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to Local Action for a Healthy and Better Quality of Life"*

University Muhammadiyah Aceh, 18 - 19 July 2017



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Title	The Degree of Dangers the Use of <i>Air Abu</i>, Borak and Formalin on Mie Aceh Culinary Circulated in City X Aceh State
Topic	Climate Change, Environment and Global Health
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Background	<i>Mie Aceh</i> is the noodle that formulated with special spices and raw materials wet noodle. <i>Mie Aceh</i> greatly favored by the Aceh's peoples.
Objectives	The aims to degree of dangers the use of <i>air abu</i> , borak and formalin on mie aceh culinary circulated in city x aceh state
Methodology	This research is conducted by using analysis of titrimetri, photometri and qualitative. The issue of using <i>air abu</i> , borax and formaldehyde of <i>Mie Aceh</i> which circulate at X's City in Aceh province been examined. After interview with 10 respondents noodle manufacture in X's City, there were three factors were identified that make them use <i>air abu</i> and formaldehyde. The three factors were economics factor, knowledge factor and the doughneeds factor. Laboratory analysis was done to see the content of <i>air abu</i> , borax and formaldehyde in <i>Mie Aceh</i> .
Result	Theresults of the 25 samples (100%) containing <i>air abu</i> with sodium carbonate test indicators ranges from 0.22% b/b - 0.27 %b/b, borax test results of 25 samples of noodles (100%) showed a negative result. Formalin test on 25 samples showed that positive test results (100%) of formaldehyde content of each sample war >4 mg/L.
Conclusion	The results showthat <i>Mie Aceh</i> circulating in X's City was less safe for consumption and dangerous for public health.
Keyword	Ash Water, Borax, Formalin, <i>Mie Aceh</i> , Wet Noodles

Title	Change in Nutritional Behavior among Adolescent School Girls After Balanced Nutrition Education by Traineda Teacher in Maros District Indonesia
Topic	Global Public Health Nutrition
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Background	In 2014, many adolescent girls in Maros Regency have nutritional problems such as anemia (28.8%) and stunting (32.2%). Indonesia has launched a balanced nutrition guideline, substituting the concept of "healthy four perfect five". In order to promote the optimal nutritional status. However, many people, particularly adolescent girls, do not understand (41%) the balance nutrition guideline. This study is important to be conducted to support the long-term investment to address the nutritional problem in the community.
Objectives	This study aims to assess changes in knowledge, attitudes and practices of adolescent girls after getting a balanced nutrition education by trained teachers.
Methodology	This multi-year study (2015-2017) was starting with an assessment of the teacher's knowledge and student's behavior of balanced nutrition (n=601) in five senior high school (4 intervention and 1 non-intervention school). Teachers trained for 2 days were biology and physical and health education (Penjaskes) teachers. Furthermore, these trained teachers shared balanced nutrition materials to the students for 6 months by inserted into Biology and Penjaskes subjects for exact science student while for social science students included into extracurricular. Wilcoxon-test were used to evaluate the changes of knowledge, attitude and practices of balanced nutrition to 563 students (DO=38 students).
Result	This study found that the knowledge, attitude and practices of balanced nutrition have significantly increased (median score of knowledge = 32 to 36; median score of attitude = 52 to 53; median score of practice = 19 to 19; $p < 0.005$, respectively). The correct answer percentage for several questions increased such as importance of food diversity (24.4 to 39.8%), fruits and vegetables as micronutrients sources (90.6 to 94.3%), exercise prevents obesity (78.8 to 85.4%), weight monitoring monthly (59 to 79.8%), balanced nutrition as healthy dietary guideline (87.4 to 94.1%), stunting, wasting, and obesity are nutrition problems (47.7 to 65.9%), and consuming supplement if lack of nutrients (48.6 to 54.1%). The proportion of respondents who have positive attitude can be seen in the following questions, consume dietary diversity to fulfill of body nutrients requirement (91.6 to 92.1%), fruit consume of 2-3 servings/day (84.7 to 91.9%), vegetable consume of 3-4 servings/day (73.1 to 87.2%), dark and orange leaves vegetables is better (76.8 to 81.7%). Based on the eating practice and hygiene of adolescent girls, it appears that several aspects were decreased such as forget to bring the lunch box to the school, skip fruit every day, skip vegetable every day and skip fruit every meal, not washing hands with clean water + soap before and after meals (17%, 18.5%, 4.2%, 9.2%, and 6.1%, respectively). On the other side, complete food group consumption and water consumption (more than eight glasses) have been increased by 2.5% and 5.9% respectively.
Conclusion	The balanced nutrition education by trained teacher might be able to increase the knowledge, attitude and practices of balanced nutrition of the students. It is recommended that education of balanced nutrition should be replicated to other schools, so that adolescent girls as the second window of opportunity to improve the nutritional status of the community can understand and apply the principles of balanced nutrition in order to overcome intergenerational nutritional problems.
Keyword	Balanced Nutrition, School Girls Adolescent, Trained Teacher

CHANGE IN NUTRITIONAL BEHAVIOR AMONG ADOLESCENT SCHOOL GIRLS AFTER BALANCED NUTRITION EDUCATION

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Abstract

In 2014, many adolescent girls in maros regency have nutritional problems such as anemia (28.8%) and stunting (32.2%). Indonesia has launched a balanced nutrition guideline, substituting the concept of “healthy four perfect five”, in order to promote the optimal nutritional status. However, many people, particularly adolescent girls, do not understand (41%) the balance nutrition guideline. This study is important to be conducted to support the long-term investment to address the nutritional problem in the community. This study aims to assess changes in knowledge, attitudes and practices of adolescent girls after getting a balanced nutrition education by trained teachers. This multi-year study (2015-2017) was starting with an assessment of the teacher's knowledge and student's behavior of balanced nutrition (n=601) in five senior high school (4 intervention and 1 non-intervention school). Teachers trained for 2 days were biology and physical and health education (Penjaskes) teachers. Furthermore, these trained teachers shared balanced nutrition materials to the students for ±6 months by inserted into Biology and Penjaskes subjects for exact science student while for social science students included into extracurricular. Wilcoxon-test were used to evaluate the changes of knowledge, attitude and practices of balanced nutrition to 563 students (DO-38 students). This study found that the knowledge, attitude and practices of balanced nutrition have significantly increased (median score of knowledge = 32 to 36; median score of attitude = 52 to 53; median score of practice = 19 to 19; p<0.005, respectively). The correct answer percentage for several questions increased such as importance of food diversity (24.4 to 39.8%), fruits and vegetables as micronutrients sources (90.6 to 94.3%), exercise prevents obesity (78.8 to 85.4%), weight monitoring monthly (59 to 79.8%), balanced nutrition as healthy dietary guideline (87.4 to 94.1%), stunting, wasting, and obesity are nutrition problems (47.7 to 65.9%), and consuming supplement if lack of nutrients (48.6 to 54.1%). The proportion of respondents who have positive attitude can be seen in the following questions, consume dietary diversity to fulfill of body nutrients requirement (91.6 to 92.1%), fruit consume of 2-3 servings/day (84.7 to 91.9%), vegetable consume of 3-4 servings/day (73.1 to 87.2%), dark and orange leaves vegetables is better (76.8 to 81.7%). Based on the eating practice and hygiene of adolescent girls, it appears that several aspects were decreased such as forget to bring the lunch box to the school, skip fruit every day, skip vegetable every day and skip fruit every meal, not washing hands with clean water + soap before and after meals (17%, 18.5%, 4.2%, 9.2%, and 6.1%, respectively). On the other side, complete food group consumption and water consumption (more than eight glasses) have been increased by 2.5% and 5.9% respectively. It can be concluded that the balanced nutrition education by trained teacher might be able to increase the knowledge, attitude and practices of balanced nutrition of the students. It is recommended that education of balanced nutrition should be replicated to other schools, so that adolescent girls as the second window of opportunity to improve the nutritional status of the community can understand and apply the principles of balanced nutrition in order to overcome intergenerational nutritional problems.

Keywords: balanced nutrition, school girls adolescent, trained teacher

INTRODUCTION

In Indonesia, there are a lot of adolescent girls group age of 16-18 years old suffering in nutrition problems such as stunting (25.9%), wasting (5.2%), while in South Sulawesi Province the prevalence of adolescent girls group age of 16-18 years old which stunting (38.2%) and wasting (12.7%)¹. In 2014, many adolescent girls in Maros regency have nutritional problems such as anemia (28.8%) and stunting (32.2%)². The nutritional status of adolescent girls

contributes to the nutritional status of the community³, including the next generation because adolescent girl will be mothers⁴. The main cause of low nutritional status adolescent girl is due to ignorance about the nutrients that have implications for poor eating habits

Adolescent girls have high nutrition requirement and vulnerable in micronutrient deficiency⁵. Without appropriate nutrition, health is impossible⁶. Adolescent girls are identified as special group which vulnerable in undernutrition effect, however it is difficult to create adolescent girls as one group with window opportunity as well⁷. Adolescent have been for a long time being untouched group from the health and development agenda. Therefore, lancet commission remind that there are a lot of intervention to do to fulfill the unique necessity of adolescent⁸.

In efforts to overcome nutrition problems in societies, Indonesia has launched a balance nutrition guideline, substituting the concept of "healthy four perfect five"⁹. However, many people particularly adolescent girls, do not understand (41%) the balance nutrition guideline¹⁰. This is showed that the socialization of balance nutrition is completely needed to support all of the component of societies particularly adolescent girls knowledge and implementation in daily life.

Education is a tool to produce a significant change in people, due to through education people could understand something that they do not understand before¹¹. Based on the fact, this study is become important to conduct by giving balance nutrition education to adolescent girls for being a nutrition-health guideline in daily life, to reach the optimal status of nutrition. Nutrition education is necessary to increase the nutrition knowledge, producing positive impact toward nutrition dietary, in order to create good dietary habit. Therefore, this study aims to assess the impact value of the intervention balanced nutrition education through trained teachers concerning to the change of balanced nutrition practice of adolescent girls.

METHOD

The study design which used in this study is quasi experiment, with participation of all girl students (n=601) in 5 senior high schools at Maros regency ; 4 intervention schools and 1 non-intervention school. The data of balance nutrition practice on adolescent girls consist of knowledge, attitude and practice of balance nutrition which assessing by using questionnaire before 2015 and after intervention in 2017. Before the intervention begin, the research team trained 12 teachers (biology, sport and health, and religion) from intervention schools. Training was about balance nutrition for 2 days, and to assess the teachers knowledge about balance nutrition before and after training for 2 days. After that, teachers started to give balance nutrition education intervention to student girls during 1 semester by using CIE media of balance nutrition (guideline book of balance nutrition on adolescent girls and balance nutrition flipchart) which already created by research team based on the assessment result from teachers and students, including the subject course related on nutrition, as well as speech method and interactive discussion. Education was given by inserting the material of balance nutrition in biology subject, sport and health as well as religion subject to exact science/ IPA students, while social science/ IPS students only given through religion subject and extracurricular activities such as Palang Merah Remaja (PMR) and pramuka. Balance nutrition education material was inserted to the school subjects due to time allocation for teaching was limited in schools. To assess the impact of balance nutrition education intervention on adolescent girls, this study was used statistical test (Wilcoxon test) and U Mann Whitney test to assess the differences of knowledge, attitude and practice of balance nutrition on adolescent girls in intervention and non-intervention schools.

RESULT

Characteristic of school girls adolescent and their family

Adolescent girls which participated in this study until this study complete were 563 students (DO= 38 students). The average of student's age was 17 years old and no differences between two groups of study. The average of the number of subject's sibling and family member were higher in control study than intervention group and both of

groups showed significant difference ($p < 0,05$). The educational level of father in both of group also significant differences among intervention and control group, which showed low educational level was higher in intervention group than control group. Educational level of mother showed considerable same between two groups of study ($p > 0,05$), $\pm 2/3$ were categories in low education level (Table 1)

Table 1. The characteristics of respondents and family

Variable	Intervention n (%) [N = 405]	Non Intervention n (%) [N = 158]	Total	P value#
Age (years)	17,3 $\pm$ 0,5*	17,2 $\pm$ 0,4*	17,3 $\pm$ 0,5*	0,843
Number of sibling (person)	3,1 $\pm$ 1,8*	3,4 $\pm$ 1,6*	3,2 $\pm$ 1,7*	0,049
Size of family (person)	5,2 $\pm$ 1,5*	5,6 $\pm$ 1,8*	5,3 $\pm$ 1,6*	0,040
Father's education level				
• Low	248 (61,2)	78 (49,4)	325 (54,1)	0,010
• High	157 (38,8)	80 (50,6)	238 (39,6)	
Mother's education level				
• Low	282 (69,6)	105 (66,5)	282 (69,6)	0,466
• High	123 (30,4)	53 (33,5)	123 (30,4)	

U Mann Whitney

*mean $\pm$ SD

The impact of nutrition education on knowledge, attitude, practices of balanced diet adolescent girls

Prior the intervention showed no significant difference in knowledge, attitudes and practice scores of balanced nutrition on adolescent girls between intervention and control groups according to U Mann Whitney Test with the significant of the value (p value) from each variables are $p = 0.291$; $p = 0.675$; $p = 0.073$, respectively. This suggests that the initial conditions regarding the behavior of balanced nutrition on the subjects not differ significantly.

Table 2 represents that most of the knowledge of balanced nutrition on adolescent girls has increased after intervention. Based on the value of balanced nutrition knowledge score on adolescent girls in both group of study change significantly ($p < 0,05$). Proven from some of questions that can be answered correctly by adolescent girls such as; every eat must be consist of variety of food was increased by 15,4% in the intervention groups and 12,0% in control group, knowledge about vegetables and fruits as a sources of vitamins, minerals and fibers increased by 3,7% in the intervention group, while in the control group declined by 1,2%. fish can be replaced by tempe, tofu and nuts increased significantly in the intervention groups (4,2%), while in the control group declined by 5,2%. The knowledge of adolescent girls about the necessity in consuming supplements if the body lacks of nutrients increased by 5,5%, while in the control group did not change, balanced nutrition is the guidance of daily food consumption and healthy behavior increased by 6,7% slightly higher than the control groups (5,7%), knowledge about stunting, wasting and obese are nutrition disorders increased significantly in the intervention groups (18,2%) was 9 times higher compared to in the control group (2,5%).

The increasing in knowlege score of balanced nutrition on adolescent girls did not differ significantly between the two groups of study based on the U Mann Whitney test ($p = 0.865$), it was proved that almost same proportion of adolescent girls who have balanced nutrition knowledge score after the intervention, which is greater than before intervention ie intervention group (51.9%) and in control group (55.7%).

The results of the study showed that after the intervention, not found the differences in the attitude of adolescent girls about balanced nutrition between the two groups of study ($p = 0.862$), proven by the presentation on adolescent girls who have attitude score of balanced nutrition after the intervention is greater than before the intervention, and almost the same between the two groups which is intervention group (68.4%) and in control group (67.7%). However, attitudes score about balanced nutrition increased significantly in both groups of study ($p < 0.05$). Look at some of the questions about attitudes toward balanced nutrition increased after intervention period such as : the importance to consume variety of foods in order to get all the nutrients for our body they needed increased by 0.5% in the intervention group and slightly lower (0.2%) on the control group; consuming 2-3 servings of fruit per day increased by 7.2% in the intervention group and 8.2% in the non-intervention group; consuming 3-4 servings of

vegetable per day in the intervention group increased by 14.1% two-fold higher than the control group; consuming protein per day as much as 2-4 portions was rose by 3.2% in the intervention group which is 3 times higher than the control group (0.5%); consuming vegetables and fruits its very important to keep the body healthy and fit increase by 1.3% in the intervention group while in the control group does not change; monitoring of body weight can be done at any time or at least once a month on the intervention group increased by 6.0% while the control group (5.1%); the ideal body can be achieved by the implementation of the principle of balanced nutrition in daily life increased by 0.7% in the intervention group while the control group increased higher (3.1%) (Table 3).

Table 2. The change of balanced diet knowledge among adolescent girls before and after intervention

Item	Intervention Group		Control Group	
	Baseline*	Endline*	Baseline*	Endline*
Eating variety of food for every meal	24.4	39.8	29.1	41.1
Vegetable and fruit as source of vitamin and mineral	90.6	94.3	94.9	93.7
Important to consume supplement when the body is deficient in nutrient	48.6	54.1	52.5	52.5
Physical activities could prevent obesity	78.8	85.4	74.7	91.8
Balance Nutrition is a guideline in consuming food in daily life and healthy behavior	87.4	94.1	86.1	91.8
Stunting, wasting and obesity are the malnutrition problem	47.7	65.9	51.3	53.8
Animal Protein could replace by vegetable protein	37.3	45.9	33.5	50.0
Fish could replace by tempe, tofu, and peanuts	80.0	84.2	81.0	75.9
Monitoring the ideal of body weight is the indicator to know the adequate nutrition and health status.	59.0	79.8	55.7	77.8
Median Score of Knowledge	32	36	31	35
P Value[#]	0,000		0,000	

* %

[#] Wilcoxon test

The results of the study showed that the score of balanced nutrition practices on adolescent girls change significantly in both groups of study ($p < 0.05$), but did not differ significantly between the two groups according to U Mann Whitney test ($p = 0.865$) proved by the number of adolescent girls who have balanced nutritional practice score after the intervention is greater than before the intervention, and almost the same between the two groups i.e. in the intervention groups (60.5%) and control groups (60.1%) (Table 2).

Based on balanced nutrition practice, there was a change in the two study groups after intervention such as adolescent girls who had breakfast before school in the intervention group (2.4%) and non-intervention group (4.9%). Adolescent girls who bring lunch box to school increased by 17% in the intervention group while in the control group slightly lower compared to the intervention group (7.6%). The pattern of fruit consumption of adolescent girls showed that does not eat fruit daily decreases by 18.5% on the intervention group and 19.6% on the control group. The subjects that did not consume fruit every time also decreases in both groups of study, i.e. 9.2% in the intervention group and 5.1% in the control group. Instead, for vegetable consumption patterns which adolescent girls who did not consume vegetables every day rose 4.9% in the intervention group, while in the control group increased by 0.6%. Teenagers who did not consume vegetables every time eat decreases by 4.2% in the intervention group while in the control group as much as 3.2%. Complete food consumption (rice, side dishes, vegetables, fruit and water) increased in both groups by 2.5% in the intervention group and 6.3% in the non-intervention group. Adolescent girls who did not wash their hands with water + soap before and after meals were reduced by 6.1% in the intervention group and 1.3% in the non-intervention group (Table 3).

Table 3. The Change of Positive Attitude and Practice of Balanced Nutrition Before and After Intervention

Item	Intervention Group		Control Group	
	Baseline ^a	Endline ^a	Baseline ^a	Endline ^a
<i>Positive attitude</i>				
It's important to consume variety of food in order to obtain all of the nutrients	91.6	92.1	88.6	88.8
Consuming 2-3 portion of fruit in every eat	84.7	91.9	84.2	92.4
Consuming 2-3 portion of vegetable in every eat	73.1	87.2	70.2	77.9
Consuming 2-4 portion of protein in every day	88.9	92.1	86.1	86.7
Vegetable and fruit are important to keep the body stay healthy	96.5	97.8	98.7	98.7
Green and Orange vegetable are better than uncolored vegetable	76.8	81.7	69.0	80.4
Body weight monitoring could conduct every day or once a month	87.6	93.6	86.1	91.2
<i>Practice of balanced diet</i>				
Breakfast before go to school	31.4	33.8	34.2	39.2
Bring the lunch box to the school	39.0	56.0	55.1	62.7
Does not consume vegetable every day	14.6	19.5	13.3	13.9
Does not consume fruit every day	34.1	15.6	36.1	16.5
Does not consume vegetable in every meal	12.6	8.4	8.9	5.7
Does not consume fruit in every meal	34.1	24.9	36.1	31.0
Every eating consist of rice, fish, vegetable, fruit and water	40.7	43.2	39.2	45.6
Not washing hands with clean water + soap before and after meals	13.8	7.7	11.4	10.1
Median Score of Attitude	52	53	52	54
P Value^b	0,000		0,000	
Median Score of Practices	19	19	18	20
P Value^b	0,000		0,000	

note: ^a : %

^b Wilcoxon test

DISCUSSION

The results of this study showed that the age of adolescent girls and educational level mother is not significantly different in the two study groups, but the number of siblings, the number of family members, and the education level of the father differ significantly. The average number of siblings and the number of family members was higher in the control group, while the education level of father in the intervention is dominated by the low level of education, rather on the control group the majority of education father is higher education.

The study also showed that before giving balanced nutrition education intervention by teachers, the knowledge, attitudes and practice score on balanced nutrition on adolescent girls was not different between the two groups of study ($p > 0.05$), as well after intervention.

After the intervention occurred increased knowledge, attitude and practice score of balanced nutrition in the intervention groups and control groups significantly ($p < 0.05$). The results of previous studies conducted by Shariff ZM, et al (2008)¹² show that 6 weeks of educational interventions have a positive impact on the knowledge, attitudes and practices of primary school children, as well as the results of study by Nuryanto et al (2014) in central Java, found that nutrition education has an effect on knowledge and attitudes of balanced nutrition of school children¹³. In addition Elmadbouly, ME (2015) also found that students' knowledge increased after educational intervention, i.e

the mean percentage of students who answered correctly increased by 11.2% after the intervention significantly ($p < 0.001$)¹⁴. Other studies also showed that there was a significant change in the median scores of knowledge, attitudes, and washing hand practices before and after the intervention¹⁵, as well as the result of the study by Soheila Set.al., (2016) that nutrition education can lead to improvement of the knowledge of nutrition, attitudes and performances of primary school students¹⁶.

This study also showed that after the intervention, there was no differences in knowledge, attitudes and practice of balanced nutrition among adolescent girls between intervention and control group ($p > 0.05$), whereas the ration of changes in knowledge is higher on adolescent girls who received balanced nutrition interventions which is adolescent girls who have low knowledge about balanced nutrition were decreased by 6.2% on intervention group while the control group was only 4.5%. Rather, negative attitudes decline higher on control group (9.5%) compared to the intervention group (2.5%), while the practice of balanced nutrition that less decline (3.8%) in the control group, on the contrary the the intervention group increased by 5.0%. This can be explained that in the educational process there are two things that need to be consider to assess the impact of the learning activities in terms of the input (learning targets) and the processes (mutual influence between various factors, among others: subject of learning, teacher (educator or facilitator), methods and techniques of study, hearing aids, and the materials studied¹⁷. In this study, is found in terms of target learning shows that there is no differences between the knowledge of adolescent girls in a pre-eminent school with 4 other schools. However, from the aspect of the process, especially in terms of the using the CIE (communication, information and education) media, the teaching of balanced nutrition of course different, because the intervention group to get the booklet and the sheet behind the guidelines balanced nutrition, while in the control groups rely only on materials or learning curriculumm related to nutrition. Should be in this study of intervention groups showed the differences in knowledge, attitudes and practices of balanced nutrition with the control group significantly, but not happened, it can be caused by some constraints, namely the learning process balanced nutrition by trained teachers are probably not optimal due to the time constraints that very dense in each school, besides the methods and skill of teachers in delivering the material balanced nutrition is quite varied between teachers, so that has an impact on the median score of the three variables it does not change optimally.

The rational theory model which used as the main reference in this study is popular known as "knowledge attitudes, practices model (KAP), is based on the premise that improving knowledge someone will encourage change in behavior¹⁸, turned out to be less in accordance with the results of this study, mainly on adolescent girls in the intervention group. In addition, many factors that affect the formation of attitudes and practices, apart from the aspect of knowledge. Some of them are motivation, family, social relations, self-efficacy, socioeconomic status, culture, environment, geography etc.¹⁹. A high level of knowledge is not enough to improve the attitudes and practices, besides found also that knowledge and attitude scores did not differ significantly among some groups of study²⁰. The results of this study is similar to that found by Ruzita AT et.al (2007) that the nutritional practice scores is not significantly different between the intervention and control groups ($p = 0.313$)²¹.

CONCLUSIONS

Trained teachers who have given balanced nutrition education interventions to adolescent girls using booklets and sheet behind balanced nutrition can alter the scores of knowledge, attitudes and practice of balanced nutrition in both groups of study significantly, but after the intervention is not obtained the difference on the scores of knowledge, attitudes and practice of balanced nutrition between intervention and control groups.

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