The Effect of Giving Ambon Banana (Musa Paradisiaca, Sp) To Decrease of Anxiety Levels in Adult Scizofrenia

Dwi Setyarini[1], Santoso[2], Brian Wasita[3]

[1]Postgraduate Program of Nutrition Science, Universitas Sebelas Maret, Surakarta, [2]Postgraduate Program of Nutrition Science, Universitas Sebelas Maret, Surakarta, [3]Faculty of Medicine, Universitas Sebelas Maret, Surakarta

Abstract

Introduction: Anxiety disorders are one of the clinical symptoms of schizophrenia. An increase in anxiety symptoms in schizophrenics significantly increases the risk of recurrence, suicide and disrupts social functioning and quality of life. Previous research mentioned a positive effect on banana intake on anxiety reduction.

Aim: This study aims to analyze the effect of ambon bananas on reducing anxiety levels in adult schizophrenics.

Method: This experimental research with a pretest-posttest control group design was conducted at Marzoeki Mahdi Hospital Bogor in May-July 2019. 60 subjects were selected based on inclusion criteria and divided into 5 groups consisting of (1) control group without giving bananas; (2) new patient groups are given 2 bananas per day; (3) new patient groups are given 3 bananas per day; (4) the old patient group was given 2 bananas per day and (5) the old patient group was given 3 bananas per day. Giving bananas for 14 days and weighing one banana ± 130 grams. Anxiety level was measured using the Hamilton Anxiety Rating Scale (HARS) questionnaire. Posttest anxiety levels were performed after 7 days and 14 days of intervention. Data were analyzed using One Way Anova.

Results: There was a decrease in anxiety levels. The intervention group showed a significantly lower anxiety score at the end of the intervention compared to the control group ($p < 0.05$).

Conclusion: The administration of bananas has a positive effect on reducing anxiety levels in adult schizophrenia patients.

Keywords: *ambon banana, anxiety level, schizophrenia*

Introduction

In 2012 an estimated 450 million people in the world experienced mental health problems where 3.6% experienced anxiety disorders[(1)]. The statistics of the Indonesian population according to Riskesdas 2018 who experience mental-emotional disorders characterized by anxiety symptoms reach 14 million more people or 6.1% of the total population. Schizophrenia is a fairly widespread mental disorder experienced in Indonesia, where about 99% of patients in psychiatric hospitals in Indonesia are schizophrenic patients[(2)]. In the city of Bogor, the number of people with mental disorders has increased every year. Based on the 2017 annual report of the Marzoeki Mahdi Hospital in Bogor, outpatients experienced an increase in visits to the clinic and inpatients experienced an increase in BOR from 65.78% to 73.16% with the most diagnoses of schizophrenia.

In schizophrenic patients, anxiety disorders are very common. As many as 65% of schizophrenic patients experience anxiety disorders. The more severe positive

Correspondence Author:
Dwi Setyarini,
email : d.setyarini@gmail.com

symptoms (delusions, hallucinations) correlate with the severity of anxiety symptoms, but anxiety can occur independently of psychotic symptoms[3]. Increased anxiety is also often associated with increased depression, suicide, neuropsychological disorders, and cognitive disorders[4,5]. An increased prevalence of anxiety together with the severity of anxiety in schizophrenia is indicated that anxiety disorders significantly increase the risk of recurrence and suicide, disrupt social functioning and quality of life[6].

Research on the benefits of fruit in people with anxiety has been done. One fruit that is indicated to provide positive benefits for sufferers of anxiety is a banana[7]. Some studies showthat bananas can help improve mood. Eating bananas helps improve focus/ concentration and mental acuity. In addition, bananas help vitality, which means bananas can increase energy both mentally and physically[8].

Bananas have potential nutrients for the brain, especially those related to anxiety. Complex carbohydrates in bananas with low glycemic index are associated with increased synthesis of tryptophan in the brain, thereby stimulating the synthesis of the neurotransmitter serotonin associated with anxiety[9,10].

Method

This research is an experimental study with a pretest-posttest control group design conducted in May - July 2019 at Marzoeki Mahdi Hospital, Bogor. Subjects were selected based on inclusion criteria: female schizophrenic patients, ages 18 -50 years, moderate to severe anxiety levels, taking standard antipsychotic drugs and willing to participate in research with family consent with agreement on informed consent. Patients who took anti-anxiolytic drugs, had a history of chronic illness, and mental retardation was excluded from this study. The population in this study were female schizophrenia patients who were treated at Marzoeki Mahdi Hospital, Bogor.

By using the Lemeshow formula (27) 60 subjects were recruited and distributed into five treatment groups consisting of: (1) a control group without bananas; (2) new patient groups are given 2 bananas per day; (3) new patient groups are given 3 bananas per day; (4) the old patient group was given 2 bananas per day and (5) the old patient group was given 3 bananas per day. New patients are patients who were first hospitalized with a medical diagnosis of schizophrenia and have never received antipsychotic treatment. Old patients are patients who have been hospitalized with a medical diagnosis of schizophrenia, patients who have received antipsychotic treatment. Each group consists of 12 people. Giving bananas for 14 days. The type of banana used in this study was ambon banana (Musa Paradisiaca, sp). Banana weight ± 130 gram/fruit. Before the intervention, both the control group and the intervention group underwent an anxiety level pretest, 24-hour food recall and measurement of body weight and height to calculate nutritional status based on body mass index. After the 7th-day intervention, the posttest 1 anxiety level, 24-hour food recall, and nutritional status were calculated. The intervention was continued until the 14th day then posttest 2 levels of anxiety, 24-hour food recall, and nutritional status were calculated.

HARS (Hamilton Anxiety Rating Scale) questionnaire, selected as a questionnaire used to measure anxiety levels. HARS has been considered a valuable scale for many years and is an internationally accepted standardized test. The validity and reliability test in Indonesia is proven by the value ($r = 0.513$-0.786) and the Cronbach Alpha coefficient which is $\alpha = 0.877$[11]. This questionnaire consisted of 14 question groups. Each of them contains a number of symptoms. Each symptom is given a scale of 0-4 based on the severity of symptoms. The total score obtained was then categorized as anxiety level as follows: (1) <14 = no anxiety; (2) 14-20 = mild anxiety; (3) 21-27 = moderate anxiety; (4) 28 - 41 = severe anxiety; (5) 42-56 = extreme anxiety[12].

The data obtained were then processed using SPSS 22 software. One Way Anova statistical test to evaluate the effects of the intervention of the five groups was followed by a Post Hoc difference test to analyze the difference in anxiety level scores with a significance of $p < 0.05$. The study protocol was approved by the Health Research Ethics Commission board of the Sebelas Maret University Surakarta Medical University with ethics number: 93/UN27.06/KEPK/2019 and all procedures involving human subjects were carried out according to research ethics standards.

Results

In table 1 can be seen the characteristics of 60 research subjects viewed from the frequency distribution. Most age is early adulthood (18-35 years) as much as 68.3%. Education varies from uneducated to tertiary graduates. Most of the subjects had primary school education (35%) and most were unemployed/ housewives. Most subjects never exercise. Most have more nutritional status (48.3%).

In table 2 it can be seen that the test results indicate a significant difference in the anxiety level score of each treatment group after the intervention ($p < 0.05$). The five treatment groups experienced a decrease in anxiety levels. In the control group only slightly decreased level of anxiety compared to the intervention group.

Then the Post Hoc Bonferroni test was performed to find out which group was most influential after the intervention of giving ambon bananas for 7 days and 14 days (table 3). The test results showed a significant difference in the difference in the level of anxiety between the four banana intervention groups compared with the control group ($p < 0.05$). But there was no difference in the difference in the level of anxiety between groups of new patients and old patients, by giving bananas 2 pieces/day and 3 pieces/day ($p > 0.05$).

Table 1. Frequency of characteristics of study subjects (n = 60)

Characteristics	Criteria	N	%
Age (Years)	18-35	41	68,3
	36-50	19	31,7
Education	No School	9	15
	Elementary School	21	35
	Junior High School	12	20
	Senior High School	13	21,7
	College	5	8,3
Working Status	Does Not Work	55	91,7
	Work	5	8,3
Sports Activities	Yes	1	1,7
	No	59	98,3
Nutritional Status	Low	15	25
	Normal	16	26,7
	High	29	48,3

Table 2. Differences in anxiety levels of the five treatment groups before and after the intervention (each group n = 12)

Kelompok	Pretest			Posttest 1			Posttest 2		
	Mean	SD	p	Mean	SD	p	Mean	SD	p
Kontrol	36.33	4.19	0,234	30.75	3.84	0,001	27.08	3.55	0,001
New patient 2x	33.17	2.69		25.83	2.82		20.17	3.97	
New patient 3x	33.92	3.82		26.08	1.24		19.25	1.36	
Old patient 2x	33.08	4.80		24.92	1.88		18.83	2.66	
Old patient 3x	34.33	3.20		26.17	1.19		18.67	1.72	

Table 3. Post Hoc Bonferroni Results the difference in the difference between the anxiety levels of the group couples after the intervention

Group 1	Group 2	Posttest 1		Posttest 2	
		Average Difference	p	Average Difference	p
Kontrol	New patient 2x	4.91	<0.001	6.91	<0.001
	New patient 3x	4.66	<0.001	7.83	<0.001
	Old patient 2x	5.83	<0.001	8.25	<0.001
	Old patient 3x	4.58	<0.001	8,41	<0.001
New patient 2x	New patient 3x	-0.25	1.000	0.91	1.000
Old patient 2x	Old patient 3x	-1.25	1.000	0.16	1.000

Discussion

Sweet fleshy bananas can be eaten raw. Bananas are a source of vitamins and sugar, along with bioactive compounds (including fiber and phenolic compounds) have been linked to reducing the risk of degenerative diseases. This bioactive compound has clear therapeutic potential and contributes to antioxidant activity. Phenolics and carotenoids in bananas and other fruits are the main phytochemicals related to human health[13]. Even the World Health Organization (WHO) recommends eating at least 400 grams of fruit per day to reduce the risk of chronic diseases[14,15].

Bananas also contain vitamins A, C, and E, are antioxidants that can prevent, inhibit or repair damage due to oxidative stress that causes anxiety disorders[16]. Combined antioxidants act in various ways, including suppressing the formation of ROS (reactive oxygen species), reducing hydroperoxides and free radicals, stimulating the activity of antioxidant enzymes, or repairing oxidative damage[17].

Bananas contain complex carbohydrates, macronutrients associated with anxiety disorders. Complex carbohydrates with a low glycemic index and contain fiber will increase serotonin levels, a chemical in the brain that makes calm and stabilizes blood pressure as a way to reduce stress and anxiety disorders[18,19]. Tryptophan contained in bananas is a precursor of serotonin synthesis, has been found to improve mood, reduce anxiety disorders and depression. The hormone insulin, which is triggered through carbohydrate consumption, can increase the synthesis of tryptophan, which ultimately stimulates the synthesis of important neurotransmitters including serotonin[9].

Bananas also contain minerals including zinc and magnesium, a common element involved in the pathophysiology of anxiety[20]. Clinical studies report that anxiety patients have low serum zinc levels compared to healthy patients. So zinc is proposed as a marker of stress[21]. Prolonged magnesium deficiency causes a reduction in concentration in the brain, resulting in affective disorders, cardiac arrhythmias, and neuromuscular hyper-excitability[22]. Previous studies have shown that low magnesium levels are associated with anxiety disorders and apathy[23,24].

A study reported that intake of ambon bananas 130 grams/fruit as much as 2 servings/day for 14 days can reduce the intensity of anxiety disorders in adolescent girls aged 15-17 years[25]. Another study of students

showed that eating one piece of banana every day for 10 days can reduce anxiety disorders compared to eating chocolate or chips[26].

Conclusion

There was a significant difference in anxiety levels after giving bananas for 7 days and 14 days between the four intervention groups compared with the control group ($p < 0.05$). In this study, the administration of bananas has the potential to reduce anxiety levels in adult schizophrenia patients.

Conflict of Interest: There is no conflict of interest in this study.

Source of Funding: Funding in this study as a whole is accounted for in the researcher independently. There are no other funding sources.

Ethical Clearance: Taken from the medical faculty of Universitas sebelas maret committee.

References

1. World Health Organization. World suicide prevention day 2012. http://www. who.int/ mediacentre/events/annual/world_suicide_ prevention_day/en/Acces. 2012.
2. Kemenkes RI. *Hasil Riset Kesehatan Dasar (RISKESDAS) 2018*. Jakarta : Balitbangkes Kementerian Kesehatan Republik Indonesia. 2018.
3. Ramos J, Torres M, Mendoza T, Suarez M, Garcia A. Cognitive Bias Modification as Treatment for Schizophrenia. *SM Journal*. 2016.
4. Temmingh H, Stein J. Anxiety in Patients with Schizophrenia : Epidemiology and Management. *Springer International Publishing Swidzerland*. 2015. DOI 10.1007/s40263-015-0282-7.
5. Bystritsky A, Khalsa S, Schiffman J. Current Diagnosis and Treatment of Anxiety Disorders. *Journal Pharmacy and Therapeutics USA*. 2013: 38(1) : 30-57.
6. Nagargoje AK, Muthe MK. Prevalence of Anxiety in Schizophrenic Patients and its Impact on Quality of Life. *International Journal of Scientific Study*. 2015: 3(7): 12-17.
7. Reddy AJ, Handu SS, Dubey AK. Effect of Musa Sapientum Stem Extract on Animal Models of Depression. *Pharmacognosy*. 2016: 8 : 249-252.
8. Kumar SK, Bhowmik D, Duraivel S, Umadevi M. Traditional and Medicinal Uses of Banana. *Journal of Pharmacognosy and Phytochemistry*. 2012: 1(3).
9. Rao TSS, Asha MR, Ramesh BN. Understanding nutrition, depression and mental illnesses. *Indian Journal of Psychiatry*. 2008: 50:77–82.
10. Nanri A, Eguchi M, Kuwahara K, Kochi T, Kurotani K. Macronutrient intake and depressive symptoms among Japanese male workers: The Furukawa Nutrition and Health Study. *Psychiatry Research*. 2014: 220:263-268
11. Rochjani S, Mardiyono, Arwani. Intervention of Spiritual Emotional Freedom Technique (SEFT) on Decreasing Anxiety and Violence Behavior in Scizophrenia Patients. LINK Journal Poltekkes Semarang. 2014: 10 (3) : 878-885.
12. Koerner N, Antony MM, Dugas MJ. Limitations of the Hamilton Anxiety Rating Scale as a primary outcome measure in randomized controlled trials of treatments for generalized anxiety disorder. *The American Journal of Psychiatry*. 2010: 167(1):103-104.
13. Singh JP, Kaur A, Shevkani K, Singh N. Influence of jambolan (Syzygium cumini) and xanthan gum incorporation on the physicochemical, antioxidant and sensory properties of gluten-free eggless rice muffins. *International Journal of Food Science & Technology*. 2015: 50: 1190-1197.
14. Hazam, H. The Pattern of Fruit and Vegetable Consumption among Saudi University Students. *Global Journal of Health Science*. 2014: 6(2).
15. Khalid U, Nosheen F, Raza A, Ishaque M, Ahmad M, Rashid A, Rubab. A Comparative Study about the Daily Intake of Fruits and Vegetables among Female Students of Two Universities of Faisalabad. *Pakistan Journal of Nutrition*. 2011: 10 (7) : 684-689.
16. Parletta N, Milte CM, Meyer BJ. Nutrition modulation of cognitive function and mental health. *Journal of Nutritinal Biochemistry*. 2013: 24:725-743.
17. Rao PS, Kalva S, Yerramilli A, Mamidi S. *Free radicals and tissue damage : role of antioxidants*. Free Radical Antioxidant. 2011: 1(4) : 2–7.
18. Singh, K. Nutrient and Stress Management. *Journal of Nutrition and Food Sciences*. 2016: 6(4).
19. Rooney C, Michelle C, McKinley, Woodside JV. The potential role of fruit and vegetables in aspects

of psychological well-being: a review of the literature and future directions. *Proceedings of the Nutrition Society*. 2013: 72:420–432.

20. Sensi SL, Paoletti P, Bush AI, Sekler I. Zinc in the physiology and pathology of the CNS. *Nat Rev Neuroscience*. 2009: 10(11) : 780–91.
21. Siwek M, Szewczyk B, Dudek D, Styczen´ K, Sowa-Kucma M, Mlyniec K. Zinc as a marker of affective disorders. *Pharmacological Reports*. 2013: 65(6) : 1512–1518.
22. Sartori SB, Whittle N, Hetzenauer A, Singewald N. Magnesium deficiency induces anxiety and HPA axis dysregulation: modulation by therapeutic drug treatment. *Journal of Neuropharmacology*. 2012: 62(1) : 304–12.
23. Nahar Z, Azad MAK, Rahman MA, Rahman MA, Bari W, Islam SN. Comparative analysis of serum manganese, zinc, calcium, copper and magnesium level in panic disorder patients. *Biological Trace Element Res*. 2010: 133(3) : 284–90.
24. Pochwat B, Palucha-Poniewiera A, Szewczyk B, Pilc A, Nowak G. NMDA antagonists under investigation for the treatment of major depressive disorder. Expert Opinion on Investigational Drugs. 2014: 23:1181-1192.
25. Putra SE, Wasita B, Anantanyu S. Effect of Banana Consumption and Walking Exercise on Anxiety in Female Adolescents. Mid-International Conference on Public Health. 2018. doi: 10.26911/mid.icph.2018.01.24.
26. Smith AP, Rogers R. Positive effects of a healthy snack (fruit) versus an unhealthy snack (chocolate/crisps) on subjective reports of mental and physical health: A preliminary intervention study. *Frontiers in Nutrition*. 2014: 1.
27. Lemeshow S, Hosmer DW, Klar J, Lwanga SK. Adequacy of sample size in health studies. World Health Organization. 1990:1–4