

The Effect of Moringa Leaves Juice on Blood Glucose Levels and Total Cholesterol at Adults in Dry Land Area of East Nusa Tenggara Islands

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Abstract— The result of basic health research in Indonesia shows that the prevalence of metabolic disease in Indonesia is increasing from year to year. Diabetes Mellitus type two (DM type 2) has the highest prevalence of diabetes thus increasing the risk of hypercholesterolemia. Moringa leaves (*Moringa oleifera*) contains flavonoids. This compound is very effective and safe in reducing glucose level that it can be used as a preventive of DM type 2. Moreover, flavonoid also have hypocholesterol effect. The purpose of the research is to determine the effect of moringa leaves juice on blood glucose level and total cholesterol on adults in East Nusa Tenggara Islands. The design of the study is quasi experimental with pre and post-test on non-equivalent control group. Samples were selected with purposive sampling technique. The total sample consisted of 42 people that were divided into two groups namely intervention group (16 samples) who consumed 200 ml of moringa leaves juice for three days and control group (27 samples). The result show that there is no significant differences before and after intervention. In other words, there is no effect of consuming moringa leaves juice on blood glucose level ($p=0,432$) and total cholesterol ($p=0,134$).

Keywords: *moringa leaves juice, blood glucose levels, hypercholesterolemia*

I. INTRODUCTION

According to the result of Basic Health Research (RISKESDAS) in 2007, the prevalence of heart and blood vessel disease rose from 7.2% to 7.5% in 2013. The result of Basic Health Research (RISKESDAS) in 2013 also showed that the prevalence of hypercholesterolemia rose to 35.9% in Indonesia. In terms of diabetes mellitus, the prevalence of diabetes mellitus in East Nusa Tenggara has risen significantly from 1.1% in 2007 to 3.3% in 2013 according to the research by Basic Health Research (Riskesdas).

Moringa oleifera is evergreen plant that can be easily found in East Nusa Tenggara. It can grow in various climates and is usually consumed in some regions. Moringa

leaves are excellent food source that are high in flavonoids and triterpenoids. Flavonoids and triterpenoids are very effective in reducing blood glucose levels and regulate lipogenesis in liver. It is also high in vitamin C.

Seeing the many nutritional values and benefits of Moringa leaves, we were interested to find out and measure the effects of Moringa leaves juice on blood glucose and cholesterol level. The purpose of the research is to determine the effect of moringa leaves juice on blood glucose level and total cholesterol on adults in East Nusa Tenggara Islands.

II. MATERIALS AND METHODS

This research used quasi experimental design post-test with non-equivalent control group and purposive sampling method. The subjects were adult patients between 25 years old to 60 years old at Oebobo Public Health Center (PUSKESMAS) in Kupang City. The data were collected using validated questionnaire to identify subjects' characteristics (inclusive criteria) while body mass index was measured using anthropometric method. The data of blood glucose level and total cholesterol were measured and analysed by laboratory staff at SK Lerik Hospital Kupang. The intervention group (16 subjects) were given 200 ml/day moringa leaves juice for three days while the control group did not. The juices were freshly prepared by researchers. The blood glucose levels and total cholesterol were measured before and after three days in all groups.

The data of this study were confidential primary score. The tabulation data obtained were processed using Excell and SPSS 20.

The condition of samples of this study were as follows: no hyper cholesterol, neither pregnant nor infant, not consuming medicine under doctor prescription, no serious metabolic disease, no infection, no chronic disease, and able to consume moringa leaves juice. Samples that had diarrhea

and not consuming moringa leaves juice for 3 days were automatically excluded from the research.

III. RESULTS

The number of female and male in the intervention group were the same (50%). In terms of age, 6 samples were in between 41-50 years old and 51-60 years old. Only two samples were in the age between 25-30 and the other two are in 31-40. In this research, we measured the samples' nutritional status. The results show that five samples (31.25%) were normal, five samples were obese (31.25%), and six samples were overweight (37.5%).

TABLE I. RESPONDEN CHARACTERISTIC BASED ON SEX, AGES AND NUTRITIONAL STATUS (N=16)

Characteristic	n	%
Sex		
Males	8	50.0
Females	8	50.0
Age (year)		
25 - 30	2	13.3
31-40	2	13.3
41-50	6	40.0
51-60	6	40.0
Nutritional status		
Normal	5	31.2
Overweight	6	37.5
Obesity	5	31.2

TABLE II. FASTING BLOOD GLUCOSE LEVEL OF INTERVENTION AND CONTROL GROUP

Fasting Glucose Level	n	%
Intervention group		
Constantly	4	25.0
Reducing	6	37.5
Increasing	6	37.5
Control group		
Constantly	2	7.4
Reducing	8	29.6
Increasing	17	63.0

TABLE III. TOTAL BLOOD CHOLESTEROL OF INTERVENTION AND CONTROL GROUP

Total Blood Cholesterol	n	%
Intervention group		
Constantly	0	0.0
Reducing	7	43.8
Increasing	9	56.2
Control group		
Constantly	0	0.0
Reducing	7	25.9
Increasing	20	74.1

TABLE IV. WILCOXON TEST BEFORE AND AFTER INTERVENSIN AND CONTROL GROUP

Correlation Before and After	Sig.
Intervention group	
Fasting blood glucose levels	0.432
Total cholesterol	0.134
Control group	
Fasting blood glucose levels	0.421
Total cholesterol	0.397

IV. DISCUSSION

Few samples in intervention group showed a decreased blood glucose level and total cholesterol although the rate was not statistically significant. This means that flavonoid in the moringa leaves juice not necessarily lower blood glucose level and total cholesterol. Longer period of intervention should be administered to fully determine the effect of flavonoid on blood glucose and total cholesterol. Daily intake should be considered as it can influence the result of research.

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