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Nutritional and Therapeutic Effects of Banana on Blood Pressure and Liver Health

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Abstract

Although the prevalence of hypertension and related conditions is rising, there is currently little usage of functional foods as a therapy. Nutrients and bioactive substances found in bananas can help to prevent and treat a number of degenerative diseases. This study is to ascertain the impact of banana *(Musa acuminata*) on teenage student's liver function, cholesterol levels, and blood pressure. The 32 respondents that made up the complete population provided samples for this experimental study. Blood pressure, liver function, and lipid function were assessed both before and after consuming bananas. The data in this study were analyzed using a paired t test. The majority of responders were in the fourteen-year-old age group, with the number of 13(40.62%) and 17(53.12%) in the ninth grade, while fewer number were in the eighth grade, with 5(15.62%). The results of the study showed that students liver function did not show considerable outcome, but their blood pressure changed considerably before and after eating bananas over the allotted time period and their lipid function levels (triglycerides and total cholesterol) also differed considerably. In conclusion, eating bananas might help to prevent degenerative diseases by decreasing blood pressure and maintaining low lipid levels in young people.

Keywords: Blood pressure, Liver function, Lipid function, Potassium, Triglycerides

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1 Introduction

According to data from the World Health Organization (WHO) in 2013, an estimated 17.4 million deaths annually were attributed to cardiovascular disease, and around 9.4 million were attributed to complications from hypertension [1]. Raising blood cholesterol is one way to raise blood pressure. Raising cholesterol in the elderly poses a serious health risk. Consuming more salt and potassium is directly linked to elevated blood pressure. High sodium consumption is associated with greater blood pressure than reduced sodium intake. Thus, salt consumption is the source of hypertension, a condition that results from high blood pressure and causes a number of consequences, including heart disease, stroke, and kidney failure [2], [3].

Fruits are an essential part of a human's diet. A secondary source of vital nutrients is fruits. Some fruits have far greater nutritional potential than grains. One of the most important and well-liked fruits is the banana (Figure 1). One of the first cultivated plants, bananas provides a wealth of nutritional possibilities. The banana is one fruit whose whole section may be nutrient-dense. Every part of this plant has medicinal and nutritional benefits [4]. Bananas help the body retain calcium, phosphorus, and nitrogen—all of which are necessary for the maintenance of healthy tissues. It's a great idea to include bananas in your diet. Bananas typically have little calories. One hundred grams of banana has around 116 kilocalories. Two bananas can provide you enough energy to physical out for ninety minutes, according to a research [4]. Compared to other foods (foods strong in protein, such as cereals), they have less protein. About 1.2 g of protein, or 2% of the daily required consumption, is included in a normal banana [5]. Proteins have a number of functions in the body. Bananas are an important source of potassium. Bananas are a great source of carbs, vitamins, and minerals—the three most vital components for human nutrition. These are some of the important tropical fruits that are offered for sale worldwide [6].

Figure 1. *Musa acuminata*

Bananas' high potassium content can lower blood pressure via controlling the body's heart rate and fluid balance [7]. Because they contain antioxidants, bananas may shield the liver from free radicals like lead exposure. Antioxidants function to neutralize and accelerate the breakdown of free radical molecules in order to prevent damage to macromolecular components [8]. Eating bananas has been shown to reduce blood cholesterol levels and also serum triglyceride levels by 40.4% [9]. This is because bananas include fiber and flavonoid chemicals that help reduce excess cholesterol in the liver and digestive tract [10]. There is a lot of moisture in bananas. A banana of average size contains 88 g of water [11]. Thus, the goal of this study is to assess how eating bananas affects high school students' blood pressure, liver function, and lipid function (triglycerides and cholesterol).

2 Materials and Methods

2.1 Study time and place

The complete sampling approach was used to collect the samples for this experimental investigation. Thirty-two students from Katiadi Government Pilot Model High School, Bangladesh selected in this study. The age range

of the selected students was 13 to 16 years. Study background for the selected respondents are from class eight to ten. In February 2025, the test and analysis were conducted at Jahangirnagar University's Wazed Miah Research Institute Laboratory.

2.2 Materials

Alcohol cotton, serum glutamic pyruvic transaminase (SGPT) reagent kit, serum glutamic oxaloacetic transaminase (SGOT) reagent kit, triglyceride reagent kit, and cholesterol reagent kit are the ingredients used. Additional instruments employed include a syringe, tube, blood pressure machine, tension, tourniquet, and photometer.

2.3 Data collection

The blood pressure of selected respondents was tested. Blood samples were used to measure the levels of SGOT, SGPT, total cholesterol, and triglycerides. The chosen students were then given bananas three times a day for the next three weeks: in the morning, at noon, and at night. After about three weeks, blood was taken from the participants once again for blood pressure checks, and following therapy, blood was taken again to analyze the levels of SGOT, SGPT, triglycerides, and total cholesterol.

2.4 Data analysis

Triglyceride and cholesterol levels, liver function (SGOT and SGPT), and blood pressure were among the information obtained. SPSS 25.0 was utilized to assess the data for each test, along with a paired t test. A p-value of less than or equal 0.05 indicates a significant outcome.

3 Results and Discussion

Table 1. Respondent characteristics (N=32)

Variable	Parameter	Number %
Gender	Boys	19(59.37%)
	Girls	13(40.62%)
Respondents age (year)	13	6(18.75%)
	14	13(40.62%)
	15	4(12.5%)
	16	9(28.12%)
Grade	Class 8	5(15.62%)
	Class 9	17(53.12%)
	Class 10	10(31.25%)

Based on (Table 1) 59.37% participants are male with 40.62% female students, most of the respondents were in age group of fourteen comprising 13(40.62%) and from ninth grade 17(53.12%), while less number of them are from class eight comprising 5(15.62%).

Table 2. Paired t tests were used to compare blood pressure values before and after eating bananas

Variable	Time interval	Average	P value
Blood pressure mmHg	Before	117.5	0.05
	After	105.6	

Blood pressure readings taken both before and after eating bananas are displayed in (Table 2). The results showed that there was a significant difference in the respondent's blood pressure before and after eating bananas (p=0.05). The results of the study into the levels of SGOT and SGPT to determine the effect of banana intake on liver function are shown in (Table 3). The results of the SGOT and SGPT tests indicated that there was no significant difference in liver function before and after consuming bananas, with p-values of 0.16 and 0.09, respectively, which is higher than 0.05. The results of the triglyceride and total cholesterol tests to determine the effect of bananas on lipid function are shown in (Table 3). Triglyceride and total cholesterol levels differ significantly before and after eating banana within the allocated three weeks period, as indicated by the triglyceride p-value being less than 0.05 and the total cholesterol p-value being almost equal to 0.05.

Table 3. Analyzing liver function levels both before and after consuming bananas and Lipid function assessed both before and after consuming bananas

Liver function	Time interval	Mean	P value
SGOT	Before	23.10±1.07	0.16
	After	22.78±0.85	
SGPT	Before	22.42±0.92	0.09
	After	20.98±1.14	
Lipid function			
Triglycerides	Before	216.6±0.56	<0.05
	After	169.2±2.78	
Cholesterol	Before	207.3±1.58	0.07
	After	180.8±1.45	

Most of the respondents were in age group of fourteen comprising 13(40.62%) and from ninth grade 17(53.12%), while less number of them are from class eight comprising 5(15.62%). According to the study's findings, student's blood pressure changed significantly before and after consuming bananas within the allocated time frame, although their liver function (SGOT and SGPT) levels did not change. The levels of lipid of students (triglycerides and total cholesterol) varied significantly before and after consuming bananas.

Bananas may be a viable option for high blood pressure prevention and treatment, according to this study's findings. This finding is quite similar to a prior study conducted by Fitri et al. [12]. According to the findings of earlier study by Lestari and Tangkilisan, eating bananas for a week will reduce blood pressure by 10%, or 9.27 mmHg [13], [14]. When pregnant women eat less meal with potassium raises their blood pressure during both the diastole and systole phases [15].

The results of the current study indicated that there was no significant difference in liver function before and after consuming bananas among respondents which is very different from a study performed on rats conducted by Mosa and Khalil [16]. However another study found that there is significant effect on rats liver function by the ingestion of banana peel extract [17].

According the current study triglyceride and total cholesterol levels differ significantly before and after eating banana within the allocated three weeks period, that pretty similar to a previous study conducted by Dikshit [18]. According to another study about the impact of eating bananas on lipid profiles by Leelarungyub showed that, lipid profiles were altered by banana intake [19].

Bananas offer important nutritional and health benefits (Figure 2) for keeping blood pressure in check and supporting liver health. Their high potassium content helps to regulate blood pressure by promoting sodium excretion and reducing vascular tension. Bananas also contain antioxidants, vitamins (especially vitamin C and B6), and phytochemicals that protect liver cells from damage and support detoxification [10], [20], [21]. Eating bananas regularly can help to improve lipid metabolism and lower inflammation, which can benefit overall heart and liver health. More clinical studies are necessary to confirm the long-term health benefits and ideal consumption levels.

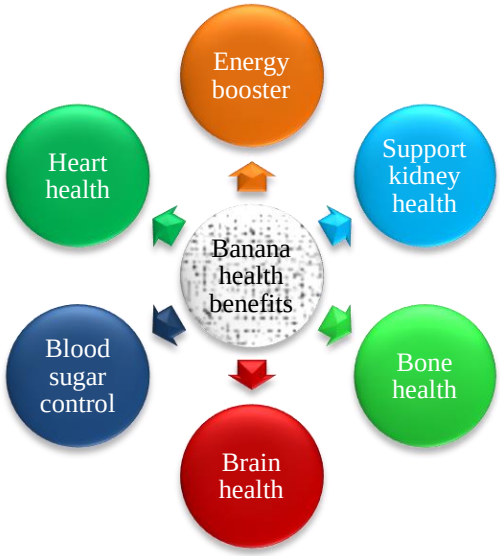

Figure 2. Health benefits of banana

4 Conclusions

Lipid function (triglyceride and total cholesterol analysis) and blood pressure test showed significant positive outcome before and after eating banana, while liver function (SGOT and SGPT tests) didn't show significant variation. More investigation is necessary to evaluate the potential effects of bananas on a larger population. A range of products are produced by processing and preserving the different parts of bananas. The most popular banana products are banana pulp, banana sauce, banana jam, banana flour, banana chips, banana biscuits, banana powder, and banana juice. In order to find new, scientifically supported pharmaceutical applications of bananas, more and more research needed about this fruit.

5 Declarations

5.1 Author Contributions

Authors MH, MMU and IKR designed the study, while MH performed statistical analysis, wrote the protocol and draft of the manuscript. Authors MMU and IKR help to manage data

collection and reviewing the manuscript to make final draft.

5.2 Funding Statement

This research was not supported by any funding sources.

5.3 Conflicts of Interest

None declared by the authors

5.4 Ethic

The necessary research ethics were followed in the conduct of this investigation. The participants' consent to participate was also asked before they began their engagement in the study. All the participants gave their consent of their own accord. The school authority granted the proper ethical permission with a reference number (KEIEC/02/2025).

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