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Problems Scanning Related to Stunting Using Iceberg Theory Model in Salakbrojo Village Central Java

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ABSTRACT
The prevalence of stunting to date is 21,6%, which is far from target which is 14%. Research aimed to elaborate on problem of stunting using iceberg method model analysis. The research is a qualitative study with a phenomenological approach to obtain idea of stunting occurrence pattern as well as the root of problem. Data was collected by assigning focused group discussion. Correspondents were ten mothers of toddlers, five health cadres, a secretary of rural, and a rural midwife. Validity test was done by doing data source triangulation during focused group discussions. Mental model analysis was taken using directly elicited mental model technique by doing content analysis. Result of iceberg analysis found that occurrence of stunting was 3,42%. Patterns and trends include wasting 2,92%, normal nutrition 84,39%, risk of overnutrition 5,85%, overnutrition 1,95%, and obesity 1,46%. Systemic structure has shown there are relation between direct cause include lack of food intake, exclusive breastfeeding, complementary food, infectious diseases and incomplete basic immunization. Indirect causes for stunting include lack of knowledge of stunting, access of health services, house condition triggers infectious diseases and poor sanitation. The mothers' analysis on mentality who are confident about their children being healthy and active despite nutritional problems. Mental model of health cadres, rural midwives, rural government and public health centers believe that collaboration in solving stunting problems is needed. It can be concluded that iceberg model can be applied in analyzing stunting problem and results of it can be considered in the implementation of stunting treatment.

INTRODUCTION

The prevalence of stunting to date is still high which is 21,6% and it is far from the target expected by the government which is 14%. The number indicates that two out of ten children are experiencing stunting.[1] This condition fails children's growth due to chronic malnutrition. Besides malnutrition during the first 1000 days of life, lack of primary health service access also becomes the causal factor of stunting. This problem of growth is irreversible and can hamper the development of children's intelligence and learning capacity to reach their maximum potential. Stunting also has been a factor of health disorder risks due to several chronic illnesses such as diabetes mellitus and heart disease.[2] Based on Mustafa et al (2015), a child who is suffering from stunting tends to have lower intelligence, a higher risk of getting obese, and is prone to various degenerative diseases.

Stunting which is possessed by children in the age of 9-24 months, if continuing, can lead to psychological development disruption which might appear at the age of 17. The symptoms which appear in teenagers who have stunting such as anxiety disorder, depression, and low self-esteem.[3] In line with a South Asian study by Saif and Anwar (2023), malnutrition is a hidden iceberg phenomenon in child anthropometric failure. The research using the ECIAF (a composite index of anthropometric failure) model, this study looks at the variety of malnutrition in South Asia throughout some periods.[4]

The efforts in decreasing stunting numbers have shown a positive trend, at the national level, it was 24,4% in 2021. This means that the number of stunting needs to be decreased by as much as 3,8% every year to reach that goal in 2024. Based on data from the Nutritional Status Survey of Indonesia *(Survei Status Gizi Indonesia or SSGI)* in 2022, the decreasing number of stunting in Central Java was insignificant which was 0,1% from 20,9% in 2021, so it became 20,8% in 2022. Pekalongan Regency's stunting rate is 23.1% higher than Central Java its 20.1%. Based on the group age, the stunting number in children aged 24-35 months was 25,29%, which was the highest among the other age groups.[5]

Based on the national acceleration scheme, there are 12 provinces selected as guided regions from the program. In the 2023 first semester, only two out of nine specific intervention indicators reached the target, that was pregnant women had iron supplements at least 9 tablets throughout the pregnancy period and children in the age of 6-23 months had weaning food.[6] These facts have shown a more comprehensive effort and strategy to reach the set target. Therefore, it is deemed necessary to investigate more deeply and comprehensively stunting problems that are related to intervention aspects, target indicators, and determinants.

Referring to data from Pekalongan District Health Service for 2022, the stunting rate in Salakbrojo Village is 12 cases and is quite high compared to other areas. Results of the initial study in Salakbrojo Village showed that problems of stunting were related to the mother's parenting in providing nutrition. Babies aged ≤6 months are generally given formula milk, honey and other additional foods. Babies aged ≥6 months do not receive adequate nutritional intake because mothers are not competent in serving a varied menu according to the child's needs. Menu variations are very necessary to meet nutritional needs, especially for children who have difficulty eating and are picky eaters. Apart from nutritional adequacy factors, stunting is a multidimensional problem. It takes a framework iceberg thinking approach to visualize stunting problem in three descriptions: problems that are above surface of sea, problems which is below surface line of seawater and issues that are at bottom of sea.[7] The iceberg model includes event variables, event patterns, problem structure that causes stunting and a mental model that is the root of problems.

MATERIAL AND METHOD

This study is a qualitative-quantitative study with a phenomenological approach to obtaining an overview of stunting patterns and the roots of the problem.[8,9] The analysis of problems and roots in stages using the iceberg theory model (iceberg theory). The data was collected through a focused group discussion in Salakbrojo Village Hall in August 2023. Correspondents selected in the focused group discussion included 10 mothers who have under five kids which were selected by using predetermined criteria. Namely, mothers who have children who are

indicated to be stunted, mothers who have children with wasting nutritional status mothers who have children with under nutritional status mothers who have children with normal nutritional status mothers who have children with overweight/obese. Each criterion consists of two informants. Other informants consist of 5 health cadres, 1 secretary, and 1 rural midwife.[9] Total number of informants was 17.

The aspects that were deeply delved into in the focus group discussion are nutrition issues, tendency patterns, causal factors, root problems, and strategic interventions that have been carried out in the decline of stunting in the village of Salakbrojo. Validity and reliability testing using source triangulation techniques was carried out directly in the focus group discussion. Source triangulation to obtain data from various sources in a single method of data collection namely focus group discussion so that data is complete from various perspectives.[10,11]

Iceberg theory approach is used to scan problems based on the structure of the iceberg. The part where the tip is above sea level is a visible problem; part that is below the sea surface is an invisible problem. The phenomena seen above the surface of the sea surface are only symptoms of problems that arise and are perceived by society. The phenomenon below the surface size and depth of the problem is much more massive than the symptoms seen.[12]

According to iceberg theory, the scanning phase of a problem consists of events that are related to context of problem. The second stage is patterns and trends, that is, patterns of trend That are formed about problem context and indicate the existence of factors that play a role as cause and effect. Scanning problems at this stage unravel the root problems associated with stunting. The fourth stage is the mental model (Figure 1), which is the study of beliefs and assumptions that form problems and problem-solving.[13] The mental model analysis uses the technique of direct-elicited mental models with a content analysis approach. Data analysis is done descriptively using open qualitative data obtained from focused group discussions.[14] This research has received ethical approval by the Health Research Ethics Committee of the Faculty of Health University of Pekalongan which is recorded in the ethical clearance numbered 166/B.02.01/KEPK/VII/2023.

RESULTS

The results were presented following the structure of the iceberg: scanning events, scanning patterns and trends, scanning systemic structure, and scanning mental models.

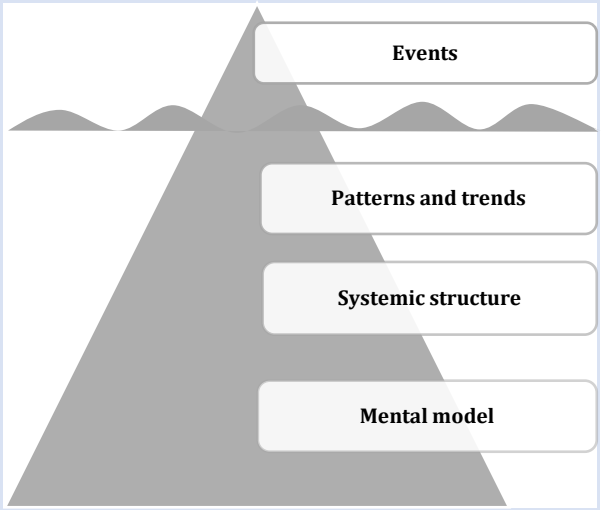
Analysis Avents

Events obtained include stunting data and other data such as exclusive breastfeeding, complete basic immunization, weaning food giving (MPASI), sanitation, infectious diseases, food intake, access to health services, as well as the knowledge of mothers-in-law against stunting. Table 1 shows the results of scanning against the stunting event:

Table 1. Stunting Events Based on Toddlers' Nutritional Status

Characteristics	n = 205	%
Exclusive Breastfeeding		
Given exclusive breastfeeding	132	84.39
Not given exclusive breastfeeding	73	15.61
Food Intake		
Carbohydrate	49	24
Plant-based protein	31	15
Animal-based protein	37	18
Vegetables	27	13
Fruits	39	19
Fat and milk	22	11
Basic Immunization		
Complete	185	90.25
Incomplete	20	9.75
Weaning Food		
≥ 6 months	153	74.63
≤ 6 months	52	25.37
Environment Sanitation		
Toilet Availability		
Have toilet	199	97.70
Do not have a toilet	6	2.30
Drink Water Sources		
Dug well	152	74.14
Boreholes	41	20
PDAM (Regional Corporation of Drink Water)	12	5.86
Knowledge about Stunting		
Sufficient	133	65
Insufficient	72	35
Infectious Diseases		
Suffering from it	6	2.93
Not suffering from it	199	97.07

Source: Primary Data, 2023



Source: Monat & Gannon, 2023

Figure 1. Iceberg Model[12]

Analysis Patterns and Trends

The second stage of scanning stunting problems is an analysis of patterns and trends. Analysis of patterns and trends displayed in Table 2. Table 2 shows that 7 cases (3.42%) are included in indicated case of stunting. Stunting events in the village of Salakbrojo Central Java are accompanied by other problems of nutritional status, such as malnutrition, risk of overnutrition, overnutrition, and obesity.

Systemic Structure

The third stage of the scanning problem is an analysis of the systemic structure that affects stunting incidents as well as other nutritional problems in the village of Salakbrojo, Pekalongan Regency. Figure 2 shows the results of the systemic structure analysis. Systemic structure model that describes the causes of stunting which are direct causes and indirect causes. The direct causes include lack of food intake, exclusive breastfeeding, complementary food, infectious diseases and incomplete basic immunization. Indirect causes for stunting include lack of knowledge of stunting, access to health services, house condition triggers infectious diseases and poor sanitation. The figure 2 shows that direct cause is the most dominant factor causing stunting in the village of Salakbrojo, Central Java. Indirect causes is triggering the emergence of direct causes.

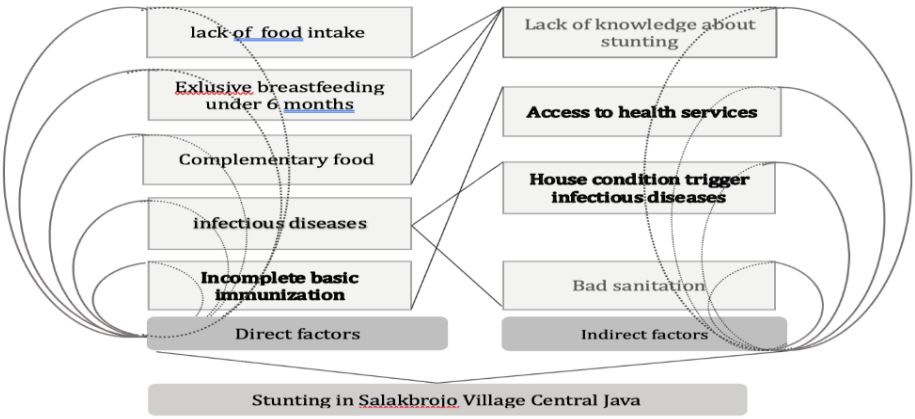
Mental Models

The fourth phase is the mental analysis of the model and the final phase of the iceberg analysis. The analysis presented in Table 3 is the result of focus group discussions by all correspondents, including the health cadres, rural midwives, village leaders, and mothers. The analysis of mental models aims to summarize the broad understanding into more specific ones. The model mental analysis is based on an in-depth investigation of information to understand the root of the problem.

Table 2. The Patterns and Trends of The Toddlers' Nutritional Status

Characteristics	n = 205	%
Nutritional Status		
Indicated stunting	7	3.42
Malnutrition	6	2.92
Normal	173	84.39
At risk of overnutrition	12	5.85
Overnutrition	4	1.95
Obese	3	1.46

Source: Primary Data, 2023



Source: Primary Data, 2023

Figure 2. Stunting Systemical Structure in Salakbrojo Village

Tabel 3. Mental Models Stunting in Desa Salakbrojo

Subject Category	The Mental Models Issues of Stunting
Toddlers' Mother	The mothers think that stunting is not a big problem to worry about. They do not feel anxious as long as the child is not sick and can carry out activities appropriate for his age. They also have confidence that their children will grow and develop normally when they enter the school.
Health Cadres	The cadres have sufficient knowledge about stunting and it is the main government program at the moment. They support the efforts to reduce stunting through the Integrated Services Post *(Pos Pelayanan Terpadu/Posyandu)* activities. They play an important role to prevent and reduce stunting in Salakbrojo Village.
Salakbrojo Village Head	The Salakbrojo Village Government supports the program to accelerate stunting reduction. The village government also provides funds for a program related to stunting through the Integrated Services Post *(Pos Pelayanan Terpadu/Posyandu)* and other activities. The municipality of Salakbrojo also facilitates the Puskesmas activities organized in the village. Regularly, the municipality coordinates with the health cadres to monitor the implementation of the stunting reduction program.
Rural Midwife	The rural midwife has the view that reducing stunting is not an easy effort to implement. The effort to reduce stunting requires a consistent and intensive effort. However, if the program is successful a role model for the community.

Source: Primary Data, 2023

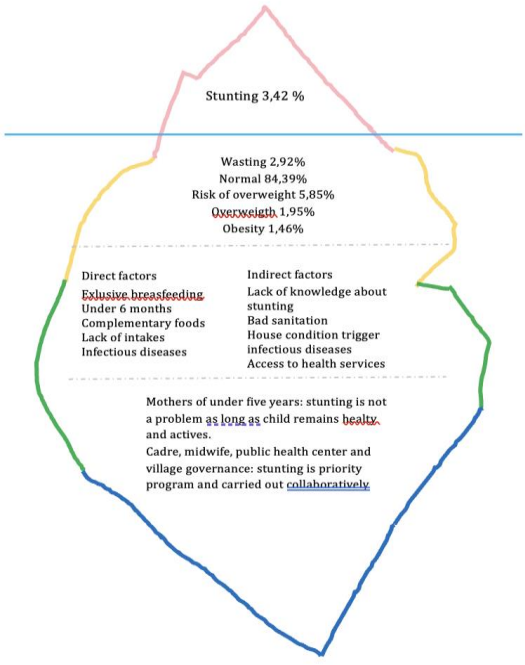
Table 3 informs us of the existence of two different mental models. The villagers, villagers, and cadres have a mental models that stunting is a problems that must be tackled together in collaboration with various parties. The mental models of mothers believes that mothers do not consider stunting as a serious problem.

DISCUSSION

The study uses the iceberg phenomenon theory model as a tool to analyze stunting problems in the village of Salakbrojo, Central Java. Some studies have used iceberg theory as a methodological approach as well as an analysis tool.[15,16,17,18] Iceberg theory model is a method for mapping research problems transparently. This theory also provides a comprehensive overview of the field of problems being studied. As an analytical tool, iceberg theory can dig deeper into understanding while identifying problem-prevention interventions.[17]

The iceberg construction is built from patterns that form structures systematically.[12] The iceberg model is a structure that is interrelated and describes a causal and consequential relationship.[12] It can be seen in Figure 2 that there is a cause-and-effect relationship in the dimensions of direct cause and indirect cause. Some studies use iceberg models for epidemiological modelling of new and ongoing cases. Epidemiological iceberg models can be used to plan troubleshooting. This model is relevant for applications in disease surveillance and screening, disease burden calculation, health services, and program planning.[15]

Iceberg phenomenon in stunting is described in two layers, namely upper layer above surface and lower layer underneath the surface. Scanning stunting problems in village of Salakbrojo as a whole can be seen in the figure 3:



Source: Primary Data, 2023

Figure 3. Results of Problem Scanning Using Iceberg Phenomenon Model

The events of stunting are at peak of the iceberg as visible and quantitatively measurable. There are seven cases indicating that there is a case of stunting from village of Salakbrojo. Stunting is closely linked to economic capacity of people to meet their nutritional food needs. A total of 131 families have income of less than Rp. 2,500,000, out of 205 families in Salakbrojo Village. This number is higher than the minimum wage figure in Central Java in 2023 of Rp. 2,247,346,00.[19] Results of the Indonesian Nutrition Status Survey in 2022 showed a decline in stunting trend from 24.4% in 2021 to 21.6% in 2022. Overweight cases have dropped from 3.8% in 2021 to 3.5% in 2022, but the prevalence of wasting and underweight has increased by 2022.[1]

The prevalence of stunting is declining globally but not evenly in every country, especially in rural areas in countries with severe poverty rates. Based on socio-economic status, there is a significant gap in the rate of decline between urban and rural areas.[20] This follows Permatasari and Chadirin study (2022), which states that stunting incidents in Bogor district are related to family income. Stunting children come from families with a monthly income of Rs. 3,800,000 and live in rural areas.[21] A study by Win and Shafique et al. (2020) revealed a relationship between working mothers and stunting cases in Dhaka, Bangladesh. Working mothers come from low-income families with extended family characteristics.[22]

The second layer of iceberg is patterns and trends, indicating a pattern of events that has similarities with stunts. Figure 3 shows patterns and trends of undernourishment, normal nutrition, higher nutritional risk, more nutrition, and obesity. The findings are interesting because they show a double burden of malnutrition, namely, overnourishment and obesity. Stunting is generally accompanied by other malnutrition problems such as wasting, underweight, and anemia.[23] These four problems are double burden of global undernourishment problem. Percentage of children between ages of 2 and 19 at risk of being overweight increased significantly by 18% in South Africa by 2020.[24] Stunting study in Timor Leste found almost same condition that prevalence of stunting in young people (44.4%) was followed by underweight (37.5%) and wasting (24.3%).[25] Increasing mother's education has a significant impact on reducing stunting. however, changes in behaviours towards mother's education did not show a significant relationship reducing stunting.[26]

Systemic structures form causality structures between indirect and direct causes. The larger systemic structure, more causal and consequential relationships are described. The wider complexity analysis, easier it is to find a solution to problem.[27] Systemic structures with a high degree of complexity make problem more difficult to understand. A flow diagram can retrospectively deduce a cause-and-effect relationship or even the absence of a factor-to-factor relationship.[12] Based on systematic structural analysis, direct causes of stunting include exclusive breastfeeding, weaning food giving, food intake, and infectious diseases. These factors arise from indirect causes such as a mother's knowledge, sanitation of environment, home characteristics, and access to basic health care. 0–6-month exclusive breastfeeding is believed to not only perfectly meet baby's nutritional needs but can also boost infant's immunity against the threat of infectious diseases. Exclusive breastfeeding is equivalent to three times the intake that must be met in children who consume energy and protein sources.[21]

Research by Rachmawati (2019) states that improper health practices early in life cause babies to be 1.15 times more likely to suffer from stunting. One of the mistakes in health practice is giving weaning food before age of six months.[28] Food intake calculation is used in this study using the FFQ method (Food Frequency Questionnaires). This method contains a list of choices, food combinations, frequency of consumption, size of servings, and duration of intake (in months and years). This FFQ method is suitable for research with large population numbers.[29] Nindyaningrum, in her research (2023), mentioned that children who consumed animal-based protein proved to have 33.3% better nutritional status.[30] Minimum energy intake <1400 kcal/capita/day significantly influenced the prevalence of stunting in babies under 2 years old in Indonesia.[31]

Stunting is closely related to environmental sanitation and home characteristics. Prevalence

of stunting in households drinking untreated water was 38.2% compared to those treated at 27.3%.[32] This is consistent with research in South Ethiopia showing that unavailability of toilets was improper and insufficient, water sources were inadequate, and the non-use of soap for hand washing significantly increased the stunting prevalence.[33] WHO Conceptual Framework identifies health care as one of the factors affecting stunting.[34] Children who suffer from malnutrition are affected by poverty and limited access to health care.[35]

Based on figure 2, it is known that mothers of toddlers have a mental model that tends not to worry about stunting child's condition. Mother believes there is no need to question stunting condition of their children as long as they look healthy and active. A mother's knowledge of stunting is closely related to her educational level. Adequate education of the mother increases good knowledge and skills in caring for children, including fulfilling their nutrition.[36] A study by Win (2020) in Bangladesh showed slightly different results; low-educated mothers were not closely associated with stunting events, and the results matched an OR figure of 0.94.[22] Stunting reduction program is one of the priorities of government through specific and sensitive intervention. Both interventions are carried out in an integrated way from the central level to village government.[37]

CONCLUSION AND RECOMMENDATION

The iceberg model is a comprehensive problem analysis that describes stunting problems both quantitatively and qualitatively Knowledge contributes to the emergence of other factors, both direct and indirect. Knowledge contributes to exclusive breastfeeding, the provision of MPASI ≤6 months, fulfilment of the child's food needs, as well as sanitary conditions of environment and home. The mother's knowledge also shapes the mental model; they believe stunting is not a big deal to worry about.

The recommendation of this study reveals that convergence efforts to reduce stunting involving village government, district government, public health center, public health office and other related sectors are needed. Convergence efforts focused on specific and sensitive interventions, especially in improving the mother's knowledge of stunting.

AUTHOR CONTRIBUTIONS

Y carried out data collection with focus group discussion, drafted the framework of the concept of an iceberg model and described it as an analysis instrument, conducted an analysis of systemic structures and mental models, wrote manuscripts, and became a corresponding author. R and DNRM collected data using focus group discussions, analyzed systemic structures and mental models and wrote the manuscript. MF performs nutritional status measurements based on data in the KMS Book and presents the measurement results in the form of tables. Y = Yuniarti; R = Ristiawati; DNRM = Dewi Nugraheni Restu Mastuti; MF = Muhammad Fatih.

CONFLICTS OF INTEREST

The author declares that there is no conflict of interest.

REFERENCES

1. Badan Kebijakan Pembangunan Kesehatan. Hasil Survei Status Gizi Indonesia (SSGI) 2022.
2. BKKBN. Laporan Pelaksanaan Percepatan Penurunan Stunting Semester Pertama Tahun 2023.
3. Migang, Y. W., Rarome, M. J., Heriteluna, M. & Dawam, M. Intervention of Specific Nutrition and Sensitive Nutrition with Nutritional Status of Under Two-Year Infants in Family Planning Village as Efforts to Face the Demographic Bonus. *Jurnal Kesehatan Masyarakat*.2020; 16(1): 101–110. https://journal.unnes.ac.id/nju/index.php/kemas/article/view/23172
4. Saif, S. & Anwar, S. Unraveling The South Asian Enigma : Concurrent Manifestations of Child Anthropometric Failures and Their Determinants in Selected South Asian Countries. *BMC Nutrition*.2023;9(120):1-13. https://bmcnutr.biomedcentral.com/articles/10.1186/s40795-023-00771-4

5. Badan Kebijakan Pembangunan Kesehatan. Hasil Survei Status Gizi Indonesia (SSGI) 2022.
6. BKKBN. Laporan Pelaksanaan Percepatan Penurunan Stunting Semester Pertama Tahun 2023.
7. Thordal-Christensen, H. A Holistic View on Plant Effector-Triggered Immunity Presented as an Iceberg Model. *Cellular and Molecular Life Sciences*.2020;77(20): 3963–3976. https://link.springer.com/10.1007/s00018-020-03515-w
8. Maxwell, J. A. & Reybold, L. E. Qualitative Research. in *International Encyclopedia of the Social & Behavioral Sciences: Second Edition*.2015; (Elsevier Inc.):685–689. https://linkinghub.elsevier.com/retrieve/pii/B9780080970868105586
9. Moen, K. & Middelthon, A.-L. Qualitative Research Methods. in *Research in Medical and Biological Sciences* 321–378 (Elsevier, 2015). https://linkinghub.elsevier.com/retrieve/pii/B9780127999432000100
10. Moon, M. D. Triangulation: A Method to Increase Validity, Reliability, and Legitimation in Clinical Research. *Journal of Emergency Nursing. 2019;*45(1):103–105. https://linkinghub.elsevier.com/retrieve/pii/S0099176718305889
11. Carter, N., Bryant-Lukosius, D., Dicenso, A., Blythe, J. & Neville, A. J. The Use of Triangulation in *Qualitative Research. Oncology Nursing Forum*. 2014;41(5):545-547. http://onf.ons.org/onf/41/5/use-triangulation-qualitative-research
12. Monat, J. P. & Gannon, T. F. The Meaning of "Structure" in Systems Thinking. *Systems*. 2023;11(2). https://www.mdpi.com/2079-8954/11/2/92
13. Doyle, E. E. H. *et al.* Eliciting Mental Models of Science and Risk for Disaster Communication: A Scoping Review of Methodologies. *International Journal of Disaster Risk Reduction*. 2022:77. https://linkinghub.elsevier.com/retrieve/pii/S221242092200303X
14. Holtrop, J. S., Scherer, L. D., Matlock, D. D., Glasgow, R. E. & Green, L. A. The Importance of Mental Models in Implementation Science. *Frontier in Public Health*. 2021;9 https://www.frontiersin.org/articles/10.3389/fpubh.2021.680316/full
15. Moradi, Gholami, et al. How Is the Iceberg of COVID-19? Results From a Rapid Literature Review. *Medical Journal of The Islamic of The Republic of Iran*. 2021;35(77). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8285553/
16. Leitao, S. *et al.* Maternal Morbidity and Mortality: An Iceberg Phenomenon. *BJOG: An International Journal of Obstetrics and Gynaecology*. 2022; 129(3):402–411. https://obgyn.onlinelibrary.wiley.com/doi/10.1111/1471-0528.16880
17. Geulayov, G. *et al.* Incidence of Suicide, Hospital-presenting Non-fatal Self-harm, and Community-occurring Non-fatal Self-harm in Adolescents in England (The Iceberg Model of Self-harm): A Retrospective Study. *Lancet Psychiatry*. 2018: 2018;5(2):167-174. https://linkinghub.elsevier.com/retrieve/pii/S2215036617304789
18. Thordal-Christensen, H. A Holistic View on Plant Effector-triggered Immunity Presented as An Iceberg Model. *Cellular and Molecular Life Sciences*. 2020;77(20): 3963–3976. https://link.springer.com/10.1007/s00018-020-03515-w
19. BPS Provinsi Jawa Tengah. Upah Minimum Kabupaten/Kota di Provinsi Jawa Tengah 2021-2023.
20. Baye, K., Laillou, A. & Chitweke, S. Socio-Economic Inequalities in Child Stunting Reduction in Sub-Saharan Africa. *Nutrients*.2020; 12:1–11. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7019538/pdf/nutrients-12-00253.pdf
21. Permatasari, T. A. E. & Chadirin, Y. Assessment of Undernutrition Using The Composite Index of Anthropometric Failure (CIAF) and Its Determinants: A Cross-sectional Study in The Rural Area of The

Bogor District in Indonesia. *BMC Nutrition*. 2022;8(1). https://bmcnutr.biomedcentral.com/articles/10.1186/s40795-022-00627-3

22. Win, H. *et al.* Association Between Mother's Work Status and Child Stunting in Urban Slums: S Cross-sectional Assessment of 346 Child-mother Dyads in Dhaka, Bangladesh. *Archives of Public Health*. 2022;80(1). https://archpublichealth.biomedcentral.com/articles/10.1186/s13690-022-00948-6
23. Kim, J. *et al.* Estimating the Burden of Child Undernutrition for Smaller Electoral Units in India. *JAMA Network Open*. 2021;4(10). https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2785600
24. Gwelo, N. B., Sumankuuro, J., Akintola, O. & Brieger, W. R. Factors Associated with Underweight, Overweight, Stunting and Wasting Among Primary School-going Children Participating in A School Health Initiative in South Africa. *BMC Nutrition*. 2023;9(1). https://bmcnutr.biomedcentral.com/articles/10.1186/s40795-023-00778-x
25. Maulina, R., Qomaruddin, M. B., Kurniawan, A. W., Fernandes, A. & Astuti, E. Prevalence and Predictor Stunting, Wasting and Underweight in Timor Leste Children Under Five Years: An Analysis of DHS Data in 2016. *Journal of Public Health in Africa*. 2022;13 (2166). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9425938/pdf/jpha-13-22-2116.pdf
26. Dessie, G., Tsegaye, G. W., Mekonnen, B. A., Bayih, M. T. & Nigussie, Z. M. Change in Stunting and Its Associated Factors Among Children Aged Less Than 5 Years In Ethiopia Using Ethiopia Demographic and Health Survey Data From 2005 To 2019: A Multivariate Decomposition Analysis. *BMJ Open*. 2022;12(11). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9660614/pdf/bmjopen-2022-061707.pdf
27. Lissack, M. Understanding Is a Design Problem: Cognizing from a Designerly Thinking Perspective. Part 2. *She Ji: The Journal of Economics, Design, and Innovation*. 2019; 5(4):327–342. https://linkinghub.elsevier.com/retrieve/pii/S2405872619300929
28. Rachmawati, S., Machmud, P. B. & Hatma, R. D. Early Life Health Practice and Stunting Among Children Under-Five Years Old. *Media Kesehatan Masyarakat Indonesia*. 2019;15(2):120–127. http://journal.unhas.ac.id/index.php/mkmi/article/view/6334
29. Neuhouser, M. L., Prentice, R. L., Tinker, L. F. & Lampe, J. W. Enhancing Capacity for Food and Nutrient Intake Assessment in Population Sciences Research. *Annual Reviews of Public Health.* 2023;44: 37–54. https://pubmed.ncbi.nlm.nih.gov/36525959/
30. Nindyaningrum, S. F., Muniroh, L. & Rifqi, M. A. Relation of Three Basic Needs by Mother with Growth and Development of Children Age 3-5 Years in Mulyorejo Surabaya. *Indonesian Journal of Public Health*.2023;18(1): 93–105. https://ejournal.unair.ac.id/IJPH/article/view/24312
31. Wardani, Z., Sukandar, D., Baliwati, Y. F. & Riyadi, H. Access to Sanitation, Smoking and Annual Parasite Incidence of Malaria as Stunting Predictors of Children Under-2 Years in Indonesia. *Media Kesehatan Masyarakat Indonesia*. 2020;16(1):127–139. http://journal.unhas.ac.id/index.php/mkmi/article/view/9070
32. Das, S. et al. Not Water, Sanitation and Hygiene Practice, but Timing of Stunting is Associated with Recovery from Stunting At 24 Months: Results from A Multi-Country Birth Cohort Study. *Public Health Nutrition*. 2021;24(6):1428–1437. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8025093/pdf/S136898002000004Xa.pdf
33. Woldesenbet, B., Tolcha, A. & Tsegaye, B. Water, Hygiene and Sanitation Practices are Associated with Stunting among Children of Age 24-59 Months in Lemo District, South Ethiopia, In 2021: Community Based Cross Sectional Study. *BMC Nutrition*. 2023;9(17). https://bmcnutr.biomedcentral.com/articles/10.1186/s40795-023-00677-1

34. Botero-Tovar, N., Arocha Zuluaga, G. P. & Ramírez Varela, A. Factors Influencing Delivery of Intersectoral Actions to Address Infant Stunting in Bogotá, Colombia – a Mixed Methods Case Study. *BMC Public Health*.2020;20(925). https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-09057-x
35. Singh, S. K., Srivastava, S. & Chauhan, S. Inequality in Child Undernutrition Among Urban Population in India: a Decomposition Analysis. *BMC Public Health.* 2020; 20(1852). https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-09864-2
36. Siddiqa, M., Zubair, A., Kamal, A., Ijaz, M. & Abushal, T. Prevalence and Associated Factors of Stunting, Wasting and Underweight of Children Below Five Using Quintile Regression Analysis (PDHS 2017–2018). *Scientific Reports.*2022;12(20326). https://www.nature.com/articles/s41598-022-24063-2
37. Peraturan Presiden (Perpres). Peraturan Presiden RI Nomor 72 Tahun 2021 Tentang Percepatan Penurunan Stunting. 2021; Jakarta.