



## Community Understanding of 13 General Messages of Balanced Nutrition

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### Abstract

Indonesia still faces a double burden of nutritional problems, especially in children. It is essential to promote balanced nutrition education to mothers of toddler years old. They are more familiar with “4 Healthy and 5 Complete” which has been replaced by “Balanced Nutrition Guidelines” (PUGS). This cross-sectional study aimed to assess the knowledge of mothers about 13 PUGS messages in East Lombok District. This study was conducted using quantitative approach and supported with qualitative data. Data was collected by interviewing 188 mothers, stakeholders, health workers, cadres and community leaders. Data was analyzed using logistic regression to determine which messages are correlated to nutritional status. The result shows that the majority of mothers do not understand PUGS. There is a relationship between mother's knowledge with children's nutritional status. Mother's knowledge of consuming iron-containing foods, drinking clean and sufficient water are associated with children's nutrition status. PUGS messages are better understood by health workers compared to mothers.

### Introduction

Basic Health Survey (Riskesdas) 2007 illustrates various maps of nutritional problems, including information on malnutrition and overnutrition. Riskesdas 2007 result showed that the national prevalence of undernutrition is 13.0% and overweight is 4.3% in infants ([Badan Litbangkes, 2008](#)). However, there was a combination of diverse nutritional status in the family ([Nti, 2011](#)) ([Zhang et al., 2017](#)). This was caused by imbalanced food distribution in the family and lack of knowledge on nutrition in the family (including the mother).

One effort to prevent nutritional problem in the community is providing communication, information and education (KIE) on good and

correct nutrition behavior. Another effective effort is nutrition education programs on Balanced Nutrition. Balanced nutrition is daily diet that contains appropriate nutrients, in terms of quality and quantity, for body's needs, taking into account the principle of diversity or variations of food, physical activity, hygiene, and ideal weight. In accordance to the principle of Balanced Nutrition, the adoption of a diet based on “Balanced Nutrition Guidelines” (PGS) cannot be treated equally for every person because it depends on age, health status, and physical activity. However, the society is already familiar with the slogan “4 healthy 5 perfect” (4S5S) that applies to everyone above 2 years old. It is unclear how the guideline only

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grouped food into 4 qualitative groups can meet the needs of various community groups. By the time the 4S5S slogan was invented in the 1950s, it was assumed that people's eating habits were getting healthier so that various health problems due to deficiencies and excess nutrients could be prevented and reduced. This assumption did not materialize either in Indonesia or other countries (including America, the origin source of 4S5S). Therefore the 4S5S guidelines since the early 1990s have internationally been replaced by a more detailed guideline called "Balanced Nutrition Guidelines" (PGS) ([Rahmita et al., 2016](#)).

The success of a program's approach depends largely on active community participation based on a careful analysis of behavioral changes in the form of knowledge, attitude and practice (PSP) assessments in the community ([Fauzi, 2012](#)).

Behavior change is strongly influenced by knowledge. Knowledge that is a domain important for the formation of one's actions. The growth and development of children is influenced by the behavior of mother in giving food ([Savage et al., 2007](#)).

Understanding of Balanced Nutrition is still not widely known to the public, as there are not many articles and books explaining this concept. Research on maternal KAP (Knowledge Attitude Practices) on nutritional anemia of toddlers shows that there is a correlation between mother's knowledge and mother's practice and attitude on toddlers ([Yabancı et al., 2014](#); [Akeredolu & Osisanya, 2014](#)).

This research is important because East Lombok District of West Nusa Tenggara Province has low prevalence of underweight nutrition in toddlers; and there are socio-cultural factors that needs to be explored in this PUGS implementation study.

West Nusa Tenggara (NTB) was selected as the research area with the following considerations: first, the prevalence of underweight toddlers in NTB (16.7%) was higher than the national rate (13.0%); Second, the caloric adequacy of NTB is lower (1,644 kal) compared to national rate (1,735 kal); Third, the percentage of poor people in NTB was higher (24.9%) compared to national level

(16.6%). The malnutrition rate among toddlers in East Lombok District was 25.5%. Posyandu as the spearhead of toddlers activities monitor the development of toddlers that come from, by and for the community. Riskesdas 2007 stated that Posyandu was the most visited place for weighing toddlers (78,3%).

The purpose of this research is to investigate maternal KAP in relation with the implementation of PUGS in toddlers, and to identify the factors that influence nutritional status of malnourished children in East Lombok District.

### Method

In this study the population is the mother and toddlers covered by the selected Posyandu activities. Samples were underweight and normal weight children in two sub-districts with the most lack of nutritional status in East Lombok Regency. In detail, the selection of samples in 2 sub-districts with the proportion of underweight toddlers in East Lombok District, Sikur Sub-District and Jerowaru Sub-District. From the calculation using the sample formula of different proportions, we needed 200 mothers or toddler caregivers from 2 sub-districts in this study. Both sub-districts were obtained from the Annual Report of the Health Service of East Lombok regency and we needed 100 mothers from each sub-district. The mothers in this study were obtained from mother or care giver of toddlers who participated in routine weighing in posyandu. Sub-district posyandu was randomly selected to be included in this study.

Inclusion criteria was children aged 0 - 59 months and are not severely ill (free from TB, Hepatitis, HIV, malaria diseases), and whose mother was willing to participate as respondents in research. The exclusion criteria were toddlers who suffered diseases such as TB, HIV, hepatitis, malaria. Sampling was conducted in two phases, firstly purposively determining 2 subdistricts with the highest proportion of toddlers with the worst nutritional status in East Lombok Regency. Secondly, by weighing all children to find 50 underweight children as the case group and 50 toddlers with normal weight as the control group in Jerowaru and Sikur sub-district. Questionnaires were prepared to interview the

target group (respondents). Respondents in the study were mothers of toddlers. There were 2 groups of questionnaires to be prepared: the first questionnaire was to explore information on factors related to nutritional status and health of toddlers and household characteristics; the second, an in-depth interview questionnaire (in depth interview), is addressed to provincial stakeholders (Provincial Nutrition Section), Regency (Head of Nutrition Section of Regency Health Agency), Subdistrict (Head of Puskesmas, Head of Subdistrict), Village (Village Midwife); third, FGD for informant cadres, toddlers, toma/toga (not all mothers interviewed were included in FGD, only about 6-10 people); the fourth was nutritional status of toddlers as measured from weight measurement using digital scales and height measurement (Microtoise).

Materials needed for data collection include: interview instruments, in-depth interview guides and FGDs, data collection tools such as Microtoise height measuring tools, Secca weighing instruments, voice recorders (tape recorders, tapes, and battery). Interview instruments and in-depth interview and FGDs guidelines were prepared and tested before being used in data collection. Interviews with structured questionnaires was conducted for toddlers' mothers. In-depth interview was conducted for selected stakeholders such as head of nutrition section of NTB Province, head of nutrition section of East Lombok District, heads of Puskesmas, sub-district head, and village midwives. Focused Group Discussion (FGD) targeted certain groups of informants in the community such as cadres and community/religious leaders. Editing, entry and clean data have been done in order to analyze the data. Data was then analyzed using univariate analysis (frequency distribution, mean value), bivariate analysis ( $X^2$  test to assess the relationship between independent and dependent variables), multivariable analysis (multiple logistic regression test to determine factors related to nutritional status of toddlers) using public statistic software version 15. For qualitative data, content analysis was done. All in-depth interviews and FGDs were transcribed. Once the transcript texts had been compiled, coding and identification of important issues

were done. In-depth interview and FGD data were also triangulated with other data such as observation and structured interview to check the data validity.

### Results and Discussion

In general, 64% respondents have low education background (below junior high school), most families came from low and middle social economy level (93.5%), with most fathers were working as a farmer, fisherman or labor (68.1%). However, most of the families had only one child (90.9%) aged 3-5 years old in their house (45.7%). They are raised by their own mother (88.2%) and most respondents live in the mountainous region (56%). The distribution status showed a balanced distribution of nutritional status (Table 1).

The proportion of mothers who have knew about 13-PUGS messages were more than 50 percent for several messages, such as knowing food variety, adequacy of energy,  $\frac{1}{2}$  carbohydrate, limiting fat consumption, using iodized salt, iron, 6-month exclusive breastfeeding, consume safe water and food, understanding food label. However, there were still many mothers who did not know about some messages, such as the importance of breakfast, regular physical activity and knowing types of alcoholic drinks (Table 2).

Table 2 shows that community knowledge, especially mothers of toddlers, on 13 PUGS messages in East Lombok District was still inadequate. The low comprehension of mothers to these messages was linked to the high prevalence of malnutrition among toddlers in study location. There are two messages indicated to have significant contribution to malnutrition in East Lombok area, namely eating iron-containing food (message 6) and drinking safe and sufficient amount of water (message 9). This was in line with research published by [Kusumawati et al \(2017\)](#) who found that there was a significant difference in mothers' knowledge towards community nutrition improvement through health promotion. In addition, it is known that there was a significant relationship between malnutrition and maternal knowledge about malnutrition as reported by [Mardani et al. in his findings in West Nusa Tenggara in 2015 \(Mardani et al., 2015\)](#).

Table 1. Sociodemographic Characteristics of Mothers at PUGS Implementation in East Lombok

Variables	N	%
1. Mother's education/caregiver' education		
- >Senior High school	67	36.0
- <= Junior high school	119	64.0
2. Number of household's member		
- <=5 person	114	61.3
- >5 person	72	38.7
3. Socio-economic		
- High	12	6.5
- Low and middle	174	93.5
4. Respondent		
- Mother	164	88.2
- Caregiver	22	11.8
5. Father's working status		
- Not working	29	15.4
Military/Civil servant/Entrepreneur	31	16.5
Farmer/Fisherman/Labor	128	68.1
6. Marital status of Mother/Caregiver		
- Not married	20	10.8
- Married	147	79.0
- Widow	11	5.9
- Divorce	8	4.3
7. Relationship		
- Mother	164	88.2
- Grand mother	15	8.1
- Brother/sister	3	1.6
- Other family	1	0.5
- Helper/servant	3	1.6
8. Gender of toddlers		
- Male	93	50.0
- Female	93	50.0
9. Number of toddlers		
- 1 (one)	169	90.9
- >= 2 (more than one)	17	9.1
10. Geography of resident		
- Beach	81	44.0
- Mountain	105	56.0
11. Nutritional status		
- Good	84	50.0
- Poor	84	50.0
12. Age of toddlers		
0-23 months	37	19.7
24-35 months	65	34.6
>= 36 months	86	45.7

Source : Primary Data

Table 2. Distribution of Mothers' Knowledge at East Lombok of 13-PUGS Messages

Variables	n	%
1. Variety of food		
- Know	167	88.8
- Do not know	21	11.2
2. consume food to meet daily caloric need		
- Know	174	92.6
- Do not know	14	7.4
3. Consume carbohydrate to meet ½ of caloric need		
- Know	96	51.1
- Do not know	92	48.9
4. Limiting consumption of fats and oils to ¼ of caloric need		
- Know	96	51.1
- Do not know	92	48.9
5. Use iodized salt		
- Know	158	84.0
- Do not know	30	16.0
6. Consume iron-rich food		
- Know	174	92.6
- Do not know	14	7.4
7. Give only breast milk to infants up to 6 months of age and add breast milk afterwards		
- Know	159	84.6
- Do not know	29	15.4
8. Get used to having breakfast		
- Know	26	13.8
- Do not know	162	86.2
9. Drink safe and sufficient amount of water		
- Know	143	76.1
- Do not know	45	23.9
10. Perform regular physical activity		
- Know	84	44.7
- Do not know	104	55.3
11. Knowing the types of alcoholic drinks		
- Know	92	48.9
- Do not know	96	51.1
12. Consume foods that are safe for health		
- Know	133	70.7
- Do not know	55	29.3
13. Read the labels on packaged foods		
- Know	109	58.0
- Do not know	79	42.0

Source : Primary Data

Some data describe the distribution of respondents with good knowledge and followed the messages: consuming a variety of foods, energy-intensive foods (including carbohydrate and fat), the need to use iodized salt, consume

iron-rich food, exclusive breastfeeding until 6 months-old, consume foods that are safe for health, drink safe and sufficient amount of clean water, and read labels of packaged foods.

Mothers with poor knowledge about

the importance of consuming iron-rich foods have a greater risk of malnutrition compared to mothers who are knowledgeable about foods rich in iron. This is in line with the theory proved by [Putri et al., \(2015\)](#), who found an association between iron and nutritional status. Putri found a significant difference between the mean of iron in underweight infants and infants with normal nutritional status ([Putri et al., 2015](#)). Micronutrients are known to be indispensable and play an important role in the body's metabolism that can support the nutritional status, especially in toddlers. An example was given by [Ridwan \(2012\)](#) who proved that a combination of iron and vitamin C will have a marked increase in iron status, when given to the patients with anemia ([Ridwan 2012](#)). However, this is not in line with research conducted by [Setyawati & Faizah \(2012\)](#), who found no relationship between iron consumption and malnutrition status in toddlers in Semarang ([Setyawati & Faizah, 2012](#)). The results reported by Rahim at Leuwimunding Puskesmas found that factors related to malnutrition in children aged 7-9 months were toddler's feeding pattern, energy consumption level, and protein consumption ([Rahim, 2014](#)). Therefore, it is important to note that mothers should have sufficient knowledge in feeding toddlers, both about the needs, composition, the way of processing and serving the appropriate foods for toddlers in order to prevent malnutrition.

Moreover, this study found that mothers with poor knowledge about drinking safe and sufficient water will also have a greater risk of malnutrition in her toddlers than mothers who are well informed about drinking enough and safe water. It is in line with [Abeng et al., \(2014\)](#) and [Hidayat & Fuada \(2011\)](#), that poor sanitation will make children more susceptible to infectious diseases which may ultimately affect nutritional status. Environment sanitation is also strongly associated with the availability of clean water, availability of toilet, etc. The more available clean water for daily needs, the less risk of malnutrition for children ([Abeng et al., 2014](#)) ([Hidayat & Fuada, 2011](#)). However, this study was in contrast to Puspitawati who found that sanitation (clean water availability) has no association with children nutrition's

status ([Natalia & Tri, 2013](#)).

Meanwhile, 13 PUGS messages are harder to memorize compared to other messages (4S5S, 10 main PKK's program and 3B). There is an impression that 13 PUGS messages is only for the scientific or academic community, because it is harder for grass root community to comprehend. This study shows that respondents have good knowledge only in several messages, for instance: consume variety of food (MESSAGE 1), consume adequate energy food (MESSAGE 2), the necessity of using iodized salt (MESSAGE 5), consuming iron-rich foods (MESSAGE 6), exclusive breastfeeding until 6 months old (MESSAGE 7), drinking safe and sufficient quantity of clean water (MESSAGE 9), and consuming foods that are safe for health (MESSAGE 12). This was in line with the findings of [Fauzi \(2012\)](#), who found that balanced nutrition guidance (PUGS) as a solution to existing nutritional problems has not been widely known by the grassroots due to the lack of health information that reaches the public. Inappropriate knowledge of nutrition and lack of access to health information can improve imbalanced nutritional behavior and increase the risk of future health problems ([Fauzi, 2012](#)). A similar study conducted by Suherni et al to determine the risk factors of malnutrition, diet and other factors related to nutrition in toddlers. This study looks at the relationship between the level of knowledge, education and family income with diet. The results showed that many respondents do not know the correct foods for toddlers ([Suherni & Kuswardinah, 2015](#)).

Quantitative analyses showed that there are some messages from 13 messages in the general guidance of balanced nutrition (PUGS) related to under nutrition status in toddlers in East Lombok that is 1) consume iron-rich food, and 2) drink safe and sufficient amount of water. From multivariate analyses those two variables have significant relationship with nutritional status (p value <0.05).

On the other hand, qualitative analyses showed that in relation to the general guidance of balanced nutrition (PUGS), most informants already have knowledge about nutrition, but only a small part (in Sikur area) who already knew about PUGS even though not all 13

Table 3. The Association between Mother’s Knowledge of PUGS and Nutritional Status of Toddlers in East Lombok

Variables	N total (% toddlers’ malnourished)	P
1. Variety of food		
- Know	167 (49.7%)	0.82
- Do not know	21 (52.4%)	
2. consume food to meet daily caloric need		
- Know	174 (49.4%)	0.58
- Do not know	14 (57.1%)	
3. Consume carbohydrate to meet ½ of caloric need		
- Know	96 (47.9%)	0.56
- Do not know	92 (52.2%)	
4. Limiting consumption of fats and oils to ¼ of caloric need		
- Know	170 (51.2%)	0.32
- Do not know	18 (38.9%)	
5. Use iodized salt		
- Know	158 (50.6%)	0.69
- Do not know	30 (46.9%)	
6. Consume iron-rich food		
- Know	174 (47.7%)	0.03
- Do not know	14(79.6%)	
7. Give only breast milk to infants up to 6 months of age and add breast milk afterwards		
- Know	159 (52.8%)	0.07
- Do not know	29 (34.5%)	
8. Get used to having breakfast		
- Know	26 (46.2%)	0.67
- Do not know	162 (50.6%)	
9. Drink safe and sufficient amount of water		
- Know	143 (44.8%)	0.01
- Do not know	45 (66.7%)	
10. Perform regular physical activity		
- Know	84 (45.2%)	0.24
- Do not know	104 (64.8%)	
11. Knowing the types of alcoholic drinks		
- Know	92 (51.0%)	0.77
- Do not know	96 (49.0%)	
12. Consume foods that are safe for health		
- Know	133 (52.0%)	0.26
- Do not know	55 (43.0%)	
13. Read the labels on packaged foods		
- Know	109 (47.7%)	0.46
- Do not know	79 (53.3%)	

Source : Primary Data

messages. According to them, it happened because "... there were many posters attached to health centers". In contrast, mothers in the South and Jerowaru District, which are coastal areas, do not understand balanced nutrition. They only fed the child without understanding its nutritional content. Some of them think that PUGS is the same as 4S5S, which is not true. PUGS mentioned about exclusive breastfeeding, not only milk. On the other hand, stakeholders said the 13 PUGS messages were difficult to be applied by the community, especially in rural areas, because "...education level of the community was still low..."

One informant said that if mothers have already understood of PUGS, then they would be care about their children's weight. On the other hand, informant from cadre group said to understand PUGS in relation to nutritional status of toddlers, by looking at KMS. "... If the toddler does not gain weight for 3 months in a row then we assume he is malnourished. .. "

Community leaders' view on toddlers' nutritional status and PUGS was more focused on intervention given through national nutrition program by the government or private sectors, such as increasing knowledge of pregnant women through mother class program, cooking program in Posyandu, nutrition and health promotion to cadres and mothers.

In addition, beside health personnel, the role of cadres can be further enhanced in this effort. In the qualitative analysis of this study, it is known that cadres play a role in identifying malnutrition among toddlers in East Lombok. It would be better if cadres can help providing information to mothers of toddlers about guidance of balanced nutrition (PUGS). By training 13 PUGS messages to cadres, it is expected that cadres' knowledge will improve and transfer their knowledge mothers of toddlers. This is in accordance with the results of Djafar's research which says that there is a relationship between knowledge with the action of Posyandu cadres about PUGS (Djafar, 2014). Thus, knowledge and awareness of the mothers of toddlers about 13 PUGS messages will be better and nutrient conscious behavior can improve.

This study also showed that most

respondents and informants (non-health workers) in the study still considered PUGS the same as "4 Sehat 5 Sempurna (4S5S)". Although in fact, there is slight difference between 4S5S and PUGS, where 4S5S only defines milk consumption without mentioning its origin, while PUGS already mentioned clearly exclusive breastfeeding (Anonim, 2015). In accordance to the Principle of Balanced Nutrition, the application of a diet based on Balanced Nutrition Guidelines (PUGS) is not the same for everyone. Each age group, health status, and physical activity, require different guidance of balanced nutrition. This is different when the diet is applied under the slogan 4S5S that applies to all people over 2 years old (Achadi et al., 2010).

### Conclusions

In general, there are still many mothers of toddlers who do not completely understand 13 messages of General Guidelines for Balanced Nutrition (PUGS). Therefore, most respondents cannot implement balanced nutrition correctly. In addition, they still refer to "4 Sehat 5 Sempurna" as a guidance on balanced nutrition. Mothers only can memorize and was familiar with some of the messages, such as: consume variety of food (MESSAGE 1), consume adequate energy food (MESSAGE 2), the necessity of using iodized salt (MESSAGE 5), consuming iron-rich foods (MESSAGE 6), exclusive breastfeeding until 6 months old (MESSAGE 7), drinking safe and sufficient quantities of clean water (MESSAGE 9), and consuming foods that are safe for health (MESSAGE 12). There is a relationship between mother's knowledge of 13 messages PUGS with nutritional status of toddlers in East Lombok that represented by 2 messages which were consuming iron-rich foods and drink safe and sufficient water. It is important to improve mother's knowledge about balanced nutrition in order to prevent malnutrition in toddlers.

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