**Knowledge and Behavior Change of People Living with HIV through Nutrition Education and Counseling**

Perubahan Pengetahuan dan Perilaku Orang yang Hidup dengan HIV melalui Konseling dan Edukasi Gizi

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DOI: http://dx.doi.org/10.21109/kesmas.v10i3.947

Abstract

HIV, AIDS and nutrition are interconnected. In the HIV Integrated Care Unit of Dr. Cipto Mangunkusumo Public Hospital, nutrition education and counseling services are provided within a collaborative service for people living with HIV (PLWH). This study aimed to determine influence of nutrition education and counseling to knowledge and behavior of PLWH. This study was conducted with quasi experimental design using treatment and control groups. The treatment group consisted of 25 samples and 29 samples for control group. Samples were adults between 18 – 50 years old selected by applying inclusion and exclusion criteria. A pretested questionnaire was used to assess knowledge. Paired t-test sample was used to analyze data. This study was conducted on May – July 2014. Based on results of this study, there was effect in form of knowledge change (p value = 0.000) with score 6.38 point lower on the control group and any significant differences in behavior change (p value = 0.048) for the treatment group after receiving nutrition education and counseling. This study shows that nutrition and counseling using media of education which is more complete and continuously provided may improve knowledge and change behavior of PLWH.

Keywords: Behavior, counseling, education, knowledge, people living with HIV

Introduction

Human immunodeficiency virus (HIV), acquired immune deficiency syndrome (AIDS) and nutrition are interconnected in which condition of HIV and AIDS contributes to malnutrition and the malnutrition condition may have a negative effect on people living with HIV/AIDS (PLWHA). Malnutrition affects the strength and disrupted body immune system resulting susceptibility to infectious diseases, hence increase nutritional needs. The side effects of malnutrition that can cause inability to meet nutritional needs may lead patients to eas-
ily get infection risk, proving the strong relation between 
nutrition, HIV and AIDS. Less nutrition and HIV infec-
tion have a negative effect on individuals, households 
and the environment as well, rising from a decrease in 
clinical condition, nutrition status, quality of life and eco-
nomic condition. Obviously, nutrition plays an import-
ant role in maintaining the health and immune system 
and to slow the progress of HIV to AIDS.

Moreover, as a consequence of HIV infection, 
malnutrition also increases the prevalence of cardiovas-
cular disease and insulin resistance among people living 
with HIV (PLWH) after receiving antiretroviral therapy 
(ART). This is also an issue of concern. ART aims to 
slow replication but does not eliminate the virus. PLWH 
are able to maintain quality of and prolong their life, but 
they must be in a condition that includes ART, other 
drugs and food consumption which affect their absorp-
tion, metabolism, distribution and excretion resulting a 
less favorable circumstances.

A study in Tanzania observed that the prevalence of 
metabolic syndrome was higher in urban than rural areas 
among individuals living with HIV and receiving ART. 
They also observed that components of metabolic syn-
drome including high blood level of triglycerides, low 
blood levels of high-density lipoprotein (HDL) and raised 
fasting blood glucose were significantly high among study 
participants from urban than those from the rural areas. 
The traditional predicting risk factors including high lev-
el of education, gender and being past or current alcohol 
consumer significantly predicted the prevalence of meta-
bolic syndrome among participants in the urban area. 
This study suggests an intervention to prevent the risk, 
such as reduction of body weight, eating healthy diet and 
participating at moderate or vigorous intensity activities.

Relation between HIV and malnutrition greatly af-
facts the progress of the disease among PLWH, and in-
teractions that occur may decline health status, nutri-
tional status, quality of life and ultimately affect the pro-
ductivity of family. At individual level, malnutrition is 
casted by inadequate intake, then the direct effects are 
metabolism problem of nutrients at the stage of absorp-
tion, storing and utilization of nutrients in the body 
which could harm the immune system causing nutrient 
deficiency and development of infectious diseases.

In improving condition of PLWH through optimiza-
tion of nutritional status, it is necessary to intervene with 
health promotion including nutrition education and 
counseling. The nutrition intervention program includes 
nutrition assessment, nutrition education and counsel-
ing, food assistance, micronutrient supplementation and 
activities to strengthen household food access addressed 
to PLWH.

Theory of planned behavior known as the theory of 
reasoned action which is an individual’s health behavior 
is directly influenced by intention to engage in that be-
havior. Three factors affecting behavioral intention in-
clude attitude, subjective norm and perceived behavioral 
control.

The HIV Integrated Care Unit of Dr. Cipto 
Mangunkusumo Public Hospital collaborates services in-
cluding nutrition education and counseling services tar-
geted to PLWH. The aim of collaborating such services is 
to improve and maintain optimal nutritional conditions 
that may support general health. This study aimed to de-
termine effects of nutrition education and counseling on 
knowledge and behavior of PLWH.

**Method**

A quasi-experimental study was conducted between 
May and July 2014 with one group using pretest and 
posttest design. Analysis was based on data from knowl-
edge and implementation of energy intake, food habit and 
food safety. Respondents were adult patients (18 – 50 
years old). Respondents (n = 54) were out patients who 
came to HIV Integrated Care Unit of Dr Cipto 
Mangunkusumo Hospital Jakarta with inclusion and ex-
clusion criteria. Inclusion criteria were ability to commu-
nicate and willing to attend nutrition education and coun-
seling every two weeks. Exclusion criteria were HIV po-
itive with stage 3 and 4 based on World Health 
Organization (WHO)’s criteria, getting pregnant, not al-
ready receiving ART and suffering a chronic disease that 
affects the diet, such as diabetes mellitus, hypertension 
and heart disease. This study received ethics and permits 
approved by Faculty of Medicine Universitas Indonesia 
Ethical Committee for Research and the obtained in-
formed consent from each respondent.

Knowledge assessment was conducted by providing a 
questionnaire consisting of a of 50 questions regarding 
nutritional needs, how to choose good food and food 
safety. This instrument was tried out and validated prior 
to the data collection. The questionnaire was filled by 
each respondent accompanied by a pretrained enumera-
tor.

Behavior was assessed in four stages. The first stage 
was to determine intake of energy and macronutrients by 
using a single 24-H food recall and analyzed using  
Indonesian food composition table. The second stage was 
comparing to individual needs to find out any compati-
bility. The third stage was assessing the suitability of the 
proportion of energy intake and macronutrients with bal-
anced nutrition principles. The fourth stage was assess-
ing implementation of food safety by using a question-
naire consisting of 20 questions about food safety beha-
vior. The fourth step considered as behavior was assessed 
twice, before and after the intervention.

The intervention group received nutrition education 
in the first week by providing booklet 1 containing indi-
vidual nutritional needs and the list of foodstuff ex-
changer. At the second week, the respondents attended
nutrition counseling and to evaluate the implementation
of nutritional advice. In the third week, the respondents
came for the second nutrition education by getting book-
let 2 containing guidance to choose any good food for
daily eating and booklet 3 containing food security. In the
fourth week, the respondents were evaluated. The con-
trol group were only asked to come during the pretest
and received a flyer containing the recommended ba-
lanced nutrition and during posttest for the next four
weeks. According to standard procedures, the balanced
nutrition flyer was distributed in accordance with HIV
patients without nutritional problems.

Results
Characteristics of Samples
Demographic data was defined by characteristics in-
cluding age, sex, education, occupation and family sup-
port. Respondents in the age of 20 to 59 years in which
57% were 30 – 39 years old (n = 31). Based on gender,
women respondents were 56.4% (n = 31). The respondents who attained high school were 18 (72%) in the
treatment group and 19 (65.5%) in the control group.
Most respondents were employed and having regular in-
come (60%) in the treatment group and 17 (58.5%) in
the control group. Respondents worked as teacher, em-
ployee, non-governmental organization (NGO) workers
and labors. Family support/peer group were 21 (84%) in
the treatment group, and 23 (79.3%) in the control
group. There was no any significant difference according
to the characteristics between those two groups of
respondents (p value > 0.05).

Knowledge and Behavior
According to Table 1, knowledge and behavior showed
characteristics as well as proportion above specified
reference values.

Before the intervention, there was no significant dif-
ference for both groups in energy intake, dietary habit
and food safety implementation. After intervention, there
were significant changes found in energy intake in the
treatment group (p value = 0.002), energy intake score (p
value = 0.002), diet (p value = 0.003) and food safety (p
value = 0.015). The differences before and after the in-
tervention in both groups were seen in the implementa-
tion of food safety (p value = 0.015). Table 2 included re-
sults of substitution from the fourth part of values above
as behavior and knowledge before the intervention.

There was no significant difference in knowledge and be-

<table>
<thead>
<tr>
<th>Variable Category</th>
<th>Before Intervention Mean ± (SD)</th>
<th>p value</th>
<th>After Intervention Mean ± (SD)</th>
<th>p value</th>
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<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy intake (Kkal)</td>
<td>Intervention (n = 25)</td>
<td>1666 ± (220)</td>
<td>0.622</td>
<td>1722 ± (184)</td>
<td>0.002</td>
<td>56.04 ± (125.27)</td>
</tr>
<tr>
<td>Control (n = 29)</td>
<td>1685 ± (229)</td>
<td>1736 ± (181)</td>
<td>0.050</td>
<td>53.03 ± (177.40)</td>
<td>0.345</td>
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<tr>
<td>Intake scoreb</td>
<td>Intervention (n = 25)</td>
<td>64.00 ± (16.26)</td>
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<td>74.00 ± (16.26)</td>
<td>0.002</td>
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</tr>
<tr>
<td>Control (n=29)</td>
<td>68.96 ± (17.23)</td>
<td>75.00 ± (17.67)</td>
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<tr>
<td>Dietary habit scorec</td>
<td>Intervention (n = 25)</td>
<td>52.00 ± (10.00)</td>
<td>0.011</td>
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<td>0.003</td>
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<tr>
<td>Control (n = 29)</td>
<td>56.89 ± (17.54)</td>
<td>60.34 ± (17.67)</td>
<td>0.424</td>
<td>3.44 ± (22.87)</td>
<td>0.015*</td>
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<tr>
<td>Food safetyd</td>
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<td>82.80 ± (13.07)</td>
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<tr>
<td>Control (n = 29)</td>
<td>82.75 ± (13.86)</td>
<td>81.72 ± (11.04)</td>
<td>0.322</td>
<td>-1.03 ± (8.59)</td>
<td>0.000*</td>
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*P value = 0.05

Table 2. Knowledge and Behavior

<table>
<thead>
<tr>
<th>Variable Category</th>
<th>Before Intervention Mean ± (SD)</th>
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<tr>
<td>Knowledgeb</td>
<td>Intervention (n = 25)</td>
<td>81.20 ± (17,15)</td>
<td>0,111</td>
<td>89,60 ± (17,15)</td>
<td>0,000</td>
<td>8,40 ± (9,4)</td>
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<tr>
<td>Control (n = 29)</td>
<td>87,58 ± (11,54)</td>
<td>86,55 ±(8,97)</td>
<td>0,477</td>
<td>-1,03 ±(7,7)</td>
<td>0,049*</td>
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<td>Behaviorb</td>
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<td>66,24 ± (8,68)</td>
<td>0,166</td>
<td>75,64 ± (13,45)</td>
<td>0,000</td>
<td>7,50 ± (8,71)</td>
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<tr>
<td>Control (n = 29)</td>
<td>69,55 ± (8,59)</td>
<td>72,00 ± (11,04)</td>
<td>0,171</td>
<td>2,53 ± (9,40)</td>
<td>0,000*</td>
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*P value = 0.05

Table 1. Energy Intake, Intake Score, Dietary Habit Score and Food Safety

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*p < 0.05

Table 2. Knowledge and Behavior
behavior in both groups. After the intervention, the result showed significant differences of knowledge and behavior and no significant differences for control group that stated the same condition for each group.

**Discussion**

There were 56.4% women included in this study. According to Indonesian HIV/AIDS statistical data, there were 30% of women living with HIV/AIDS until December 2013. If it is associated with HIV, women are much easier to experience epidemic than men related to biological, sociocultural and economic reasons. The education levels in this study were senior high school 68.5% and the remaining was both secondary school and college. Education level may influence behavior in choosing his/her lifestyle, particularly related to food and nutrition. In the study that took students as samples, there was a relation between parents’ education level and their children’s nutritional status. Education took a part in influencing food provision in the household level. About 59% of diverse occupations was described in this study. They were private employees, teachers, volunteers at community social institution, labors, and self-employed. People work to fulfill their daily needs including food by expanding their job income. According to the Joint United Nations Programme on HIV/AIDS (UNAIDS) 2002, treatment costs for PLWHA can discard family’s savings much more than the deaths caused by ailments in a short time or an accident. Family sustainability will disappear, especially when the parents (of PLWHA) are died. About 81% of the total of sample gain support from their family. Family support is one of the important non-pharmacological therapy for someone potentially suffers from depression.

The pretest resulted no difference of knowledge between the two groups were found before the intervention (p value = 0.111). After nutrition intervention was performed to the treatment group, this group had changed (p value = 0.000), while the control group which was not performed intervention had not changed (p value = 0.477). The comparison of value change was statistically different (p value = 0.000). It means there was any influence of performing nutrition education and counseling in enhancing knowledge of PLWHA. Knowledge is a factor that contributes to create a behavior. It is usually obtained from the involvement of seeing and hearing sense. These senses become important in creating behavior. Study conducted in West France among adult men showed there was a relation between eating pattern knowledge and food choice related to eating behavior.

Study conducted in Uganda among women with HIV positive showed performing nutrition education and knowledge regarding nutritious foodstuffs perceived effectively work through grouping foodstuffs approach, for example, each group of flour, source of protein, fruits, vegetables and food in accordance with season. This method was able to improve their knowledge about foodstuffs (p value = 0.006) and eating schedule (p value = 0.002). The result was in accordance with this study showing the answer upon the questions about that group did not know energy source food declining to 36% from 44%. Likewise, that group did not know vitamin source food declining to 24% from 36% after intervention was performed. This study also obtained difference result of 9 right answers of 10 questions between the treatment group and the control group.

The study using the theory of planned behavior to influence the food consumption behavior found that respondents who were well-informed about food additive and processed food had a positive food consumption attitude to those kinds of food. It also showed that there was a difference of the food containing additives selection between the well-informed group and the less-informed group (p value = 0.002). The study of adult attitude to milk consumption had concluded that nutrition education needed to focus on the behavior changes and diminishing any barriers which affected their consumption of milk. In such theory of planned behavior, attitude is a way in the direction of behavior. The attitude is formed as a degree for people to evaluate which behavior that will give advantage or disadvantage and good or bad for them to take a decision toward behavior. When someone considered the processed food and food contained additives were safe to consume, they would have the intention to consume those kinds of food. Somehow that attitude was also controlled by the norms surround them. The study results on PLWH had found that there were attitude changes to the implementation of food security education for PLWH. The education support used problem-solving approach for common problems and motivation support from the health personals.

The three kinds of behavior assessed in this study contained intake adequacy compared to the individual needs, food source selection and food security. Applied daily skills to handle food and beverage, the capacity to overcome the food access and ability of food preparation were behaviors that became a concern in this study. Particular lessons were needed in order to get the desired skills. The objective of the lessons was supplying the knowledge as provisions to change someone’s behavior. The study had shown that there was no difference of the nutrient intake in the after and before the intervention for both groups (p value = 0.622), meanwhile after the intervention, there was a difference of nutrient intake of the exposed group (p value = 0.002). Nutritional needs topic as the nutrition education aimed to improve nutrient intakes of PLWH. The result in eating pattern had
shown that there was a difference in eating pattern after nutrition intervention (p value = 0.003). From the answered questions by the PLWH, there were significant differences on the answers of questions related to the attention of packaged food and beverage, the way to store raw foods and the food selection while eating out. The results were also in line with the study on food security after the intervention (p value = 0.015). Food security for PLWH really needs special attention because they are very susceptible to food-related infectious disease, such as chronic diarrhea which can exacerbate their condition. Usually, such condition derived from the raw food consumption or half-cooked food consumption. Several ways to avoid that condition are by processing every food until it is fully-cooked before eating, particularly food like meats, fishes, poultries; storing the food sources carefully to avoid the cross-contamination; and boiling the water. Therefore, the right knowledge of food security is needed.18

After these three aspects were observed, the results showed that behavior had changed, by the intervention such as education and counseling (p value = 0.015). This kind of behavioral change is one of the basic skills for living healthier, though they need another compliant aspect like taking an ARV. Study of the women’s group in Uganda had shown that the food selection pattern in the household level had changed after they received the training about the importance of nutrition for PLWH and balance nutrient knowledge. The flour consumption is higher than the fruits and protein source prior to the study. The relation between knowledge support of skills to differ each food source by their group, nutrition comprehension (p value = 0.006) and eating schedule had been proven significant (p value = 0.002).18

Conclusion

As a conclusion, nutrition education has a significant relation with the increasing nutrition knowledge and behavior. Nutrition intervention as a part of nutrition care as processed by providing nutrition education and counseling may increase nutrition knowledge and behavior of PLWH. Continuous education is a good method to be gradually provided in accordance with the needs of the PLWH and it can be sustainable. Since PLWH are in healthy condition, the provision of education is needed because this can help maintain their condition. Therefore, this should be immediately implemented before they come with nutritional problems.

Recommendation

Nutrition counseling on nutrition education should be provided to support the establishment of good nutrition behavior and help PLWH to face problems related to nutrition. Supportive and collaborative process between client and counselor in improving food, nutrition and physical activities in which the individual goals and plans are approved by the client will help to organize individual treatment plans as addressed to achieve optimal health.

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