



## MULTILEVEL INTERVENTION MODEL TO IMPROVE NUTRITION OF MOTHER AND CHILDREN IN BANYUMAS REGENCY

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### Abstract

The community nutrition improvement with main focus on pregnant women and children up to the age of 2 years old need to be done by a cooperation across sectors. Multilevel promotion is a comprehensive intervention and modify the determinant factors. We used multilevel promotion with MATCH (Multilevel Approach to Community Health) to modify determinant factors in various levels i.e. mother, family, community, and policy that related to nutritional status of children. This research was conducted in Banyumas and Kembaran II Community Health Center working area because the nutritional problems in this area were complex, such as low exclusive breastfeeding coverage, low birth weight, and underweight children problems. This study used a quantitative analytic design with cross sectional approach. The population used for this research were pregnant women, toddler's mother, and their family. The number of sample in this research was 100 people of each population. The data was analyzed by univariate analysis to determine the intervention model of children nutrition improvement in mother's level. The effectiveness of intervention model was tested by bivariate analysis using dependent t-test. The result of this research were formulated into nutrition improvement model for mother and children through facility identification, approach, media, and information needed. There was a significant difference in knowledge of mother before and after intervention.

### Introduction

In Millenium Development Goals (MDGs), nutrition improvement become an indicator to solve poverty and starvation problems. Nutrition improvement is related to the existence of communicable disease and ability to provide food in family level. These factors are related to income, health care, knowledge, and parenting style used by the family. Given the vast dimensions that influence the nutritional factors, the nutritional problems must be solved multidiciplinary and across institution with the involvement of profession

organization, college, community organization, and the community itself. In addition, good nutrition status will lead us to achieve other MDGs as well (Bappenas, 2011).

The groups of mother and children are vulnerable to experience many health and nutritional problems. It is marked by high maternal mortality rate 359 per 100000 live births and neonatal mortality rate 32 per 1000 live births. There were 10.2% low birth weight infants, 20.2% short stature neonate (<48 cm), 19.6% undernutrition infants (Weight/Age), 37.2% stunting cases (Height/Age), 12.1%

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underweight cases (Weight/Height), and 11.9% overnutrition cases in infants, 30.2% infants got exclusive breastfeeding. The lack of knowledge about balanced nutrition and energy intake below 1400 kcal per day are indicator of food insecurities (Kemenkes, 2014).

According to the nutritional status data of Banyumas regency in 2013, prevalence of undernutrition (Weight/Age) is 12.13% and stunting (Height/Age) 29.79%. These are problems that need to be solved to achieve food and nutritional development target of Banyumas regency year 2015, that is reduction of undernourished children prevalence up to 11% and stunted children up to 27.5%. In last two years, Banyumas regency has not achieved the undernutrition and stunting reduction target (DKK Banyumas, 2015).

Based on previous research by Kusumawati (2012), the risk factors of malnutrition are infectious disease, parenting style, family income, mother's activity, and family health care. Research by Rahardjo (2011), indicate the causes of growth faltering in toddlers are maternal parenting style and family income. Research by Kusumawati (2015), identifies maternal factors that have a role in undernourished children under 5 years old, such as education, nutrition knowledge, unemployed mother, parenting style of feeding, and exposure to information. In the following research, Kusumawati (2015), identifies the factors that influenced toward stunting in children aged 6 to 24 months are infectious disease, food availability, and environment sanitation. They also find that children with infectious disease are having a risk being stunted 6.22 times higher than a healthy one.

*SUN movement* promote to end malnutrition and reduction of nutritional problems, mainly for the first 1000 days of live (270 days during pregnancy and 730 days after delivery till aged 2 years). This period is called the golden period or critical period. If not utilized properly, it will cause permanent damage (window of opportunity). Some studies show that babies with exclusive breast feeding were not experienced growth failure (Kramer, 2007; Bhandari, 2003).

Community's nutrition improvement determined for pregnant woman and children

up to two years old should be done through some aspects which consist of across sectors collaboration, choosing effective nutrition intervention with strong data background and high economic return, giving high impact on economic growth, and reducing poverty.

Prevalence of stunted children under five-years-old in Brazil are declining for more than 30% which was initially 37% in 1974 into 7% in 2006. This is achieved by four priorities which consist of: (1) continuous health and nutrition service access for mother and children; (2) education and information access for teenage girls and women; (3) sanitation and water provision coverage; and (4) family's purchasing power (Monteiro et al, 2010). Study in Peru involving 6-18 months old stunted children shows that by proper intervention, body height could be caught up so that in about 4.5-6 years old they have the same intelligence compared to children who don't experienced stunted in infant period (Crookston, 2010).

Multilevel promotion concept is selected because of its characteristic which is comprehensive but not compartmental and could modify more determinant factors. This multilevel promotion refers to Multilevel Approach to Community Health (MATCH) concept which modified determinant factors on various levels which are on mother level, family level, community level, and nutritional status for children under five-years-old policies. Multilevel approach intervention model for improving nutritional status for children under five-years-old is based on need assessment, so that the result would be as expected and adjusted to resources of the local community. This research is very important to be conducted in order to achieve better nutritional status for children under five-years-old.

Socio perspective understand the multilevel stages in community; which are individual level to form behavior, interpersonal level to give supports, community level to form norms, and governmental level to change policies. Intervention strategy is chosen based on various theories on multilevel stages in local community (Bartholomew, 2006).

Multilevel promotion works by modify determinant factors of nutritional status for children under five-years-old in every level.

Determinant factors use *PRECEDE-PROCEED* model through need assessment (Keleher, 2007). Determinant factors which are modified in promotion to improving nutritional status for children under five-years-old are (1) predisposing factors on individual level which consist of mother factors (knowledge, attitude, practice of nutritional status improvement for children under five-years-old), (2) supporting factors including knowledge and individual behavior on interpersonal level (husband, grandmother, or respected family members), local community level (cadre of integrated health post, ulama, village headman), and organization level (village midwife, nutrition staff, primary health care chairman) and (3) supporting factors on governmental level/policies including referral services for malnutrition and improving nutritional status for children under five-years-old.

This research aims to identify and develop an intervention model for improving nutritional status for children under five-years-old on mother level and interpersonal level. The research is located in Banyumas and Kembaran II community health center due to its location have complex nutritional problems which are low exclusive breastfeeding coverage (23,68% in Banyumas community health center and 39,23% in Kembaran II). It is below minimal service standards that is 80%. Other reason is Banyumas community health center have higher percentage of low birth weight infants (7,47% in Banyumas PHC and 5.02% in Kembaran II ) than average (3%). And the last reason is Banyumas community health center have the highest percentage of children under five-years-old that below the red line (*bawah garis merah/BGM*) with percentage of 38,34%.

#### Method

This research used quantitative and qualitative approaches. The quantitative research was performed with cross sectional approach characterized by quasy experimental with *non-randomized control group pretest posttest design* (Notoatmodjo, 2010). This study explained with numerical data done by measuring or observing before and after intervention. This plan could be explained as below:

Intervention group :  $O_1 \rightarrow X_1 \rightarrow O_2$

Notes:

$O_1$  : first observation (*Pretest*)  
 $O_2$  : second observation (*Posttest*)  
 after intervention  
 X : Intervention

Population for need assessment stage of this study were pregnant women, mother with children under five-years-old, and family with pregnant women. Sample used in this study were 100 pregnant women, 100 mother with baby, and 100 people of their family. Calculation samples in this research were based on minimal sample formula (Supriyadi, 2014). Sampling technique was done by cluster random sampling in which researcher took six out of twelve villages randomly and then from each village, pregnant women, mother with children under five-years-old, and family with pregnant women were taken randomly. Inclusion criteria were samples domiciled in Kembaran district and Banyumas district. Exclusion criteria was individual disagreed to participate in research. Data was analyzed using univariate analysis to determine the intervention model of improving nutritional status for children under five-years-old on individual level. Effectiveness of intervention model was tested with bivariate dependent t-test analysis.

#### Result and Discussion

From primary data statistical analysis, it was resulted an intervention model with individual level and interpersonal approach of nutritional improvement of mother with children under-five-years old, pregnant women and their families using MATCH (Multilevel Approach to Community Health) approach, the model were summarized in Figure 1.

The Test Model of Improving Toddler Nutrition's Interventions at the Level of Mother and Interpersonal Level

For short-term evaluation, we used printed nutrition improvement module media as a tool of counseling by implementing pretest and posttest to 20 mothers with children under five-year old and 20 pregnant women, given some nutrition improvement questions during pregnancy and toddler. Before attending counseling, pretest and posttest after pretest had been done. Here are the results of short-term evaluation of pregnant women and

Table 1. Analysis results of paired difference test of pregnant women's knowledge before and after counseling with the printed media

No	Knowledge	Before	After	P number	Information
1.	Average	8.00	9.05	0,002	There was a difference
2.	Minimum	3.0	9.07		
3.	Maximum	10.0	10.0		

Source: Primary Data

toddler mothers' knowledge before and after counseling with the print media.

Table 1. showed that the average score of knowledge of pregnant women increased from 8.00 before counseling to 9.05 after counseling. From analytical studies using dependent t-test with  $p$  value 0,002 ( $<0,05$ ) which means  $H_0$  was rejected, it can be concluded that there was significant difference on pregnant women's knowledge about nutrition improvement during pregnancy before and after counseling using the printed media.

Table 1. showed that the average score of knowledge of toddler mother increased from 7.72 before counseling to 8.62 after counseling. From analytical studies using dependent t-test with  $p$  value 0,002 ( $<0,05$ ) which means  $H_0$  was rejected, it can be concluded that there was significant difference on toddler mother's knowledge about nutrition improvement during pregnancy before and after counseling using the printed media.

Tools for Improving Nutrition on Individual Level (Pregnant Women and Toddler mother)

Implementation of health promotion can be run well if it is supported by availability of facilities and infrastructure as needed (Lamawati, 2011). From the results, the tools that could be accessed by the pregnant women were utilization of pregnant women class, utilization of Maternal and Child Health (KIA) handbook,

utilization of village meetings (Family Welfare Movement (PKK), Neighborhood Association (RT), Dasawisma and Recitation)

Mulyana (2005), states, interpersonal communication is a communication between the people face to face, allowing each participant to capture reactions of others directly, either verbally or nonverbally. Communication can be defined as a success if both the sender and the receiver of the message would interpret and understand the messages that are sent with the meanings and implications at the same level. In line with this study, interpersonal communication in this study has been conducted by pregnant women as much as 69%.

Mass communication for pregnant woman held by attending classes for pregnant women consisting of 10 people and for the toddler mothers were held by counseling in Integrated Health Post (Posyandu). Research results of Winancy (2015), states that there is more addition of knowledge of the buzz group better than the brainstorming group. Health education method of brainstorming groups and buzz groups have influence on respondent's awareness of danger signs of pregnancy, childbirth, and puerperium. Lectures can be done as an attempt for health education to the target. Yogi (2013), mentions in his research result that there are differences in the decision to test for HIV among groups of interpersonal communication method and conventional

Table 2. Analysis results of paired difference test of toddler mother's knowledge before and after counseling with the printed media

No	Knowledge	Before	After	P number	Information
1.	Average	7.72	8.65	0,002	There was a difference
2.	Minimum	6.40	6.40		
3.	Maximum	8.80	10.0		

Source: Primary Data

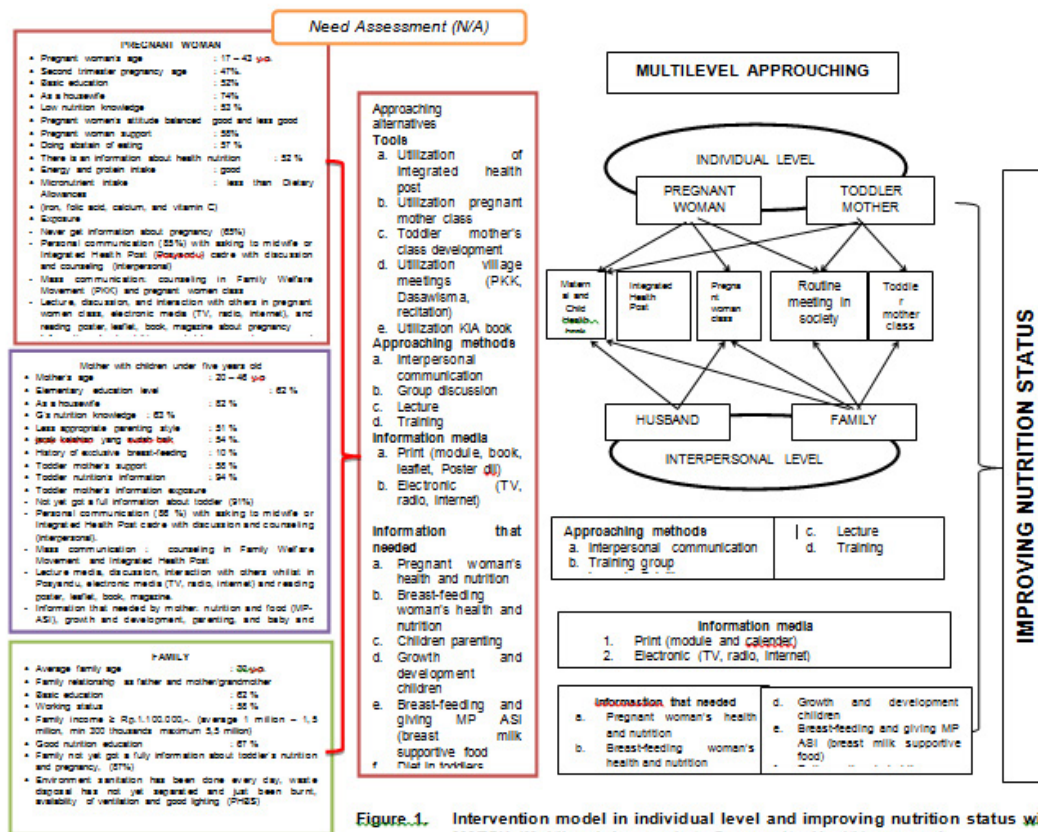


Figure 1. Intervention model in individual level and improving nutrition status with MATCH (Multilevel Approach to Community Health) approach

lecture method groups. Interpersonal communication methods are more effective than conventional lecture methods, in terms of its influence on increasing pregnant women's decision to test for HIV. Based on the Lontaan (2014), research results, group of pregnant women who were given the intervention had better knowledge about birth preparation and readiness to become parents than the control group at the health center of Teling, Manado City.

In Integrated Health Post activities, mass counseling held and carried out by midwives or Integrated Health Post cadres. According to Rahardjo (2013), there are still problems at the Integrated Health Post activities, cadres and toddler mothers. Integrated Health Post cadres thought that activities in it is less efficient because the cadres only conduct the weighing and distribution of PMT for the children, while health promotion to the mothers has not been done. Ilutagaol (2012), research results states that interpersonal communication of health workers with Integrated Health Post visitors are not going well, so it requires training for health

workers to promote the ability to provide health information to pregnant women and mothers along with their kin. The approach can be done in improving the nutritional status with utilization of maternal class and Integrated Health Post through accompaniment for pregnant women and toddlers and improving the role of Integrated Health Post cadre as the community driving force and solve the problems of public health at the grassroots level, especially the problem of nutrition for pregnant women and toddlers.

Media required on individual (Pregnancy and toddler mothers) level and interpersonal (family) level.

In this study, the majority (90%) communication media used by pregnant women, toddler mothers and families were in the form of interaction with others, electronic media through TV, radio, internet and reading the posters, leaflets, books, magazines about pregnancy and development of the health of infants and toddlers. Sources of the recorded information were obtained from the printed media and electronic media by accessing the

internet, though still limited in number. Main sources of the information recorded on the printed media which is obtained by the main informants were from MCH (Mother and Child Health / KIA) Handbook. MCH handbook is a handbook held by pregnant women containing maternal health record and various information about pregnancy care that a must-have and read by all pregnant women. According to Notoatmodjo (2011), printed media such as books has its advantages and disadvantages. Advantages of printed media is durable, does not need electricity, can be read anytime and anywhere as it is easy to carry anywhere so as to facilitate easier understanding. The disadvantages, it's unable to stimulate the sound effects and motion effects.

Information resources in Fajria (2015), research were obtained from the Internet and television. Television and the internet act as an electronic media has its advantages and disadvantages. Internet has its advantages can be accessed easily, quickly, anywhere, anytime, and information acquired is more updates. The fulfillment of the needs of public towards faster news report will not give good information. Many errors are found in the online media portal. Errors in the media makes news becomes inaccurate and change the public understanding of the content of the news, so news became not credible.

In the making of health media should be based on the following criteria which consider the methods and activities that will be used to convey a message of health information, the level of health literacy of message recipients, the auditory level is community level of recipients, ease of implementation, the likeliness (possibilities) to be held / effectiveness. In this study, the recommended media were a module that can be read, studied and calendars with consideration can be installed in the house and read by all family members.

From the results of the study, it was mentioned that the majority of pregnant women (65%), toddler mothers (91%) and family (89%) had never received complete information about nutrition.

At the individual level (Maternity) and interpersonal (husband and immediate family) requires information on the nutrition of

pregnant women and lactating, breastfeeding, healthy and safe food, Integrated Health Post. The importance of materials about nutritional intake of pregnant women are given to pregnant women, because based on the results of research obtained from the practice, nutritional intake of pregnant women is still less than the RDA (Recommended Dietary Allowance).

The nutritional intake of pregnant women that were still less than the RDA, especially micronutrients, namely iron (66%), folic acid (83%), calcium (64%) and vitamin C (72%). Knowledge of pregnant women about nutrition was still very low at 48%, while the less favorable attitude was as much as 51%.

This is in line with the results of Daba (2013) research which states that many pregnant women still know little about their nutritional need. The results of this study stated that there was a relationship between the level of education, income with knowledge of nutrition during pregnancy. Associated with the results of this study, most mothers had low education levels as much as 54%. Based on previous studies, it shows no relationship between social and cultural factors in the outcome of pregnancy as well as socio-economic status of women with regard to its role in maternal health (Ajiboye, 2012). Among the socio-cultural factors involved are: pregnant women and husband's economy, number of children, age of marriage, educational level, income, and cultural practice during pregnancy. Our study found that 43% of mothers practice abstinence from eating (certain food) during pregnancy. The foods many respondents avoid were durian, pineapple, tapai, melinjo leaves, papaya leaves, crabs, and shrimps. In toddlers' mother with birth spacing greater than 2 years, the frequency was 54%.

Believes in myths regarding pregnancy in the community is something that should be avoided. That culture will affect mindset, attitude, and behavior of every individual. The particular food that is avoided in the culture includes shrimps, catfish, eel, and fish, even though those aforementioned foods are rich in nutrients. Another food pregnant women are taught to avoid is shrimps, although shrimps are high in proteins and minerals. Eels are shown to have higher nutrient content of

protein, calcium, and iron than beef and egg (Manurung, 2009).

Intervention given on individual level (toddler's mother) and interpersonal level (husband and closest family) is about babies' and toddlers' food and nutrition, growth and development, parenting, and babies' and toddlers' health. These subjects were important because the study found there were inadequate understanding regarding: toddlers' nutrition (49%), nutritious foods required by toddlers (48%), macronutrients and micronutrients (99%), child with poor feeding problem (78%), relationship between feeding and toddler's nutrition problem caused by malnutrition (91%), consequences of micronutrient deficiencies (98%), cause of malnutrition, and the effect of nutrition during pregnancy toward toddler's nutrition (57%). In addition, we found difficulties in managing toddler's food menu that was suitable with existing resources.

A study by Thomas (2007), shows there is a significant relationship between mother's level of knowledge and children's nutritional care in southern region of India. Mothers in the countryside who have low level of knowledge tend to provide poor nutritional care. In contrast, mothers in the cities who have higher level of knowledge can provide better nutritional care. Irdawati and Dewati (2010) also found a significant relationship between level of knowledge and children's nutrition fulfillment. In other words, greater understanding of nutrition provision lead to better nutritional provision behavior toward malnourished children less than three years of age. In this study, information about toddlers' nutritional rehabilitation, pregnant mom's health and nutrition, lactating mom's health and nutrition, lactation, breast milk complementary food, children growth and development, child care and clean and healthy lifestyle was given through modules and calendars.

Trial of Toddler Nutritional Rehabilitation Intervention Model in Mother Level and Interpersonal Level. The nutritional rehabilitation intervention model tried on individual and interpersonal level was module; calendar was not tried due to the great amount of time – 1 year – required to see its effect.

The study showed there was an increase

in distribution of correct answers in pretest and posttest question in pregnant women and toddlers' mother. Statistical analysis using dependent t-test yield a *p*-value of  $< 0.05$ , indicating that  $H_0$  was rejected, hence it could be concluded that there was a difference in knowledge regarding nutritional rehabilitation among pregnant women and lactating mother before and after printed-media-aided counseling. The result showed that printed media (module) was effective in increasing knowledge of nutrition. Counseling using lecture method is a way of teaching used to orally convey information about a particular issue. This method is generally used in health promotion; the matter is conveyed orally aided by a power point presentation. Whereas a poster or other printed media have the advantage of delivering information and advice to help people see clearer what the lecturer is talking about in his speech. It also encourages change of attitude (Sadiman, 2006).

The result concur with the study by Negash (2014), which shows that knowledge score of the intervention group, given poster and demonstration about breast milk complementary food, is higher than control group. Study by Sule (2009), shows an increase in mother's knowledge about food provision for children less than five years of age after receiving nutrition counseling and food demonstration. A study by Wibowo (2009), also shows an increase in score after health education lecture and demonstration about gross motor stimulation in babies in toddlers' mother, with a *p*-value of 0.000.

### Conclusion

This multilevel promotion, based on MATCH (Multilevel Approach to Community Health) approach, modifies determinant factor on multiple levels, that is mother, family, community, and policies related to toddlers' nutrition. This study starts multilevel intervention model by identifying individual level, i.e. pregnant woman, toddlers' mother, and family. Approach used includes integrated health post and pregnant women classes. Access to both electronic and printed media is also put to use. Required nutrition information is incomplete. Our evaluation on individual and interpersonal level of nutritional rehabilitation

intervention suggests that printed media (modules) and counseling are effective measures in increasing mother's knowledge regarding nutrition.

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