

Nutrition counseling about general messages of balanced nutrition improve energy intake and haemoglobin level among HIV children

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ABSTRAK

Latar Belakang: HIV adalah masalah kesehatan yang signifikan di Indonesia. satu kota di DKI Jakarta yang memiliki perkiraan jumlah kasus HIV tertinggi yang ditularkan melalui pria ke wanita. Beberapa penelitian menyatakan bahwa anak-anak dengan HIV memiliki asupan energi dan protein yang kurang, dan anemia. Oleh karena itu, pentingnya meningkatkan pengetahuan gizi seimbang pada orangtua yang memiliki anak HIV sehingga adanya peningkatan perilaku yang baik terhadap asupan makanan pada anaknya

Tujuan: Penelitian ini bertujuan untuk menganalisis pengaruh pemberian pedoman nutrisi seimbang pada asupan gizi (energi dan protein) dan kadar hemoglobin pada anak-anak HIV

Metode: Desain penelitian adalah studi pra-eksperimental desain One Group Pre-Post Test. Penelitian ini adalah desain pre-post test kelompok kontrol non acak. Penelitian dilakukan di RSUPN dr Cipto Mangunkusumo dari Agustus hingga Oktober 2019. Sampel diambil secara purposive dengan kriteria inklusi dan eksklusi. Data dianalisis dengan menggunakan paired t-test

Hasil: Hasil penelitian menunjukkan bahwa ada perbedaan yang signifikan antara asupan energi rata-rata sebelum konseling dan setelah konseling ($p = 0,013$) tetapi tidak ada perbedaan yang signifikan antara asupan protein rata-rata sebelum dan sesudah konseling ($p = 0,934$). Ada perbedaan yang signifikan antara level Hb sebelum dan setelah konseling ($p = 0,000$)

Kesimpulan: Ada pengaruh konseling gizi terhadap asupan energi tetapi tidak ada pengaruh terhadap kadar Hb

KATA KUNCI: energi; protein; Hb; HIV; anak

ABSTRACT

Background: HIV is a significant health problem in Indonesia. There were an estimated 242.699 persons living with HIV. Central Jakarta is one of the cities in DKI Jakarta that has the highest estimated number of HIV cases transmitted through men to women. Thus means that there is a possibility that the number of HIV children in Central Jakarta wil also increase. Some studies suggest that children with HIV have less energy and protein intake, and anemia. Because of this, the importance of increasing the knowledge of balanced nutrition in parents who have HIV children so that there is an increase in good behavior towards food intake in children.

Objectives: The study aimed to analyze the effect of providing balanced nutrition guidelines on nutritional intake (energy and protein) and hemoglobin levels in HIV children.

Methods: The research design was a pre-expreimental study of the One Group Pre-Post Test design. study was experimental non randomized control group pre-post test design. The study was carried out at RSUPN dr Cipto Mangunkusumo from August to October 2019. The sample were taken purposively with inclusion and exclusion criteria. Data were analyzed by using paired t-test

Results:The results showed that there was a significant difference between the mean energy intake before counseling and after counseling ($p = 0,013$) but there was no significant difference between the average protein intake before and after counseling ($p = 0,934$). There was a significant difference between the level Hb before and atter counseling ($p = 0.000$)

Conclusions: The provision of counseling on nutrition guidelines provide a significant difference between the average energy intake and the levels of Hb.

KEYWORDS: energy; protein; Hb; HIV; children

INTRODUCTION

HIV is one of the health problems that occur in Indonesia. As of March 2017, the number of HIV in Indonesia was 242,699 people and DKI Jakarta was the highest province for HIV cases with 46,758 people. Central Jakarta is one of the cities in DKI Jakarta Province which has the highest estimated number of HIV cases transmitted through men to women in 2016, amounting to 1,719 cases (1). This means that there is a possibility that the number of HIV children in Central Jakarta will also increase. Underweight is a risk factor for death in HIV children undergoing antiretroviral treatment. The research in the Regional District and The City of Semarang that the majority of HIV children receiving antiretrovirals had underweight and stunting (2).

This nutritional status is influenced by the intake of macro and micronutrients. Nutrient intake will also affect the immune system of children and HIV at risk of anemia (3). Research in Semarang, lack of zinc intake in HIV children increases the risk of underweight by 3.02 times (4). Protein and vitamin A intake decreases the body's HIV resistance so that a low CD4 + count can affect a child's HIV appetite (2). Other than that, based on a study of children in India (2015) for 12 month, HIV infected children have less energy intake in all age groups, iron intake is less than 50% of their needs with underweight (46.8%). Iron deficiency (49.3%) causes anemia in pediatric HIV (45.5%) (5). Besides, 69% of anemia occurs in HIV children who get zidovudine ARV types (6). Iron supplementation for 6 months can increase Hb as much as 0.5 g / dl in HIV children aged 2-12 years with adequate intake of energy, fat, and protein (7).

Based on qualitative research in Temanggung, caregivers for HIV children in Temanggung have very limited knowledge related to caring for children with HIV. Nearly all caregivers say they do not know the provision of good nutrition for HIV children so that all HIV children experience malnutrition, their growth and development are slow. This is due to the lack of health workers providing information related to proper nutrition through counseling (8). This is also because many Integrated Health Post cadres and HIV sufferers still do not understand the importance

of adequate nutrition to slow the progression of HIV to the next stage (9).

Adequate nutrition can be achieved by reading/understanding through balanced nutrition guidelines. Community understanding related to general guidelines on balanced nutrition in West Lombok, of 188 mothers, did not understand that general guidelines. In this study, it was proven that there was a relationship between the mother's knowledge and children's nutritional status. It can change the behavior of balanced nutrition from mother to child so that the nutritional intake of children increases to prevent malnutrition in children (10). This is in line with the results of research at the General Hospital Dr. Sardjito, Yogyakarta, increasing knowledge through nutritional counseling can increase energy and protein intake and nutritional status in HIV patients (11). This study aims to analyze the effect of nutritional intake (energy and protein) and hemoglobin levels for children with HIV in Central Jakarta. The results of this study are expected to increase nutrient intake and hemoglobin levels.

MATERIALS AND METHODS

This research design was a pre-experimental study of the One Group Pre-Post Test design. The research was conducted. The data was collected during two month (August-October 2019) in Dr. Cipto Mangunkusumo Hospital located in the Central Jakarta Region. The population is children diagnosed with HIV. We selected sample using consecutive sampling technique. In this study consist of 16 boys and 15 girls. Criteria for respondents are children infected with HIV aged 1-14 years without TB and liver/kidney disease. The inclusion criteria of this study are willing to be the subject of research by signing informed consent, parents/caregivers of respondents can communicate well, undergoing ARV therapy, respondents registered as patients in the hospital where the study was conducted

Nutrient intake through the method of Food Recall 2x24 hour before and after the provision of counseling for balanced nutrition completed with a time. According to the Hemoglobin levels data through the

HemoCue method, before and after the intervention with each measurement 2 times. Independent variables of guidance on balanced nutrition guidelines. The dependent variables in this study were energy intake, protein intake, and Hb Levels.

At the treatment stage I (Pre), a 1x 24 hour recall interview and Hb examination were carried out by an enumerator. Then after two days (Pre), a second 1x24 hour recall interview was conducted. Then the lapse of a day, treatment II (intervention), provision of nutritional counseling to respondents by researchers with Powerpoint media and leaflet distribution. A week later, treatment III (Post) 1x24 hour recall interview was conducted. Then after two days (Post), the interview was conducted a second 1x24 hour recall and Hb examination by the enumerator.

Data processing in this study was conducted by Shapiro-Wilk normal distribution test. The test results showed a normal distribution so the data were analyzed using a paired sample T-test with a significance level of $p < 0.05$ to see to determine the effect of the dependent variable on the independent (12) using SPSS version 16, while the sample characteristic data were analyzed descriptively.

Before the study was conducted, parents had explained the advantages and disadvantages that would be obtained by the respondent and all the processes carried out during the study. If parents are willing and let their children be the subject of study, parents are asked to sign informed consent. This study has been approved through the hearing of the Health Research Ethics Commission (KEPK) of the Faculty of Medicine, University of Indonesia with No.KET-623/UN2.F1/ETIK/PPM.00.02/2019.

RESULTS

General characteristics of respondents'

General characteristics of the respondent that most of the study respondents were male with an average age of 9.2 years. The average Hb level of respondents before the intervention was 11.48 mg/dl and after the intervention, the average was 11.83 mg/dl. The average energy intake has increased from 1,389.5 kcal to 1,634.22 kcal. while for the

average protein intake has decreased from 61.02 gr to 60.76 gr.

Characteristics of Respondents' Parents/Guardians

In Table 1. it can be seen that most of the respondents in this study (51.6%) had no parents or one of their parents had died. The percentage of mother's education level with a high school education background is higher than that of the respondent's father, which is 35.5% in mothers 32.3% in fathers. However, there was 1 respondent's father who had a bachelor's background. Occupation of respondent's parents: the father consisted of laborers (22.6%) and traders/services/entrepreneurs 12.9%. Most

Table 1. Characteristics of Respondents' Parents/Guardians

Variabel	n=31	%
Mother's age		
20-35 years old	4	12.9
>35 years old	11	35.5
Father's age		
20-35 years old	5	16.1
>35 years old	10	32.3
Mother's education		
Didn't finish school	1	3.2
Graduated elementary school	2	6.5
Graduated high school	11	35.5
Graduated academy/Diploma	1	3.2
Father's education		
Graduated elementary school	3	9.7
Graduated high school	10	32.3
Graduated academy/Diploma	1	3.2
Postgraduated	1	3.2
Mother's job		
Salesman/entrepreneur/service	2	6.5
Housewife	13	41.9
Father's job		
Labor	7	22.6
Salesman/entrepreneur/service	4	12.9
Private employees	2	6.5
The other (unemployed)	2	6.5
Number of family dependents		
1 person	8	25.8
2 person	14	45.2
3 person	6	19.4
4 person	2	6.5
5 person	1	3.2

Note: As many as 51.6% of parents of HIV children died in the study

Table 2. Characteristics of Respondents based on Adequacy of Nutrient Intake (Energy and Protein) and Anemia Status

Variabel	Pre intervention		Post intervention	
	n=31	%	n=31	%
Energy intake (Kcal)				
Less	28	90.3	24	77.4
Enough	3	9.7	7	22.6
Asupan protein (g)				
Less	22	71	26	83.9
Enough	9	29	5	16.1
Hb Levels				
Anemia	22	71	15	48.4
Didn't anemia	9	29	16	51.6

of the respondents (41.9%) did not work or were housewives. The number of dependents was mostly 2 people (45.2%).

Characteristics of Respondents based on Adequacy of Nutrient Intake (Energy and Protein) and Anemia Status

Adequate intake of energy and protein is categorized into two, namely insufficient and sufficient. The intake which is categorized as sufficient is that which has a percentage of $\geq 100\%$ by comparing the intake of respondents with their needs. Respondent needs are calculated by paying attention to body weight (BB) and height (TB) and physical activity. Anemic status was categorized in two namely anemia (< 12 gr/dl) and no anemia (≥ 12 gr/dl). Table 2 shows that there is an increase in the percentage for energy intake in the sufficient category and Hb levels in the non-anemic category. The energy intake in the category experienced quite an increase from 9.7% to 22.6%. The non-anemic category Hb levels increased from 29% to 51.6%. While protein intake is sufficient there is a decrease from 29% to 16.1%.

The influence of counseling on balanced nutrition guidelines with energy, protein, and hemoglobin levels

Table 3. shows that there is a significant difference ($p < 0.05$) between before and after the intervention on the variable energy intake and Hb levels. As for the variable protein intake, there was no significant difference between before and after the counseling intervention (intervention). In addition, in the table above it can be seen that there is an increase before and after counseling only energy and Hb levels.

DISCUSSION

General characteristics of respondents

In this study, most of them experienced anemia. This is in line with the results of research on HIV children in India and Tanzania, HIV positive children ≥ 2.5 years are at lower risk than positive children < 2.5 years (13-14). Besides, the lack of energy intake in children can cause anemia (14). The increase in average Hb in some respondents is in line with the increase in the average energy intake.

This is in line with research Sop MMK et.al (15) children who have adequate energy intake according to their needs do not experience anemia. Food intake in children depends on the mother. Mothers who get nutrition education will provide quality food intake. Therefore, maternal knowledge about nutrition can reduce the prevalence of anemia by 0.52 times (16).

Characteristics of Respondents' Parents/Guardians

Based on the level of education both the father or mother of the respondents have a good

Table 3. The influence of counseling on balanced nutrition guidelines with energy, protein, and hemoglobin (Hb) levels

Variable	Mean \pm SD		t _{df}	p Value
	Pre intervention	Post intervention		
Energy intake (Kcal)	1.390 \pm 361.19	1.634 \pm 565.07	-2.637	0.013*
Protein intake (gram)	61.02 \pm 18.68	60.76 \pm 21.28	0.084	0.934
Hb Levels (g/dL)	11.48 \pm 1.15	11.84 \pm 1.36	-2.053	0.000*

*Significant ($p < 0.05$)

educational background so it is easier to receive knowledge from counseling. Higher education makes it easier for someone to get information that can have an impact on behavior change (17). Based on Prihatmawati's research (2013), the level of education of high school graduates is easier to understand the information provided and apply it properly. Good implementation related to diet is also supported by income earned from work.

Based on the work of parents or child companions of HIV in this study, most areas laborers or as traders/services /entrepreneurs are efforts to meet the daily needs of the household father, especially the food intake of children. Parents' work can influence good parenting, which can be seen from feeding their children so that it can improve the nutritional status of children (18). Based on Kurniasari's research in 2017, parents' income affect the nutritional status of children by 2.3% while the rest is influenced by the environment, birth weight, duration of nursing mothers, type of house, toilet facilities, child care, milk, and milk products, staple food, and cough and diarrhea. Poor child food intake will affect the nutritional status of children (19).

Characteristics of Respondents based on Adequacy of Nutrient Intake (Energy and Protein) and Anemia Status

Lack of protein intake in children with HIV for a long time will have an impact on its growth. This is because, in children with HIV, protein is needed very high for the metabolism of the HIV immune system (14). A sufficient level of protein intake significantly increases nutritional status in pediatric infections (20). Adequate protein intake prevents tissue loss during illness and returns during the recovery so that the proportion of fat and free fat mass can be maintained (21).

The influence of counseling on balanced nutrition guidelines with energy, protein, and hemoglobin levels

Significant differences in energy variables and Hb levels, as well as an increase in percentage in this study, prove that counseling conducted can increase energy intake and Hb levels. Counseling

of balanced nutrition guidelines in this study was delivered through lectures 1 time with PowerPoint media and giving materials with leaflets 1 time on different days. The provision of material with leaflets is done individually to the patient's family and patients. This research is in line with Siregar (2016), which states that counseling can effectively change attitudes and actions through the introduction of general guidelines for balanced nutrition with a lecture method of 1 meeting. Besides in this study, there was an increase in knowledge among respondents (22). Other research states that increasing knowledge after being given nutrition education using lecture methods with powerpoints and modules is influenced by the level of education of respondents' parents. Higher education will make it easier for someone to get information that can have an impact on behavior change (16). In addition to behavioral change, the level of education graduating from secondary school is easier to understand the information provided and apply it properly (17). This is in line with the results of this study that the education of some respondents' parents, namely high school graduates and above.

In this study, energy intake was asked again with the food recall method twice in 15 days after the last intervention (leaflet). The increase in energy in this study was 244 ± 203.88 Kcal. This study is in line with the research of Hadisuyitno (2018), that there is an increase in energy intake by 32% of respondents having a good energy intake category after a month of nutrition counseling (23). Nutrition education will be very influential when done in a caregiver and community leaders meeting, with a frequency of 2 times a week by combining counseling material and cooking demonstrations (24).

Poor nutrient intake is a risk factor for HIV deaths of children who start antiretrovirals. Energy nutrient intake and macronutrients (protein, fat, and KH) play an important role in improving nutritional status (14). Research Evans et.al (2013), Nutritional supplements of 388 kcal/day for 6 months in HIV patients with antiretrovirals can improve nutritional status which can be seen from a 7.8% increase in BMI of patients who receive these supplements. Moreover, it can increase the hemoglobin by 9.5%,

and the CD4+ count increases at 120-174 cell/mm³. This proves that good energy intake can increase body weight and improving immune function in HIV-positive patients that present at ART initiation to increasing quality of life and ultimately reducing HIV-related complications (25).

HIV study in children in Hyderabad, India (2009-2011) aged 1.5-15 years, boys have lower food intake than girls, so they are underweight (4). Boys are more active than girls, so they need more energy. Besides, the need for energy intake is higher in HIV children than healthy children due to increased metabolism to fight the virus in the body (26). when calculating the energy needs of each study subject, attention to age, body weight, sex, activity factors, and multiplier growth factors are multiplied if they have a Z score of <2. This is also supported by WHO recommendations (2010). HIV care for children from the age of 6 months to 14 years is supported by monitoring nutritional status and family support (21,28).

Based on the results of this study, there were no significant differences in the protein intake variables before and after the intervention). This research is in line with Sefaya and Nugraheni (2017) about of significant differences in the level of protein adequacy after nutrition education (27). Children infected with HIV will experience impaired protein balance due to the inability to regulate protein catabolism. Furthermore, the acute phase of responding to proteins caused by HIV infection is characterized by high concentrations and levels of protein-related synthesis. The amount and type of protein in HIV patients need to be considered and it is recommended to adjust it to the needs that function as protein stores in the body. Protein stores are needed during inflammation and fever (28).

Children's HIV protein intake needs to be increased to reduce the risk of death in child HIV. Adequate protein intake in children avoids tissue loss during illness and returns during the recovery so that the proportion of fat and free fat mass can be maintained (21,26,28). Protein intake is needed to avoid one of the metabolic complications such as lipodystrophy (LD) from taking ARVs for a long time. These metabolic complications can occur in

children infected with perinatal HIV, thus affecting the quality of life and long-term adherence to treatment. Therefore, HIV children who have been using ARV for a long time need to be monitored for lipid profile, by identifying LD early and maintaining heart and bone health (29-30).

Healthy HIV children are children who do not experience weight loss or low weight or stunting and other infectious diseases. This can occur if an HIV child has adequate protein intake in addition to energy and fat intake and sufficient micronutrients (28,31). In this study, respondents who had a mean protein intake decreased from 61.02 ± 18.68 grams (before the intervention) to 60.76 ± 21.28 (after the intervention). Lack of protein intake is dominant in low socioeconomic societies. Lack of pure protein at a severe stage causes kwashiorkor (31). Some respondents in this study experienced kwashiorkor symptoms which were seen as stunted growth seen from TB that did not match the age, decreased appetite, depigmented, dry, scaly, cracked skin. These signs generally occur in pediatric HIV patients who have been on antiretroviral drugs for a long time but lack of nutrition.

Based on the results of this study indicate that there are significant differences between the average Hb before and after extension ($p < 0.05$). These results state that there is an influence in providing an extension for balanced nutrition guidelines on Hb. Hemoglobin levels in respondents who received counseling were higher than those who did not get counseling (32). Providing counseling or nutrition guidelines can help increase nutrient intake and improve diet, especially for HIV. People Living With HIV-AIDS (PLWHA) who are given nutritional counseling show a positive influence on attitudes that have an impact on improving nutritional status (11). The extension of nutrition guidelines for children with HIV infection can help change eating patterns better and be able to anticipate the possibility of symptoms of infection that may arise by eating food according to their needs and illness.

Anemia is one of the initial problems for PLWHA (33). Several factors that influence an HIV child have anemia, one of which is caused by hematological complications. Three basic

mechanisms of anemia in HIV infection are decreased erythropoiesis, increased erythrocyte destruction and erythropoiesis ineffectiveness (34). Anemia in HIV infection is generally caused by side effects of ARV treatment, namely hematopoiesis disorder (35). The mechanism of anemia that occurs in HIV infection there are three, namely decreased production of red blood cells, increased red blood cell, and destruction increased red blood cell destruction and ineffective red blood cell production (33).

LIMITATION

Limitations of this study are the observation time that is not long enough, that is only 14 days and the number of respondents is small (31 people). Besides, counseling is only given twice, namely with power points and leaflets. The research variables only focus on energy and protein intake while other micronutrients need to know the effect or its relation with anemia status, nutritional status, and HIV immunity of children (CD4+ count).

CONCLUSION AND RECOMMENDATION

Nutrition counseling on balanced nutrition guidelines increases energy intake and Hb. These guidelines provide a significant difference between average energy intake and Hb levels before and after the intervention. However, there was no significant difference between the average protein intake before and after the intervention. Future study needs to examine the effect or relationship of nutritional counseling on increasing body immunity (CD4 + count), anemia status, and energy intake, protein intake, and nutritional status by distinguishing the media used when counseling is done. Besides, further research is better carried out with a greater number of respondents and a longer observation time of at least 3-6 months.

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