunting reduction program. Moreover, stunting prevention requires collaboration between multiple institutions, with mutual support and assistance being necessary to achieve objectives. Additionally, interagency partnerships are vital (27). Furthermore, this study identified indicators related to resource utilization, exchange mechanisms, joint activities, and mutual respect within the mutuality dimension. This concept derives from interdependence, which requires collaborating organizations to feel mutually dependent and beneficial despite differing interests. Previous studies underscored the importance of mutuality in collaboration. According Thomson and Perry, mutual trust and respect were identified to be essential for collaboration success (15). Furthermore, O'Leary and Bingham emphasized the significance of shared goals (28), while Ansell and Gash suggested that mutuality is a critical factor in collaboration (16). They proposed that three dimensions—mutual trust, respect, and shared goals—could be used to measure mutuality. Previous research is in line with the mutuality in collaborative theory, which includes mutual trust and respect. However, this study differs from previous studies in that it emphasizes the importance of resource utilization, exchange mechanisms, and mutual respect as essential components of mutuality.

Norms

The "norms" dimension in collaborative theory is crucial for effective collaboration, comprising rules, values, and beliefs governing behavior and interactions. Barbara Gray identified "norms of trust" and "norms of communication" as measurement dimensions (14). In addition, Thomson and Perry introduced "norms of reciprocity" for resource sharing, and O'Leary's research added "norms of conflict resolution" for managing conflicts (15,28). This study differs from previous studies in that it incorporates commitment and reward indicators in addition to trust. According to experts, trust promotes commitment and motivation, as gauged by institutions' confidence in stunting reduction achievement through collaboration. Furthermore, commitment was measured by institutions' participation, and rewards serve as recognition to maintain their commitment.

Limitations and Cautions

A limitation of this study is the absence of quantitative results from the cross-sector collaboration assessment using the developed indicators. Additionally, future research may focus on quantitatively measuring the role of cross-sector collaboration in stunting reduction acceleration efforts. This quantitative research will help solidify the stunting collaboration assessment model.

Recommendations for Future Research

Incorporating the collaboration assessment indicators identified in this study is recommended for evaluating stunting reduction acceleration in South Sulawesi Province.

CONCLUSION

The identified indicators enhanced the existing cross-sector collaboration theory proposed by experts. In addition, these indicators, which were developed using five dimensions, can be used to assess cross-sector performance in stunting reduction acceleration programs, particularly in South Sulawesi Province, Indonesia.

AUTHOR'S CONTRIBUTION STATEMENT

Author 1, author 2, author 3, author 6, author 7, and author 9 designed the experiments. Author 4, author 5, author 8 and author 10 analyzed the data. Author 11 and Author 12 analyzed the data and prepared the manuscript. All authors approved the final manuscript.

CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

SOURCE OF FUNDING STATEMENTS

Funding for this study was provided by LPPM Universitas Hasanuddin, grant number 00323/UN4.22/PT.01.03/2023

ACKNOWLEDGMENTS

We would like to express our gratitude to the informants for their support and contributions to this research.

BIBLIOGRAPHY

1. Miranti, Mutiarasari D, Arsin AA, Hadju V, Mallongi A, Nur R, et al. Determinants of the incidence of stunting in the working area of Kinovaro Sigi Health Center. *Enferm Clin.* 202 ;30 (IcnpH 2019):246–52. Available from: <https://doi.org/10.1016/j.enfcli.2019.10.077>
2. GNR. Global Nutrition Report. Actions and Accountability to Accelerate the World's Progress on Nutrition. Washington, DC; 2014.
3. World Bank. Indonesia: Accelerating Action Against Stunting. 2016.
4. Indonesian Ministry of Health. 2018 National Riskesdas Report. Publishing Institution Health Research and Development Agency (LPB). 2019. p. 674.
5. WHO. World Health Organization. Reducing Stunting in Children: Equity Considerations for Achieving the Global Nutrition Targets 2025. 2018.
6. SSGI. Study of Indonesia's Nutritional Status 2021. Ministry of Health of the Republic of Indonesia Health Research and Development Agency Ris Kesehatan Nas Stud of Indonesia's Nutritional Status 2021 Individual Questionnaire. 2021;1–4.
7. Sumiati, Arsin AA, Syafar M. Determinants of stunting in children under five years of age in the Bone regency. *Enfermería Clínica.* 2020;30(4):371–4.
8. Satwapres. Strategi Nasional Percepatan Pencegahan Stunting 2012-2024. 2018.

9. Indonesia M of H of the R of. Ministry of Health of the Republic of Indonesia, Results of 2018 Indonesian Basic Health Research. Jakarta;
10. Regulation of the President of the Republic of Indonesia. Presidential Regulation of the Republic of Indonesia No. 72 of 2021 concerning the Acceleration of Reducing Stunting. Republic of Indonesia 2021 p. 23.
11. Human Development Worker. Human Development Cadre (KPM) Pocket Book; Ensuring Convergence in Handling Village Stunting. Human Development Worker. 2018.
12. Ministry of Health of the Republic of Indonesia. Indonesian Stunting Prevention Acceleration Strategy 2021-2024. Jakarta: Ministry of Health of the Republic of Indonesia; 2022.
13. Indonesia PR. REGULATION OF THE PRESIDENT OF THE REPUBLIC OF INDONESIA NUMBER 42 OF 2013 CONCERNING THE NATIONAL MOVEMENT TO ACCELERATE NUTRITION IMPROVEMENT. Vol. 16, Presiden Republik Indonesia. 2013. 2013 p.
14. Gray B, Purdy J. Collaborating for our future: Multistakeholder partnerships for solving complex problems. *Collaborating for Our Future: Multistakeholder Partnerships for Solving Complex Problems*. 2018. 1–251 p.
15. Thomson AM, Perry JL, Miller TK. Conceptualizing and measuring collaboration. *J Public Adm Res Theory*. 2009;19(1):23–56.
16. Chris Ansell, Alison Gash. Collaborative Governance in Theory and Practice. *J Public Adm Res Theory*. 2007;18:543–71.
17. Thomson, Marie A, Perry JL, M. TK. Linking Collaboration Processes and Outcomes Foundations for Advancing Empirical Theoryle. In R. O. and L. Bingham (Ed.). New York: Armonk, NY: Sharpe: Collaborative public management: The big questions (pp. 97–120); 2006.
18. Emerson K, Nabatchi T, Balogh S. An integrative framework for collaborative governance. *J Public Adm Res Theory*. 2012;22(1):1–29.
19. Bovaird T. on Beyond Engagement and Participation : User and Community Perspectives Performance and of Public Services Accountability Coproduction in Public Administration. *Public Adm Rev*. 2014;67(5):846–60.
20. Saz-Carranza, A., Lorenzo, O., & Pérez-Amaral T. An analysis of the main factors affecting the design of collaboration agreements between competitors. *Ind Corp Chang*. 2012;21(4):861–99.
21. Castañer X, Oliveira N. Collaboration, Coordination, and Cooperation Among Organizations: Establishing the Distinctive Meanings of These Terms Through a Systematic Literature Review. *J Manage*. 2020;46(6):965–1001.
22. Sørensen E, Torfing J. Enhancing Social Innovation by Rethinking Collaboration, Leadership and Public Governance. *Soc Front*. 2013;1–12.
23. Stoker G. Public value management: A new narrative for networked governance? *Am Rev Public Adm*. 2006;36(1):41–57.
24. Carayannis EG, Campbell DFJ. Triple helix, Quadruple helix and Quintuple helix and how do Knowledge, Innovation and the Environment relate to Each other? a proposed framework for a trans-disciplinary analysis of sustainable development and social ecology. *Int J Soc Ecol Sustain Dev*. 2010;1(1):41–69.
25. Nambisan S, Sawhney M. Orchestration Processes in Network-Centric Innovation: Evidence From the Field. *Acad Manag Perspect*. 2011;25(3):40–57.
26. Klijn EH, Koppenjan JFM. INSTITUTIONAL DESIGN IN NETWORKS Elaborating and analysing strategies for institutional design. Eighth Int Res Symp Public Manag (IRSPM VIII), 31 March-2 April 2004, Budapest. 2004;1–18.
27. Setiarsih D, Raharjeng SH, Kardina RN, Viantri P, Fildzah PP. The important role of multi-sector partnership in stunting management in east java: a literature review. *Bali Med J*. 2023;12(1).
28. O’Leary R, Bingham LB. The collaborative public manager: New ideas for the twenty-first century. *The Collaborative Public Manager: New Ideas for the Twenty-first Century*. 2009. 1–320 p.
29. Ministerio de Salud de Guatemala. Encuesta Nacional de Salud Materno Infantil y Nutrición (ENSMIN). Guatemala; 2022.
30. National Nutrition Council (NNC) Philippines. National Nutrition Survey 2022. Philippines; 2022.
31. International Institute for Population Sciences. National family health survey(NFHS-5) india 2019-21.

Demographic and health surveys. 2021. 1–714 p.

32. Ministry of Health. Indonesian Nutritional Status Study 2021. Ministry of Health of the Republic of Indonesia Health Research and Development Agency National Health Research Indonesian Nutritional Status Study 2021 Individual Questionnaire. 2021;1–14.