COMPARISON OF TELARI CONSUMPTION (COMBINATION OF BUTTERFLY PEA FLOWERS AND STRAWBERRY LEAVES) ON BLOOD HDLLEVELS OF TLM STUDENTS OF THE MINISTRY OF HEALTH POLYTECHNICOF JAKARTA III

Tri Prasetyorini, Bagya Mujianto, Fira Kuswandari, Angki Purwanti, Kinanti Agitaningrum

Poltekkes Kemenkes Jakarta III, Indonesia
e-Mail : tprasetyorini@gmail.com

ABSTRACT

TELARI drink is a functional beverage made from natural ingredients, namely butterfly pea flower and strawberry leaves. Both ingredients share similar benefits as antioxidantsand contain phytochemicals such as flavonoids, anthocyanins, and tannins. This study aims to determine the effect of TELARI consumption (a combination of butterfly pea flower and strawberry leaves) on the blood HDL levels of TLM students at Poltekkes Kemenkes Jakarta III. This research is a quasi-experimental study conducted on a singlegroup without a comparison or control group, using a one-group pre-test-post-test design. The study was carried out from January to June 2024, using primary data from 33 samples of medical laboratory technology students at Poltekkes Kemenkes Jakarta IIIwho met the inclusion and exclusion criteria. Data analysis used the mean difference test(T-test) with a confidence level of 95%. The results showed an increase in the mean HDLblood levels before and after consuming the TELARI drink, from 51.68 mg/dL to 55.97 mg/dL, with a p-value (0.000) < α (0.05).

Keywords: *TELARI; Butterfly Pea Flowers; Strawberry Leaves; HDL levels*

ABSTRAK

Minuman TELARI merupakan minuman fungsional yang berasal dari bahan alami yaitubunga telang juga daun stroberi. Kedua bahan tersebut memiliki persamaan manfaat sebagai antioksidan dan juga memiliki kandungan fitokimia yaitu flavonoid, antosianin, dan tannin . Penelitian ini bertujuan untuk mengetahui perbedaan konsumsi TELARI (Kombinasi Bunga Telang dan Daun Stroberi) terhadap kadar HDL darah mahasiswa TLM Poltekkes Kemenkes Jakarta III. Jenis penelitian merupakan penelitian eksperimensemu yang dilaksanakan pada satu kelompok saja tanpa ada kelompok pembanding ataukelompok kontrol dengan one group pre test-post test desain. Penelitian dilaksanakan pada bulan Januari sampai Juni 2024 menggunakan data primer sebanyak 33 sampel dari mahasiswa teknologi laboratorium medis Poltekkes Kemenkes Jakarta III yang memenuhi kriteria inklusi dan eksklusi. Analisis data menggunakan uji perbedaan rata rata (Uji T-tes) dengan tingkat kepercayaan 95%. Hasil penelitian

menunjukkan adanya peningkatan rata rata hasil pemeriksaan HDL darah sebelum dan sesudah mengonsumsi minuman TELARI dari 51,68 mg/dL menjadi 55,97 mg/dL dengan hasil uji perbedaan yaitu p-value (0,000) < α (0,05).

Kata Kunci: TELARI, Bunga Telang, Daun Stroberi, Kadar HDL

INTRODUCTION

Indonesia is known as a region rich in herbal plants. Various parts of the plant, such as flowers, leaves, stems, and seeds, can be processed into drinks, medicines, or functionaldrinks. One example of a functional drink is the extract of butterfly pea flowers and strawberry leaves. Butterfly pea flowers, known by the scientific name Clitoria ternatea L., grow in tropical areas and have the potential as antioxidants, antidiabetics, antiobesities, anticancer, anti-inflammatory, and antibiotics, thanks to the content of its compounds[1].

In addition to butterfly pea flowers, strawberry leaves also have significant health benefits. Strawberry leaves are rich in polyphenolic compounds that function as antioxidants, anti-inflammatories, and diuretics. Studies have shown that strawberry leaf extract can lower triglyceride levels and increase HDL, making it an attractive choice forhealth[2]. The combination of butterfly pea flower and strawberry leaf extracts offers similar benefits, making it a potential innovation in functional beverages[3].

HDL plays an important role in lipid metabolism, helping to transport excess cholesterol from tissues back to the liver. Low HDL levels can increase the risk of coronary heart disease and metabolic disorders associated with metabolic syndrome[4]. Previous studies have shown a significant effect of TELARI drinks on HDL levels, but involved elderly respondents. So this study focused on TLM students at Poltekkes Kemenkes Jakarta III and expected different results because younger respondents also had no history of disease7.

METHOD

This research design is a quasi-experimental study and the research design used is a one group pre-test-post-test design which involves measurement before and after treatment. In this study, the pre-test was carried out before giving treatment, while the post-test was carried out after giving treatment, namely consuming TELARI drinks for seven days 21.

The composition of the telari drink is the ratio of telang flowers to strawberries (3: 1) by weighing 2 g of telang flower powder and 0.6 g of strawberry leaves boiled with 1 L of water then filtered with Fresh coffee and added cassava sugar as much as 75 mL after cooling transfer in a bottle of 100 mL, which is drunk for 7 days and as much as 100 mL.

HDL examination uses the principle of a spectrophotometer with measurements made by an automatic analyzer and only needs to enter reagents and samples.

The Sysmex BX-3010 automatic tool is connected to the computer system and will then operate according to the instructions that have been entered into the computer and directly measure the concentration of HDL cholesterol in the blood referred to as the HDL (High Density Lipoprotein) rec method.

RESULTS AND DISCUSSION

This research is divided into several tests on the variables studied and then arranged and presented in table form, the following are the results described by the researcher:

1. Respondent Characteristics Overview

The following are the characteristic results based on age, gender, body mass index,diet, physical activity, sleep patterns, and others which can be seen in table 1:

Table 1 Respondent characteristics

Variables	Frequency (n)	Percentage (%)
Age		
18 years	2	6.1
19 years old	18	54.5
20 years	10	30.3
21 years	3	9.1
Gender		
Man	5	15.2
Woman	28	84.8
BMI (Body Mass Index)		
Thin (<18.5)	8	24.2
Normal (18.5 – 22.9)	12	36.4
Overweight(23 – 24.9)	3	9.1
Obesity I (25 – 29.9)	5	15.2
Obesity II (>30)	5	15.2
Physical activity		
Light activity	1	3.0
Moderate activity	16	48.5
Heavy activity	16	48.5
Exercise Routine		
Yes	10	30.3
No	23	69.7
Staple food consumption		
1 time/day	5	15.1
2 times/day	22	66.7
3 times/day	6	18.2
Consumption of Fried Foods		
Yes	31	93.3
No	2	6.1
Seafood Routine		
Yes	24	72.7
No	9	27.3
Fastfood Routine		
Yes	27	81.8
No	6	18.2
Nap Routine		
Yes	11	33.3
No	22	66.7
Sleep patterns		
Less (< 6 hours)	3	9.1
Enough (6 – 10 hours)	28	84.8
More (>10 hours)	2	6.1

Based on table 1, the majority of the study respondents were 19 years old, as many as 18 people (54.5%), followed by 20 years old with 10 people (30.3%).In the gender category, women were more dominant with 28 people (84.8%) compared to men who were only 5 people (15.2%). Most respondents had a normalBMI (36.4%), while 24.2% were categorized as thin, and 9.1% were overweight. Respondents' physical activity was relatively low, with only 1 person (3.0%) having light activity, while 16 people (48.5%) had moderate and heavy activity. In terms of exercise routine, 69.7% of respondents did not exercise regularly. Eating patterns showed that 66.7% of respondents ate 2 times a day, and 93.9% ofthem consumed fried foods. The habit of consuming seafood and fast food was also high, with 72.7% and 81.8% of respondents respectively. Regarding sleep patterns, 33.3% of respondents regularly take naps, while 66.7% do not. A total of28 people have sufficient sleep patterns, but there are 9.1% of respondents who lack sleep and 6.1% who sleep excessively. These findings indicate variations in the characteristics of respondents that can affect their health.

2. Descriptive Analysis of Numerical Data of HDL Levels Before and AfterThe following results of this descriptive analysis can be seen in table 2:

Table 2 Descriptive Analysis of Numerical Data of HDL Levels Before and After

Variables	Mean ± SD (mg/dL)	Median (Min – Max) (mg/dL)	95% CI
HDL Before	51.68 ± 6.72	52.04 (40.26 – 64.28)	49.3-54.07
HDL After	55.97 ± 7.53	57.32 (40.36 – 68.73)	53.3-58.64

Based on table 2, the average HDL level before the intervention was 51.68 mg/dL and increased to 55.97 mg/dL after the intervention, both in the normal category. The median value before and after the intervention was 52.04 mg/dL, with a standard deviation of 6.72 mg/dL before and 7.53 mg/dL after. The minimum HDL level after the intervention was 40.36 mg/dL, while the maximumreached 68.73 mg/dL. These results indicate an increase in HDL levels after the intervention, remaining within normal limits.

3. Data Normality Test Results

The following is a data normality test which can be seen in table 3:

Table 3 Data Normality Test Results

Variables	Frequency (n)	Shapiro Wilk
		Sig, (p-value)
HDL Before	33	0.055
HDL After	33	0.219

Based on table 3, the results of the HDL normality test before p = 0.055 (0.055 > 0.05) and HDL after p = 0.219 (0.219 > 0.05) were obtained, having significance (p) > 0.05 which means the distribution of the research data is normal. So the hypothesis test used is a parametric test (T-Test).

4. Results of Difference in HDL Before and After Consuming Beverages

The following are the results of the difference in HDL before and afterconsuming the drink, which can be seen in table 4:

Table 4 Results of Difference in HDL Before and After Consuming Beverages

Variables	Frequency (n)	Sig, (2-tailed)
HDL Before	33	0,000
HDL After	33	

HDL after with α = 0.05 obtained p-value (0.000) <α (0.05), so there is a difference in the average consumption of TELARI drinks (Combination of Butterfly Pea Flowers and Strawberry Leaves) on HDL in medical laboratory technology students. From these results it was found that there was a significant difference from TELARI to students because the data was classified as normal buthad a difference in the average HDL levels of students before and after consumingTELARI drinks.

Based on the questionnaire results, respondents consisted of 28 women (84.8%) and 5 men (15.2%). The majority were 19 years old (54.5%), followed by 20 years old (30.3%), 21 years old (9.1%), and 18 years old (6.1%). The age range of 18 to 21 is included in the productive category, where health is influenced by diet and physical activity. A decrease in HDL levels generally occurs in individuals over 50 years old, whilein young adults, a drastic decrease is not common without risk factors such as BMI, physical activity, and medical conditions[12]. In terms of diet, most respondents eat 2 timesa day (66.7%), followed by 3 times (21.2%) and 1 time (12.1%). They tend to consume high-carbohydrate staple foods such as rice, which can lower HDL levels due to lipoprotein metabolism disorders[2]. As many as 93.3% of respondents consume fried foods, 72.7% seafood, and 81.8% fast food. There were

13 respondents with BMI abovenormal, potentially affecting HDL levels, especially due to lack of physical activity. Other studies have found a positive relationship between BMI and cholesterol, HDL, LDL, andtriglycerides. Increased BMI can cause dyslipidemia and affect HDL levels in the blood7.Respondents' physical activity varied, with 48.5% having moderate and heavy frequencies. Low-impact aerobic exercise has been shown to reduce BMI and increase HDL levels[6], but only 10 respondents exercise regularly. Around 33.3% of respondents took naps, while 66.7% did not, and poor sleep patterns can increase the risk of metabolicsyndrome[7]. Around 9.1% of respondents lacked sleep, and 6.1% slept excessively, whichcan disrupt hormone regulation and potentially increase triglycerides and lower HDL[8].

From the characteristics of the respondents, the results of data analysis from 33 respondents showed that the average HDL level increased from 51.68 mg/dL before consuming TELARI drinks to 55.97 mg/dL afterward. The T-test showed a significant difference with a p-Value of 0.000, less than α 0.05. This difference is related to the content of bioactive compounds in butterfly pea flowers and strawberry leaves, such as flavonoids, tannins, and phenolic acids which are good for the body, including increasingHDL levels[12]. Previous studies also support these findings, showing an increase in HDL levels in the elderly after consuming TELARI and the positive effects of flower extracts on fat and cholesterol levels in mice[1]. Flavonoids, especially anthocyanins, have been shown to increase HDL levels and lower LDL and the risk of heart disease[3]. Ethanol extract of strawberry leaves has also shown the ability to lower triglycerides and increaseHDL[4]. The combination of butterfly pea flowers and strawberry leaves in TELARI drinksprovides antioxidant activity that can help increase HDL levels in the blood7.

CONCLUSION (12pt)

Most of the respondents in this study had a normal Body Mass Index (BMI) and
tended to eat twice a day, but did not exercise regularly. Consumption of seafood, fast food, and fried foods among them was relatively high. Before consuming TELARI drinks,the average HDL level of students was 51.68 mg/dL, which increased to 55.97 mg/dL after consumption. This significant difference indicates that TELARI has a positive effecton HDL levels in students. To increase health awareness, it is recommended that students pay more attention to their diet and physical activity to maintain overall health, especially in increasing HDLlevels. Further research needs to explore the long-term effects of TELARI consumption and consider additional variables that may affect HDL levels, such as genetic factors andother lifestyle choices. In addition, educational institutions should provide guidance on the importance of consuming foods and beverages that can increase HDL levels and theirimpact on heart health.

ACKNOWLEDGEMENT

Our gratitude goes to all the leaders and staff of the Medical Laboratory TechnologyDepartment, Poltekkes Kemenkes Jakarta III.

REFERENCES

Al Rahmad AH. Relationship of Body Mass Index with Cholesterol, LDL, and Triglycerides in Coronary Heart Disease Patients in Banda Aceh City. J Kesehatan [Internet]. 2021;9(1):1–8.

Anhar CA, Prasetyorini T. Sensory Quality Characteristics of the Combination Formulation of Butterfly Pea Flower Extract (Clitoris Ternatea) and Strawberry Leaf Extract (Fragaria X Anannasa) Mix as a Functional Drink. Pros of the National Seminar on Downstreaming of Research and Community Service Results [Internet].2022;37–45

Ansori A, Sekaringgalih R, Rachmah ANL, Susanti Y, A'yun AQ, Lestari IP. Education on Making Butterfly Pea Flower Tea (Clitoria Ternatea L.) in Bagorejo Village, Banyuwangi Regency. Selaparang J Progressive Community Service. 2023;7(3):2026.

Arifah Y, Sunarti S, Prabandari R. Effect of Butterfly Pea Flowers (Clitoria ternatea L.) on Total Cholesterol, LDL, HDL in Rats (Rattus Norvegicus). J Syifa Sci Clin Res. 2022;4(1):18–31.

Bao L, Hu L, Zhang Y, Wang Y. Hypolipidemic effects of flavonoids extracted from Lomatogonium rotatum. Exp Ther Med. 2016;11(4):1417–24.

Cho KH. The Current Status of Research on High-Density Lipoproteins (HDL): A Paradigm Shift from HDL Quantity to HDL Quality and HDL Functionality. Int J Mol Sci. 2022;23(7).

Fecka I, Bednarska K, Włodarczyk M. Fragaria × ananassa cv. Senga Sengana Leaf: An Agricultural Waste with Antiglycation Potential and High Content of Ellagitannins,Flavonols, and 2-Pyrone-4,6-dicarboxylic Acid. Molecules. 2022;27(16).

Handito D, Basuki E, Saloko S, Dwikasari LG, Triani E. Composition Analysis of Butterfly Pea Flowers (Clitoria ternatea) as Natural Antioxidants in Food Products. Pros SAINTEK [Internet]. 2022;4(November 2021):64–70.

Kusuma IM, Djuhariah YS, Desi IP. Antioxidant Activity Test of Strawberry Leaf Infusion (Fragaria x annanasa) Using the DPPH (1,1-Diphenyl-2-Picrylhydrazyl) Method. J Pharmaceutical Sciences. 2023;16(2):109–13.

Medika UA, Anhar CA, Prasetyorini T, Nuryati A, Rahayu M. The Antioxidant Effects of

"TELARI" Healthy Functional Drinks on Reducing Levels of Fat in Elderly. 2023;(July):1–5.
Siahaan T. The Effect of Consumption of TELARI Drink (Combination of Butterfly Pea Flowers and Strawberry Leaves) on HDL and LDL Levels in the Elderly in LubangBuaya Village. West Java; 2023. p. 1–121.
Zulkarnaini PI, Suyanto, Azrin M, Karmansyah NP, Putri AA, Arion A, et al. Community Empowerment Through the Matang Program (Planting Butterfly Pea Plants) as Family Medicine in Mekar Sari Village, Dumai. Maspul J Community Empower. 2022;4(2):359.

Book:

Mikkelsen, B. (2011). *Metode Penelitian Partisipatoris dan Upaya Pemberdayaan: Panduan Bagi Praktisi Lapangan*. Yogyakarta: Yayasan Pustaka Obor Indonesia.

Book chapter:

Mardianto, T. (2013). 'Konsep Pemberdayaan Masyarakat', in *Ilmu Kesehatan Masyarakat*. 4th edn. Surakarta: UNS Press.

Journal article:

Sultana, R. *et al.* (2013). 'Platelet Count in Preeclampsia', *Journal of Dhaka National Medical College & Hospital*, 18(2), pp. 24–26. doi: https://doi.org/10.3329/jdnmch.v18i2.16018.

Official document:

Kementerian Kesehatan RI. (2014). *Pusat Kesehatan Masyarakat: Peraturan Menteri Kesehatan No. 75 tahun 2014*. Indonesia: Kementerian Kesehatan RI.

Thesis, Dissertation, Research Reports:

Kusumastuti, W. R. (2015). *Hubungan Asupan Zat Gizi Makro (Energi, Protein, Lemak, Karbohidrat) terhadap Status Gizi Pasien Gagal Ginjal Kronik Rawat Jalan dengan Hemodialisis di RSUD dr. Moewardi*. Universitas Muhammadiyah Surakarta.

Conference proceeding:

Prabawati, N., Priyanto, S., & Suhariyanti, E. (2016) 'Hubungan Kecerdasan Spiritual dengan Kecemasan Ibu Premenopause di Banyudono Kecamatan Dukun Magelang', in *Muswil IPEMI Jateng*. Semarang, pp. 194–203.

Report:

Dinas Kesehatan Kota Depok. (2018) *Profil Kesehatan Kota Depok Tahun 2017*. Depok.