

Prevalence, Predictors and Policy Implications of Double Burden of Malnutrition [DBM] in Indonesia

Analyses from Indonesia Basic Health Survey (RISKESDAS) 2013

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Background of study

- Malnutrition remains as health priority → contributes to > 50% deaths for children under 5 (Walton & Allen, 2011).
- Most Asian countries experiencing the nutrition transition.
- Whilst the problem of underweight still exists → the prevalence of obesity has increased rapidly in Indonesia.

Background of study

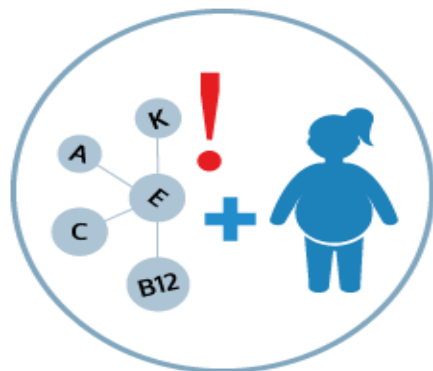
- Various interventions and programs →
 - reducing the underweight prev: from 30% (1995) to 19.6% (2013).
 - prev of stunting has remained high at around 37.2% in 2013 [down from 48% in 1995]
- Only few studies about DBM in Indonesia which using nationally representative surveys.

WHO



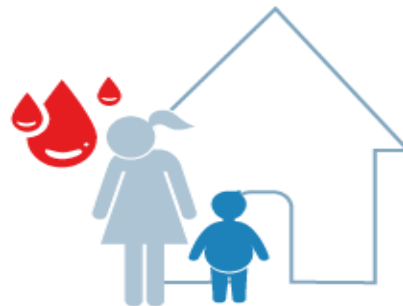
INDIVIDUALS

with the simultaneous presence of two or more types of malnutrition, or development of multiple types over a lifetime



HOUSEHOLDS

with multiple family members affected by different forms of malnutrition



POPULATIONS

with both undernutrition and overweight prevalent in the same community, region or nation



The importance of DBM's study

DBM

Individual

To identify the risk factors across the life stage esp. the occurrence of NCD's

HH

Needed to identify the modifiable risk factors at the household level

Population

Identify the system level factors affecting risk of DBM

Objectives of the study

To identify the extent of DBM in Indonesia (at the household level) and the main predictors as a basis for strengthening interventions.

Specifically :

- The DBM prevalence and its characteristics
- What are healthy lifestyle components which associated with DBM

Methods of Survey

IBHS (RISKESDAS) data description

- Community-based survey in 2013 (previously were conducted in 2007 & 2010).
- Nationally representative cross-sectional survey.
- Data collected includes essential health indicators.
- Multi-stage stratified sampling was used, with district/ municipality as the primary sampling unit.
- Sample: number of HHs covered was 294,959 [98.3%] and individual data from 1,027,763 household members [93%].

Methods of Study

- Study design: observational with a cross-sectional design.
- Population: all households and individuals who participated in the IBHS 2013 data collection.
- The subjects of this study are mother-child pairs:
 - All non-pregnant women of reproductive age [15–49 years], either ever-married or never-married,
 - with children aged 24-59 months and the mother-child pairs live in the same household.

Methods of Study

- Data validity and reliability:
 - Anthropometrics measurement variable → sufficient validity and reliability score > 80
- Data Analysis
 - Were carried out using SPSS software.
 - Univariate, bivariate (cross tabulation) and multivariate (binomial logistic regression).

DBM definition and Variables

- DBM is specified as the co-existence of stunted children paired with overweight mothers [SCOM] living in the same household.
- Paradoxical Malnutrition
- Why SCOM?
 - Stunting : cumulative & long-term nutritional deficiency during IU period & in the first 2 years of life.
- Healthy lifestyle: consumption of sugary, salty, fatty foods, instant noodle and wet/ fresh noodle.

Results

- There were 37,979 mother-child pairs included in the analysis.
- The Prevalence of SCOM was 8.2%

Type of Mother-Child Pair	Study Sample	
	N valid cases	%
SCOM	28,915	8.2
UCOM	32,817	3.8
WCWM [HAZ]	24,624	21.2
WCWM [WAZ]	23,277	30.5

Table 1. Prevalence of mother-child pairs in study sample

Abbreviations: SCOM, stunted children overweight mother;

UCOM, underweight children overweight mother;

WCWM [HAZ], well-nourished children well-nourished mother [based on HAZ]

WCWM [WAZ], well-nourished children well-nourished mother [based on WAZ].

Results

Bivariate analyses

- The SCOM Characteristics :
 - Children: in age group of 24-36 months is having the highest proportion.
 - Mother's: non-working, mid-level (primary or junior high school) education and having a short stature (height < 145 cm).
 - Father's: mid-level education.
 - Behavioral variables: fatty food, instant noodle and fresh noodle consumption.
- Details provided in the [appendices](#).

Results

Multivariate analyses

- Socio-demographic variables
 - There were 16,662 cases included → due to incompleteness.
 - Three models were presented.
 - SCOM pairs were significantly more likely to occur in households with:
 - Short mother (OR: 2; 95% CI for Exp (B) 1.75-2.28)
 - parents in middle-level of education (OR: 1.14; 95% CI for Exp (B) 1.02-1.27)

Results

Multivariate analyses

- Behavioral variables
 - There were 17,638 cases included → due to incompleteness.
 - SCOM pairs were significantly more likely to occur in households:
 - Who consume wet noodle at least one serving a day (OR 1.4 ; 95% CI for Exp (B) 1.13-1.74)
 - And consume fatty foods (OR 1.16; 95% CI for Exp (B) 1.06-1.27)
 - Other covariates were not associated with SCOM in multivariate models.

Discussion

Prevalence

- The prevalence of SCOM corresponds with previous multi-country studies which ranging from 8.4% - 10%.
- Within Indonesia's studies, the SCOM prevalence was between other estimates, ranging from 5.8% to 13%.
- However → consider the similarities and differences in sampling criteria.

Discussion

Predictors

- **The maternal factors** that were strongly associated with SCOM were the height.
- This result corresponds to the theory of intergenerational transmission of stunting that is presented in Bhutta et al. (2013).
- **The children factors** found to be a predictor of SCOM was child age. Younger children were more likely to experience SCOM.
- After 2 years of age, children were given complementary food. During this transition period, it may shift to improper feeding practices.

Discussion

Predictors

- **Households factors:** the highest SCOM prevalence was in the middle-income group.
- Association between socio-eco and SCOM → the inverted U shape.
- The people in this category were having the ability to purchase food. However, food selection? Healthy?
- Besides, the nutrition transition is undergoing.

Discussion

Predictors

- **Behavioral factors:** Consuming fatty foods and wet noodle associated with increased risk of SCOM.
- Due to data limitations, further analysis of details consumption can not be done.
- However, it provided an indication → food habits should be take into account In the program development.

Discussion

Policy implications

- Current policy & programs
 - 2011 → the first 1,000 days of life movement (Scaling Up Nutrition). Short term specific intervention → can be monitored in relatively short period.
 - Specifically focusing in mother-children interventions
- Based on this study results:

It is necessary to design policy/ intervention programs → **modify intergenerational transmission of stunting.**

Discussion

- Policy & Programs should be put more attention to health of women in reproductive age.
- Improving nutrition, education since the adolescent period may be critical.
- Important phase to modify the nutr. Status for both young mothers and their future children.

Discussion

Strength & Limitation of study:


- Strength: the usage of updated nationally representative data that used appropriate sampling methods.
- Limitations:
 - Cross sectional nature of study
 - Data availability → due to secondary data analysis.
 - Data incompleteness → 30% of women did not have complete anthropometrics measurement → reduction in study power.

Conclusion

- Prevalence of DBM (SCOM) in Indonesia was 8.2%.
- The SCOM predictors are: short stature of mothers, level of education of parents, SES of the family, wet noodle and fatty food consumption.
- Result of this study: reinforces the importance of modifying the intergenerational transmission of stunting between mother and child.
- Need to build the right strategy for nutrition education → improve the knowledge and empowerment of women.
- Women hold a key role as the family caregiver esp. feeding practice and ensuring a healthy environment for her family.



Thank You – Terimakasih



Appendices

Appendix 1.

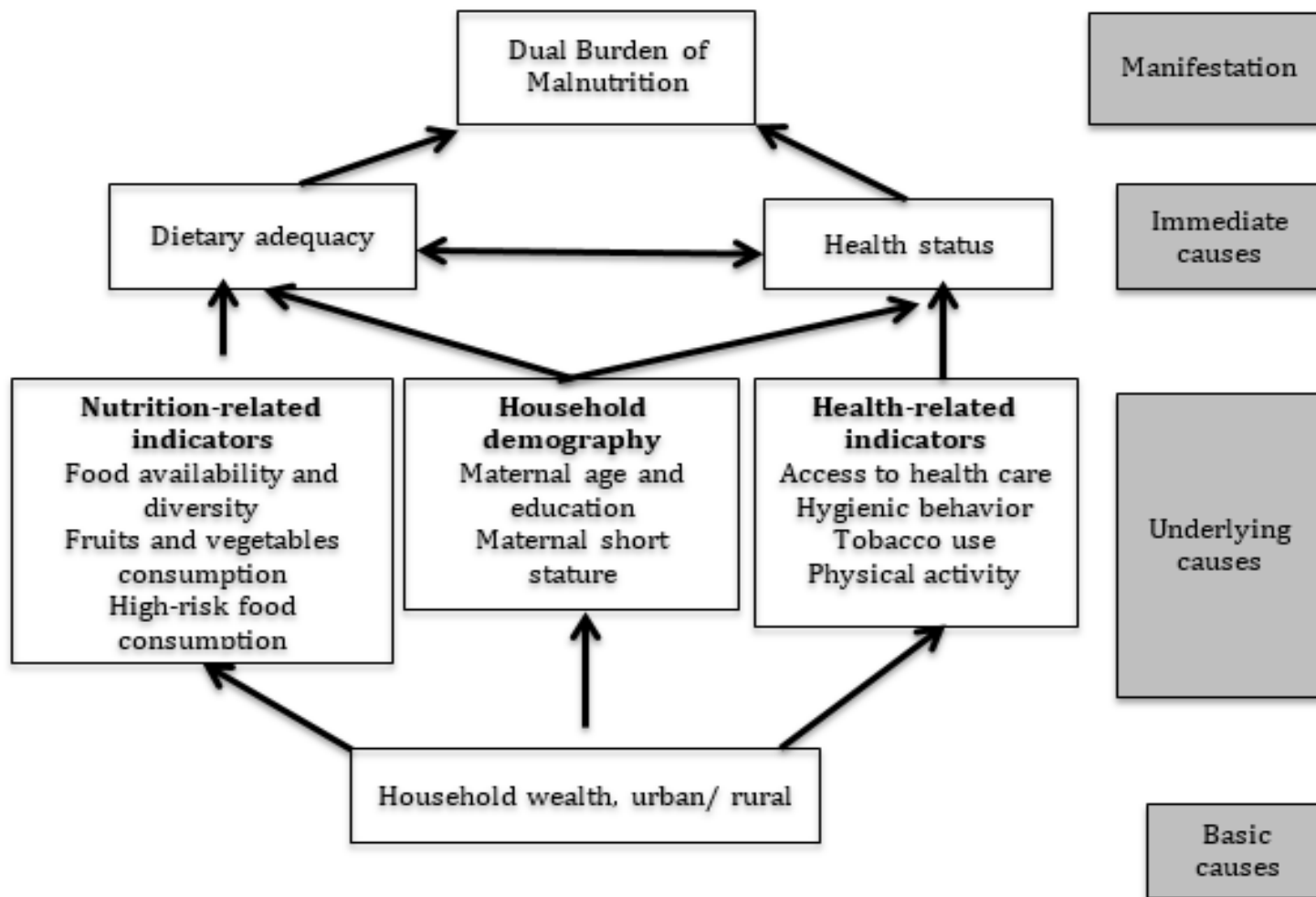


Figure 1. Conceptual framework of DBM, adapted from the UNICEF malnutrition framework (Black et al., 2008).

Appendix 2. The SCOM characteristics

		Study Sample I		Study Sample II	
		[n]	%	[n]	%
Child characteristics		37,979		16,775	
	Age [months, mean ± SD]	42.0 ± 10.3		35.9 ± 9.1	
	Sex	37,979		16,775	
	Male	19,508	51.4	8,456	50.4
	Female	18,471	48.6	8,319	49.6
Maternal characteristics		37,979		16,775	
	Age [years, mean ± SD]	31.3 ± 6.4		31.4 ± 6.3	
	Education [%]	18,149		16,775	
	Never go to school	605	3.3	550	3.3
	No schooling completed	1,561	8.6	1,460	8.7
	Elementary School	4,987	27.5	4,578	27.3
	Junior high School	4,070	22.4	3,754	22.4
	Senior High School	5,156	28.4	4,795	28.6
	Academy/ college or higher	1,770	9.8	1,638	9.8
	Working status [%]	18,149		16,775	
	Not working	10,517	57.9	9,743	58.1
	Working	7,455	41.1	6,869	40.9
	Looking for a job	97	0.5	93	0.6
	Student	80	0.4	70	0.4

Table 2. SCOM Pair Characteristics

NOTE: Study sample I: all sample who met the inclusion criteria. Study sample II: only included mother-child pairs with complete anthropometric data [BMI and HAZ].

Appendix 2. The SCOM characteristics

		Study Sample I		Study Sample II	
		[n]	%	[n]	%
Maternal characteristics		37,979		16,775	
	Occupation [%]	7,455		16,775	
	Civil Servants	911	12.2	850	12.4
	Private employees	863	11.6	794	11.6
	Entrepreneurs	1,467	19.7	1,362	19.8
	Farmer/ Fisherman/ Labor	3,390	45.5	3,090	45
	Other	824	11.1	773	11.7
	Marital Status	37,979		16,775	
	Married	37,052	97.6	16,369	97.6
	Living together	25	0.1	13	0.1
	Divorced	435	1.1	189	1.1
	Separated	218	0.6	90	0.5
	Divorced by death	249	0.7	114	0.7
Household characteristics					
	Area of living	37,979		16,775	
	Urban	16,927	44.6	7,653	45.6
	Rural	21,052	55.4	9,122	54.4
	Socioeconomic status	37,979		16,775	
	The lowest quintile	7,673	20.2	3,462	20.6
	Middle-lower quintile	7,130	18.8	3,104	18.5
	Middle quintile	7,350	19.4	3,204	19.1
	Middle-upper quintile	7,963	21	3,466	20.7
	The highest quintile	7,863	20.7	3,539	21.1

Appendix 3. Bivariate Analyses

Variables		DBM				P Value
		SCOM [n]	%	Not SCOM [n]	%	
Child's characteristics [N valid cases = 28,915]						
	Age [months]					
	24-36	1,522	13.0	10,172	87.0	<0.001
	37-48	603	6.4	8,798	93.6	
	49-60	255	3.3	7,565	96.7	
Mother's characteristics						
	Age [years] [N valid cases = 28,915]					
	15-34	1,578	8.0	18,244	92.0	0.01
	35-49	802	8.8	8,291	91.2	
	Occupational status [N valid cases = 17,638]					
	Working	913	12.6	6,341	87.4	0.003
	Not working	1,467	14.1	8,917	85.9	
	Education [N valid cases = 17,638]					
	Low [no schooling completed]	262	12.3	1,860	87.7	0.001
	Middle [primary or junior high school]	1,270	14.4	7,525	85.6	
	High [senior high school or higher]	848	12.6	5,873	87.4	
	Mother's height [N valid cases = 17,615]					
	Normal	2,039	12.7	14,039	87.3	<0.001
	Short stature [<145 cm]	341	22.1	1,200	77.9	
Father's characteristics [N valid cases = 26,522]						
	Education					
	Low [no schooling completed]	51	7.2	659	92.8	0.002
	Middle [primary or junior high school]	848	9.4	8,178	90.6	
	High [senior high school or higher]	1,373	8.2	15,413	91.8	
Household demography [N valid cases = 28,915]						
	Socioeconomic status					
	The lowest quintile	406	7.5	5,030	92.5	0.001
	Middle quintile	458	8.8	4,760	91.2	
	Middle-lower quintile	514	9.2	5,065	90.8	
	Middle-upper quintile	526	8.3	5,776	91.7	
	The highest quintile	476	7.5	5,904	92.5	

Appendix 3.

Table 15. Logistic regression assessing the probability of being a SCOM pair based on socio-economic variables

Variables	Model 1						Model 2						Model 3						
	B	S.E.	Wald	df	Sig.	Exp [B]	B	S.E.	Wald	df	Sig.	Exp [B]	B	S.E.	Wald	df	Sig.	Exp [B]	
Child's Age Category																			
24-36 months			10.89	2	0.00				10.92	2	0.00				10.81	2	0.00		
37-48 months	-0.10	0.05	3.70	1	0.06	0.90	-0.10	0.05	3.71	1	0.05	0.90	-0.10	0.05	3.75	1	0.05	0.90	
49-60 months	-0.22	0.07	9.15	1	0.00	0.80	-0.22	0.07	9.17	1	0.00	0.80	-0.22	0.07	9.03	1	0.00	0.80	
Working Status of Mother																			
Working	-0.08	0.05	2.48	1	0.12	0.93	-0.07	0.05	2.35	1	0.13	0.93							
Mother's Education Category																			
High			6.90	2	0.03				7.00	2	0.03				8.02	2	0.02		
Middle	0.14	0.06	6.30	1	0.01	1.15	0.14	0.06	6.38	1	0.01	1.16	0.15	0.06	7.33	1	0.01	1.17	
Low	0.06	0.09	0.37	1	0.55	1.06	0.06	0.09	0.36	1	0.55	1.06	0.06	0.09	0.43	1	0.51	1.06	
Short Stature																			
Yes	0.69	0.07	102.61	1	0.00	1.99	0.69	0.07	102.68	1	0.00	2.00	0.69	0.07	102.87	1	0.00	2.00	
Father's Working Status																			
Not Working	-0.11	0.14	0.68	1	0.41	0.89													
Father's Education Category																			
High			8.12	2	0.02				8.22	2	0.02				8.40	2	0.02		
Middle	0.13	0.06	5.27	1	0.02	1.14	0.13	0.06	5.35	1	0.02	1.14	0.13	0.06	5.44	1	0.02	1.14	
Low	-0.18	0.16	1.22	1	0.27	0.84	-0.18	0.16	1.22	1	0.27	0.84	-0.18	0.16	1.27	1	0.26	0.83	
Socioeconomic Status																			
Fifth quintile			34.79	4	0.00				35.33	4	0.00				38.53	4	0.00		
Forth quintile	0.06	0.07	0.71	1	0.40	1.06	0.06	0.07	0.71	1	0.40	1.06	0.06	0.07	0.79	1	0.38	1.07	
Third quintile	0.08	0.07	1.16	1	0.28	1.08	0.08	0.07	1.14	1	0.29	1.08	0.08	0.07	1.20	1	0.27	1.08	
Second quintile	-0.06	0.08	0.66	1	0.42	0.94	-0.07	0.08	0.70	1	0.40	0.94	-0.07	0.08	0.74	1	0.39	0.94	
First quintile	-0.34	0.08	16.41	1	0.00	0.71	-0.34	0.08	16.74	1	0.00	0.71	-0.36	0.08	18.07	1	0.00	0.70	
Constant	-1.91	0.06	1009.0	0	0.00	0.15	-1.91	0.06	1018.12	1	0.00	0.15	-1.94	0.06	1205.9	5	1	0.00	0.14
	Model X2 =8.94, df=8, p=0.35 Pseudo R2 = 0.018 N= 16,662						Model X2 =10.56, df=8, p=0.23 Pseudo R2 = 0.018 N= 16,662						Model X2 =10.46, df=8, p=0.23 Pseudo R2 = 0.018 N= 16,662						

Note: The dependent variable is SCOM, which has coded 0= not-SCOM and 1=SCOM.

Appendix 4.

Table 16. Logistic regression assessing the probability of being a SCOM pair based on the behavioural variables

Variables	Model 1						Model 2						Model 3					
	B	S.E.	Wald	df	Sig.	Exp. [B]	B	S.E.	Wald	df	Sig.	Exp. [B]	B	S.E.	Wald	df	Sig.	Exp. [B]
Sugary Foods Consumption																		
Rare consumption			1.62	2	0.44				1.84	2	0.40							
At least 1 serving a day	0.04	0.08	0.30	1	0.58	1.04	0.04	0.07	0.25	1	0.62	1.04						
Occasionally	-0.02	0.08	0.07	1	0.80	0.98	-0.03	0.08	0.14	1	0.71	0.97						
Fatty Foods Consumption																		
Rare consumption			15.22	2	0.00				15.18	2	0.00				16.90	2	0.00	
At least 1 serving a day	0.30	0.08	15.04	1	0.00	1.35	0.29	0.08	14.92	1	0.00	1.34	0.31	0.08	16.36	1	0.00	1.36
Occasionally	0.21	0.07	7.93	1	0.01	1.23	0.20	0.07	7.54	1	0.01	1.22	0.20	0.07	7.63	1	0.01	1.22
Instant Noodles Consumption																		
Rare consumption			1.52	2	0.47													
At least 1 serving a day	0.03	0.09	0.07	1	0.79	1.03												
Occasionally	-0.05	0.06	0.76	1	0.38	0.95												
Wet Noodle Consumption																		
Rare consumption			15.71	2	0.00				17.98	2	0.00				18.38	2	0.00	
At least 1 serving a day	0.37	0.12	9.32	1	0.00	1.45	0.40	0.11	12.68	1	0.00	1.49	0.41	0.11	13.06	1	0.00	1.50
Occasionally	0.15	0.05	9.55	1	0.00	1.16	0.14	0.05	8.87	1	0.00	1.15	0.14	0.05	8.90	1	0.00	1.15
Constant	-2.13	0.09	554.15	1	0.00	0.12	-2.15	0.09	636.42	1	0.00	0.12	-2.15	0.07	1045.31	1	0.00	0.12
	Model X2 =7.46, df=7, p=0.38 Pseudo R2 = 0.05 N= 17,638						Model X2 =7.06, df=8, p=0.53 Pseudo R2 = 0.004 N= 17,638						Model X2 =1.37, df=4, p=0.85 Pseudo R2 = 0.004 N= 17,638					

Note: The dependent variable is SCOM, which has coded 0= not-SCOM and 1=SCOM.