Maternal Knowledge of Stunting in Rural Indonesia

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Abstract: Child undernutrition and stunting remain serious public health problems in Indonesia. According to the Health Belief Model, increasing mothers' knowledge of stunting is fundamental to establishing accurate threat perceptions predictive of behavior change. The purpose of this study was to increase understanding of factors related to maternal knowledge of stunting in Indonesia by addressing three questions: 1) How familiar with stunting are Indonesian mothers? 2) What antecedent factors do Indonesian mothers associate with stunting? and 3) What health effects do Indonesian mothers associate with stunting? A total of 3,150 mothers participated in structured face-to-face interviews. Study measures targeted four main variables. Mothers were asked: 1) Have you heard of stunting?; 2) Have you heard of shortness?; 3) What causes stunting/shortness?; and 4) What are the effects of stunting? Only 66 (2.1%) mothers reported having *heard of, read about, or knew something about stunting.* Approximately two-thirds of participants attributed stunting to hereditary factors. *Interrupted growth* (33.7%), *idiocy* (13.8%), and *easy to get sick* (11.8%) were identified as health effects of stunting. Results highlight the need for health promotion and education efforts focused on increasing basic knowledge of stunting, its causes, and its health effects among Indonesian mothers.

Keywords: Stunting, knowledge, childhood nutrition, Indonesia, Health Belief Model.

INTRODUCTION

Stunted growth, or stunting, is defined as a height-for-age Z score more than two standard deviations below the World Health Organization (WHO) child growth standards for age and sex. Stunting increases the risk of child disease and deaths [1], adversely affects cognitive and motor development [2], lowers performance at school [3], increases the risk of overnutrition and non-communicable diseases [4], and reduces productivity in adulthood [5]. Stunting is the result of chronic or persistent undernutrition stemming from poor maternal nutrition, poor feeding practices, and poor sanitation [3,4]. An estimated 156 million children under five years of age worldwide are stunted [6].

Despite dramatic economic advances in the last two decades, child undernutrition and stunting remain serious public health problems in Indonesia. Of the 24.5 million children under 5 years of age in Indonesia, approximately 9.2 million (37%) are stunted [7]. Regions with large rural populations exceed the national average, including West Kalimantan (39.7%), Central Kalimantan (39.6%) and South Sumatra (38.9%).8 The high stunting rate in Indonesia is associated with a combination of complex factors, including nutrition, hygiene and childcare practices characterized by poor dietary diversity and sub-optimal feeding practices, low maternal and paternal education inadequate maternal nutrition, shorter maternal height, lower per-head household expenditure, low birthweight, insufficient birth spacing, low levels of exclusive breastfeeding, open defecation and insufficient hygiene practices, and household food insecurity [7,9,10].

Improving mothers' behavioral beliefs, behaviors, and education are key to addressing stunting. Improved maternal education, especially, has consistently been associated with reductions in child stunting [11]. This complex relationship between education and stunting is likely mediated by other, more proximal factors. For example, Semba *et al*. [9] note that mothers in Indonesia are generally the primary caregivers for children and that maternal education is associated with protective behaviors including increased visits to the local health post or posyandu, access and use of closed latrines, receipt of childhood immunizations, and receipt of vitamin A capsules. These parental protective caregiving behaviors reflect a mother's knowledge of, and ability to implement, practices supportive of child growth and development.

The Health Belief Model (HBM) is a value expectancy theory postulating that an individual's desire to avoid illness or to get well (value) and one's belief that a specific health action available would prevent or ameliorate illness (expectancy) is predictive

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of health behavior change. Key constructs of the HBM include *perceived susceptibility*, or an individual's subjective perception of his or her risk of contracting a health condition, and *perceived severity*, an individual's opinion of how serious a condition and its symptoms or health consequences are [12]. The combination of *perceived severity* and *perceived susceptibility* equate to an individual's *perceived threat*. In other words, the individual's perception that action or inaction is a threat to health [12]. The HBM theorizes that for behavior change to occur, individuals must feel threatened by their current behavioral patterns and the subsequent expected outcomes. The HBM also includes the constructs of *perceived benefits* and *perceived barriers* which also impact health behavior change efforts. *Perceived benefits* highlight what can be expected, typically the positive effects, of a specific action [12]. *Perceived barriers* refer to the tangible and psychological costs of changing or modifying an existing behavior. Accuracy in perceiving both benefits and barriers to health behavior change requires the gaining of new knowledge or factual information as well as the correcting of existing misinformation [12]. In effect, the accuracy of threat perceptions, as well as perceived benefits and barriers, are largely dependent on an individual's knowledge of a specific health condition, the condition's causal factors, and finally, the condition's probable effects or health outcomes. Based upon the HBM, assessing mothers' knowledge and understanding of stunting is fundamental to establishing accurate threat perceptions predictive of health behavior change. The purpose of this study was to increase understanding of factors related to maternal knowledge of stunting in Indonesia. In particular, this study aimed to address the following research questions: 1) How familiar with stunting are Indonesian mothers? 2) What antecedent factors do Indonesian mothers associate with stunting? and 3) What health effects do Indonesian mothers associate with stunting?

METHODS

Design

Data for this study comes from formative research gathered to inform the design and implementation of a National Nutrition Communications Campaign (NNCC) targeting 10 provinces (West and East Java, West and East Nusa Tenggara, Gorontalo, Maluku, North Sulawesi, West and Central Kalimantan, and South Sumatra) across the Indonesian archipelago. This formative research represents a collaborative effort between IMA World Health (IMA), the University of Indonesia's Center for Nutrition and Health Studies, and the Ministry of Health in Indonesia. Data was gathered from mid-September to mid-October, 2014. A quantitative survey was conducted in seven provinces and 10 districts, with site selections made to ensure coverage of the varied cultures and religions within the provinces.

Sample

The study sample consisted of pregnant mothers and mothers of children under two years of age. Specific regions were selected for the larger effort because of the high prevalence of stunting, representativeness and accessibility. The number of respondents within each region was determined using the World Health Organization's 30 Cluster Method [13]. A village within a district was considered a cluster, and 30 were selected from each district. Respondents within clusters were then randomly selected to participate. The sample for the current study included 3,150 respondents.

Procedure

Participants were recruited to participate in structured interview. After a participant's home was randomly selected for participation, an interviewer traveled to the home, acquired consent to participate and then conducted a face-to-face interview. Participation rate was 100%. Interviewers used a structured guide to ask questions and collect responses. Participants' responses were recorded on the actual interview guide and were then transferred to an electronic database for data cleaning and analyses.

Measurement

Interviewers collected data from participating mothers regarding demographics, stunting knowledge and other key variables related to nutritional practices. Demographic variables related to socioeconomic status were assessed by a single measure of familial wealth used to represent home-based assets. This variable was created by summing respondents' reports that they owned any of the following assets (yes/no): radio, cell phone, refrigerator, television, bicycle/boat, motorcycle/ motorbike, and computer/laptop. These variables resulted in a Cronbach's Alpha coefficient of .60. The summed total was then divided by seven (the total number of possible assets) to create a ratio. Knowledge of stunting was measured using four variables. First, mothers were asked if they had heard of stunting (yes/no). Mothers that reported 'yes' were

then asked to identify signs and symptoms of stunting, which included height corresponding to age (yes/no), shorter than average (yes/no), dwarf (yes/no), and did not know (yes/no). Mothers were asked if they had ever heard of shortness (i.e., the condition of shortness) (yes/no). Mothers that reported 'yes' were then asked to identify signs and symptoms of shortness, which included height does not correspond to age (yes/no), shorter than average (yes/no), dwarf (yes/no), and did not know (yes/no). Two items were used to measure knowledge of factors known to cause stunting/shortness. First, mothers were asked what causes stunting/shortness. Response options included undernourished (yes/no), gets sick often (yes/no), lack of activity (yes/no), and inherited (yes/no). Next, they were asked what it takes to avoid stunting/shortness. Response options included take vitamins (yes/no), eat a lot (yes/no), do sports (yes/no), and keep hygiene (yes/no). Lastly, a single item was used to measure mothers' knowledge of the effects of stunting. Mothers were asked what they thought stunting/shortness in children under 2 years of age would cause. Response options included idiocy (yes/no), easy to get sick (yes/no), interrupted growth (yes/no), and nothing (yes/no).

Analysis

Stata SE version 15.0 was used to conduct all analyses. Frequency statistics were calculated to summarize demographic variables and to identify sources of stunting-related knowledge. Due to skip patterns in the questionnaire, sample sizes vary according to analyses as not all participants answered every potential questionnaire item.

RESULTS

This study sample included 3,150 pregnant mothers (33.3%) and mothers of children under two years of age (66.7%) (Table **1**). The average age of mothers was 27.8 years. The highest level of education attained for the majority of mothers was graduating from elementary school (42.4%), followed by graduating from secondary high (26.1%), junior high (24.3%), and college (7.2%).

The term *stunting* was generally not known by participants in this study. Of the 3,150 participants, only 66 (2.1%) (Table **2**) reported having *heard of, read about, or knew something about stunting*. Among mothers familiar with the term *stunting*, 33.3% associated the term with *dwarf*, 22.7% with *height does not correspond to age*, and 19.7% with *shorter than average*. Approximately 12% of those mothers indicating they had heard of or read about the term *stunting*, indicated they *did not know* what the term meant. Respondents were much more familiar with the term and condition of *shortness*. Exactly one-third (33.3%) of participants indicated they had *heard of, read about, or knew something about shortness*. Approximately half (50.3%) of respondents associated shortness with the term *dwarf*, 25.0% associated shortness with *shorter than average*, and 14.5% associated shortness with *height does not correspond to age*.

Participants who had *heard or, read about, or knew something about* stunting (n = 66) or shortness (n = 1,052) answered two questions related to the antecedents of stunting. The first: *In your opinion, what causes stunting/shortness in children under two years of age?* Hereditary factors (*inherited*) were mentioned by 68.0% (Table **3**) of respondents as a cause of stunting/shortness, with lack of food intake (*undernourished*) next at 38.9%, followed by illness (*gets sick often*) at 8.7%, and *lack of activity* at 7.7%. Participants also answered the question: *In your opinion, what does it take to avoid stunting/shortness in*

Table 1: Sample Characteristics, n = 3,150

Variable		%	n
Highest level of education	Some elementary or elementary graduate	42.35	1,334
	Some junior high or junior high graduate	24.32	766
	Some high school or high school graduate	26.13	823
	Some college or college graduate	7.21	227
Mother status	Pregnant	33.33	1,052
	Child < 2	66.67	2,100
		Mean	SD
Age		27.75	7.08
Assets		3.86	1.59 (0-7)

Table 2: Knowledge of Stunting/Shortness, n = 3,150

Variable		%	N
Have you ever heard/read/know about stunting?	Yes	2.10	66
	No	97.90	3,084
What is stunting?	Height does not correspond to the child's age	22.73	15
	Shorter than average	19.70	13
	Dwarf	33.33	22
	Other	12.12	8
	Do not know	12.12	8
Have you ever heard/read/know about shortness?	Yes	33.30	1,052
	No	66.60	2,098
What is shortness?	Height does not correspond to the child's age	14.54	153
	Shorter than average	25.00	263
	Dwarf	50.29	529
	Other	6.08	64
	Do not know	4.09	43

Table 3: Knowledge of Factors known to Cause Stunting/Shortness, n = 1,052

Variable		%	N
In your opinion, what causes stunting/shortness in children under 2 y/o?	Undernourished	38.88	409
	Gets sick often	8.65	91
	Lack of activity	7.70	81
	Inherited	67.97	715
In your opinion, what does it take to avoid stunting/shortness in children under 2 y/o?	Take vitamins	47.53	499
	Eat a lot	51.43	541
	Do sports	33.17	349
	Keep hygiene	9.70	102

children under two years of age? Eat a lot (51.4%), *take vitamins* (47.5%), and *do sports* (33.2%), were the most common responses followed by *keep hygiene* (9.7%).

A total of 669 participants answered the question: *In your opinion, stunting/shortness in children under two years old will cause what?* The most frequently indicated response was *interrupted growth* (33.7%) (Table **4**), followed by *idiocy* (13.8%), *easy to get sick* (11.8%), and *nothing* (4.4%).

DISCUSSION

Stunting, or height-for-age below standard, is an important undernutrition indicator among children under

Table 4: Knowledge of what Stunting/Shortness Causes, n = 669

Variable		%	N
In your opinion, stunting/shortness in children under 2 y/o will cause what?	Idiocy	13.78	145
	Easy to get sick	11.79	124
	Interrupted growth	33.65	354
	Nothing	4.37	46

five. As a signatory to the global movements Scaling Up Nutrition (SUN), the Millennium Development Goals and the Sustainable Development Goals, decreasing stunting rates in Indonesia is a public health priority [10]. The purpose of this study was to gain an understanding of factors related to maternal knowledge of stunting in Indonesia to inform stunting prevention efforts. Perhaps this study's most important finding is that two-thirds of respondents, a total of 2,098 mothers, had never heard of, read about, or knew something about stunting or shortness. This widespread lack of knowledge and awareness presents a serious challenge to modifying stunting-related behaviors. While knowledge alone is rarely a sufficient catalyst for behavior change, it is key to improving one's perceptions of both susceptibility and severity, important constructs in the HBM predictive of taking action [12]. It should be noted that one challenge to stunting-prevention efforts in Indonesia is that a word for *stunting* simply does not exist in Bahasa Indonesian. In the absence of stunting-specific vocabulary, approximately one-third of respondents in this study identified stunting with *shortness,* an equivalent term and condition among many Indonesians. However, less than 15% of those respondents correctly identified *shortness* as being low height-for-age. These results demonstrate a strong need for both establishing stunting-specific vocabulary or terminology and engaging in a country-wide communication effort to inform and educate Indonesian mothers about this condition.

The results of this study's first research question help to emphasize the importance of its second question aimed at understanding antecedent factors Indonesian mothers associate with stunting. Among those mothers who were aware of *stunting* or *shortness*, the majority considered this condition to be a direct result of heredity. This misunderstanding may be partially explained by noting that respondents in this study associated the terms *stunting* and *shortness* with *dwarf* (cebol) and *midget* (kerdil). The cognitive coupling of stunting with genetic mutations affecting the skeletal system only further complicates education and prevention efforts. However, this finding is consistent with research in other areas of the world where individuals consistently associate stunting with genetics rather than prolonged undernutrition [14]. According to the HBM, falsely attributing a short stature to genetics creates a substantial perceived barrier to behavior change. Often narrowly defined as simply the costs associated with a particular behavior, perceived barriers include an individual's belief that an outcome expectation is beyond his or her control [12]. Much like Social Cognitive Theory's *self-efficacy* construct [15] and the Theory of Planned Behavior's *perceived behavioral control* construct [16], *perceived barriers* are powerful predictors of behavior. These constructs address the belief that one can take effective action to reduce the personal or familial risk of an undesired outcome expectation. Perceived barriers are especially forceful in preventing or undermining behavior change efforts when an individual perceives that taking action will be ineffective in altering the outcome. Even when an individual's perception of susceptibility, severity, and subsequent threat are accurate, believing the outcome to be beyond one's control creates a substantial barrier to change as otherwise potential courses of preventative action are considered futile. Important to this study and according to the HBM, mothers who consider the cause of stunting to be hereditary, and thus beyond their control, may be unlikely to engage in preventative behaviors. The dearth of knowledge about stunting identified among this study sample, together with confusion regarding the antecedents of stunting, represent two significant barriers to stunting prevention efforts in Indonesia.

The current study sought to identify the health effects Indonesian mothers associate with stunting. Effects of stunting have been well documented and include reduced long-term and successive physical and cognitive growth, compromised immune response and strength, and reduced life expectancy. Familiarity with the consequences of stunting, whether cognitive, financial, physical, or otherwise, are essential to accurately perceiving severity of, and subsequent perceptions of threat imposed by, stunting. Few mothers in this study sample identified the effect that stunting has on cognition, immune response, and long-term physical growth. Again, drawing upon constructs in the HBM, perceived severity forms part of the perceived threat to one's health. Associating negative outcomes with stunting may cause a mother to feel that her child's health is threatened, thereby motivating corrective action.

RECOMMENDATIONS

Efforts to prevent stunting are ongoing across Indonesia. Current programs designed and implemented by both government and non-government entities to directly prevent childhood stunting appropriately target key health behaviors, optimal infant and young child feeding practices, and services, such

as: exclusive breastfeeding until six months, appropriate complementary feeding, improving dietary diversity, distribution of multivitamins including iron and folic acid, distribution of micronutrient supplements for children, deworming medicine for children, medical treatment for under-nourished children, fortification of food with micronutrients such as vitamin A, iron, and iodine, as well as prevention and treatment of malaria for pregnant women and children. Additionally, important efforts are currently being made in addressing indirect causes of undernutrition, such as the environment, lack of access to quality health services, and food security challenges in the households. Other ongoing and vital supportive efforts effective in preventing stunting include the promotion of handwashing, increasing access to clean water, maternal instruction related to psychosocial stimulation for babies and children, family planning information, creation of local nutrition gardens and fisheries. Each of these efforts reflect best practices related to maternal and child health generally, and stunting prevention specifically, and should be continued and expanded, particularly targeting rural and poor populations. The results of this study highlight, however, the continued need for intensified health promotion and education efforts focused on increasing basic knowledge and understanding related to stunting, its causes, and its health effects among Indonesian mothers, fathers and other care-givers. These elementary, yet foundational efforts, are instrumental in creating the accurate perceptions and beliefs needed to enhance the efficacy of all other programs and energies and to appropriately motivate mothers and fathers to action. The findings of this study help to establish a continued need to increase knowledge of stunting, its antecedents, and related health effects among Indonesian mothers.

Limitations

The current study has several key limitations. The absence of stunting-specific vocabulary, while certainly a challenge for stunting-prevention efforts, is also a significant limitation to this study. It is possible that portions of the low knowledge and understanding of stunting among Indonesian mothers presented here is attributed to lexical semantics given the array of closely related terms mothers associate with short stature. Data analyzed in this study was part of a large-scale formative assessment of population demographics, maternal nutritional knowledge, infant and young childhood feeding practices, as well as household and community resources. The survey questionnaire and interview guide was not created specifically to address this study's research questions. While the data and analysis herein are adequate in addressing these questions, future research specifically aimed at understanding maternal knowledge of stunting, its antecedents, and health effects of Indonesian mothers may be beneficial. While a strength of the current study is its large sample size, future investigations might employ more qualitative methodologies such as focus groups, observation, in-depth interviews, or an entirely open-ended interview format and focus group discussions to enlarge and deepen the understanding of stunting-related knowledge among Indonesian mothers.

CONCLUSION

Stunting knowledge, and subsequent perceptions of susceptibility and severity to this condition, are nearly nonexistent among Indonesian mothers. Among mothers who are aware of stunting, the majority perceive it to be a condition of genetics or heredity and not associated with suboptimal future cognitive attainment, health and productivity. This general lack of knowledge about stunting and misunderstanding related to the antecedents of stunting combine to create significant challenges to behavior change and efforts to prevent stunting in Indonesia. Public health programs designed to address stunting among Indonesian mothers should begin with education efforts aimed at increasing stunting-related knowledge and creating accurate perceptions of this condition's threat to health and wellbeing. Such efforts should likewise include focus on specific causal factors or antecedents of stunting, as well as both short- and long-term health effects of stunting.

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