



Original Article

The Effect of Giving Boiled Papaya Leaf Water on Blood Glucose Levels in DM Sufferers in the Simpong Community Health Center Working Area

Djadid Subchan¹, Nurarifah¹, Hasmar Fajriana², Firdaus Syafii²

¹Department of Nursing, Poltekkes Kemenkes Palu, Central Sulawesi, Indonesia

²Department of Nutrition, Poltekkes Kemenkes Mamuju, West Sulawesi, Indonesia

*Corresponding author: djadidsubchan1@gmail.com

ARTICLE INFO

Article History:

Received: 2024-09-01

Published: 2025-04-01

Keywords:

boiled papaya leaf water;
diabetes mellitus patient;
blood sugar levels.

ABSTRACT

Papaya trees are often found in Indonesia, both fruit, flowers and leaves are commonly used. Papaya leaves are widely used to treat various diseases including diabetes. Indonesia, with 10.7 million diabetes sufferers, is in the top ten countries with the highest number of diabetes cases. Boiled papaya leaves water can be an alternative in controlling blood sugar levels in people with diabetes. The aim of the study was to prove that boiled papaya leaf water is useful for lowering blood sugar levels in diabetes mellitus patients. The materials used were papaya leaves and clean water. The research method, this study is analytical, namely quasi-experimental design using the pre-test method (before treatment) how much blood sugar levels and post-test (after treatment) blood sugar levels were measured after 30 minutes of treatment then compared with the control group. Statistical tests were carried out with SPSS ver. 25. The treatment was in the form of drinking boiled papaya leaf water with a dose of 100 ml from 10 grams of papaya leaves in one gift. The control only drank water. The research results were based on statistical tests, the data distribution was not normal so the Wilcoxon test was carried out. The significance obtained was 0.117 (>0.05) so that H₀ was accepted, it mean there was no effect, meaning that boiled papaya leaf water had no effect on reducing blood sugar levels in diabetes sufferers. The conclusion is that boiled papaya leaf water has no effect on lowering blood sugar levels in diabetes sufferers. It is recommended to calculate the dose based on body weight, increase the dose, or grind it first before use.



©2025 by the authors. Submitted for possible open-access publication under the terms and conditions of the Creative Commons Attribution (CC BY SA) license (<https://creativecommons.org/licenses/by-sa/4.0/>)

INTRODUCTION

Papaya (*Carica Papaya*) is one of the plants that is widely found and consumed by Indonesian people. In addition to being eaten as a vegetable, papaya leaves are believed by people to be able to treat various diseases, including diabetes.¹ Research by Tangkumahat et al (2017) proves that blood sugar levels in Wistar rats can be lowered by administering papaya flower and leaf extract.² In research by Kurniasari et al (2019), it was found that giving papaya leaf extract was more effective than in powder form to 15 Wistar rats.³ Diabetes is a global health problem. According to the IDF (International Diabetes Federation), global diabetes cases are around 463 million people with an age range of 20-79 years, equivalent to a prevalence of 9.3% at the same age in 2019. China is the country with the largest number of diabetes sufferers, namely 116.4 million people. Indonesia ranks seventh with 10.7 million people, the only country in Southeast Asia that is in the top 10 people with diabetes.⁴

Diabetes is a chronic disease in the form of a metabolic disorder characterized by blood sugar levels that exceed normal limits. As defined by WHO, Diabetes is a chronic disease that occurs when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin produced⁵. According to the IDF (International Diabetes Federation) Diabetes mellitus, commonly called diabetes, is a serious, long-lasting (chronic) condition that occurs when blood glucose increases which occurs because the body cannot produce sufficient amounts of insulin or the body cannot use insulin effectively.⁴

The urgency of the research, this research is important because the number of DM cases in Indonesia is number 7 among countries in the world. Papaya leaves have long been used for medicinal purposes due to their bioactive compounds such as the enzyme papain, alkaloids, flavonoids, vitamins and minerals¹. Also DM is a comorbidity for death in Covid-19 cases.^{6,7,8,9,10} This study will evaluate the boiled papaya leaf water on humans with DM, where research on humans is very rarely carried out on humans, more research is carried out on animals in laboratories.^{2,3,11,12} Literature studies show that papaya leaves are used as medicine for the anticancer, anti-inflammatory, antidiabetic and antiviral activities¹³. The research problem is "Can giving boiled papaya leaf water at a dose of 10 grams reduce blood glucose levels in diabetes mellitus sufferers within 30 minutes?" The purpose of the study was to prove that drink papaya leaves water are useful for lowering blood sugar levels in diabetes mellitus patients.

METHODS

This study used pre-test and post-test methods, the sample was selected 50 people and control 50 people from a population of 116 DM sufferers recorded at the Simpong Community Health Center. The sampling technique was carried out using statistical formulas¹⁴,

$$n = \frac{N}{1+N(d^2)}$$

n = sample size, N = population size and d = desired level of confidence/accuracy.

$$n = \frac{116}{1+116(0,05^2)}$$

Sample size n = 90 so that a minimum of 90 samples were obtained. The samples were all DM sufferers who came to Posbindu PTM and Elderly in every village/subdistrict in South Luwuk District as well as during Prolanis activities at the Simpong Community Health Center. Data collection starts from 17 May to 6 July 2024 in sub-districts in the Simpong Community Health Center area and at Prolanis activities.

The tool used is Nesco multichcek and its accessories, blood sugar check stick, autoclick, lancet, alcohol swab) and the material used is papaya leaves that are neither too old nor too young washed clean and boiled with 100 ml of water with a dose of 10 grams per person.

Diabetic sufferers who come have their blood sugar checked, given information and asked to become research subjects. Diabetic sufferers who agreed to undergo the research procedure were given 100 ml of boiled papaya leaf water. After 30 minutes the blood sugar was checked again. In general, liquids such as tea and juice take 30 minutes to digest and absorb¹⁵. The decoction is made from 100 grams of fresh papaya leaves that have been washed and boiled in 1 liter of water for 10 people. For control, blood sugar was checked twice, 30 minutes apart, but without treatment (only drinking water).

After data was collected in sufficient quantities, data analysis was carried out using SPSS ver. 25. The results of blood sugar measurements before and after administration of papaya leaf decoction were then analyzed using a statistical test in the form of a normality test. If the data was normally distributed, a "paired samples t test" was carried out, whereas if the data distribution was not normal, a Wilcoxon test was carried out¹⁶.

RESULTS

This section presents the characteristics of the respondents included in the study sample. The characteristics described consist of gender, age group, level of education, occupation, and comorbidities. These variables provide an overview of the demographic and health profile of diabetes mellitus patients registered at the Simpong Community Health Center, South Luwuk Subdistrict, Banggai Regency, Central Sulawesi.

Table 1. Characteristics of the Sample of DM Sufferers in the Simpong Community Health Center Area

Variables	n	%
Gender		
Male	30	30
Female	70	70
Age		
≤39	5	5
40-49	6	6
50-59	31	31
60-69	47	47
70-79	11	11
School		
Not School	2	2
Elementary Sch	25	25
Junior High Sch	19	19
Senior High Sch	41	41
Academician	13	13
Employment		
Doesn't work	3	3
Housewife	51	51
Civil Servant	8	8
Farmer	5	5
Self-employed	9	9
Retired/Pension	24	24
Comorbidities		
Appear	3	3
Nothing else	97	97

Simpong Health Center is located on Jalan Pulau Samosir, Simpong Village, Subdistrict South Luwuk, Banggai Regency, Central Sulawesi 94713 and accredited Superior. Based on table 1, from 100 samples or respondents, the gender characteristics were 30% male and 70% female, age groups: 40-49 years 6%, 50-59 years 31%, 60-69 years 47% and 70- 79 years 11 %. Most respondents' education was high school graduation (41%). The lowest is no school and the highest is Academician. The majority of respondents' occupation is housewife (51%). The majority of respondents did not have comorbidities (97%).

Table 2. Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig	Statistic	df	Sig
Pre Test	.149	50	.007	.916	50	.002
Post Test	.159	50	.003	.923	50	.003

^a Lilliefors Significance Correction

Sig Shapiro-Wilk < 0,05 for pre-test dan post-test, data is not normally distributed.

Table 3. Wilcoxon Test

	Test Statistics ^a	
	Posttest experiment - Pretest experiment	Posttest control - Pretest control
Z	-1.567 ^b	-2.419 ^b
Asymp. Sig. (2tailed)	.117	.016

^a Wilcoxon Signed Ranks Test

^b Based on positive ranks.

Asymp. Sig. (2-tailed) 0.117 > 0.05, H0 accepted, meaning that there is no effect of giving boiled papaya leaf water on blood sugar levels in diabetes sufferers.

DISCUSSION

This research was conducted to get an idea of the benefits of boiled papaya leaves to reduce blood sugar levels in DM sufferers in North Luwuk District, Simpong Health Center area, Banggai Regency. The characteristics of the sample obtained were that the majority were women, age group 50-59 years, low education, household work. These characteristics are very similar to the characteristics of visitors to the Posbindu PTM in Pejagalan who are dominated by women, low education and work as domestic workers or not working, even though the age groups are not the same.¹⁷ Likewise, the results of research at UPT Panghegar, Posbindu for the elderly are dominated by women, low education and work as domestic workers or not working,¹⁸ but the age groups are not the same. Age groups are not the same due to different age range factors.

After data analysis, it was found that the data was not normally distributed, so the Wilcoxon test was carried out. The average pre-test blood sugar level was 267.74mg/dl with a standard deviation of 117,069 and the average post-test blood sugar level was 251.62 mg/dl with a standard deviation of 104,347. The difference was tested by Wilcoxon and the Asymp value was obtained. Sig (2-tailed) = 0.117 is greater than 0.05, so it can be concluded that there is no effect of giving boiled papaya leaves on reducing blood sugar levels.

The difference in the results of this study with other studies on experimental animals by Tangkumahat et al (2017), Kurniasari et al (2019) and Solikhah, T.I et al (2020), is possibly due to differences in dosage where the results of the study by Tangkumahat et al (2017) used a dose of 170 mg/kg weight Wistar rats, Kurniasari et al (2019) used a dose of 200 mg/Kg body weight of Wistar rats, while Solikhah, T.I et al (2020) used doses of 100, 500, 1000, 3000 mg/kg body weight of mice had the effect of lowering blood sugar levels which further increased at a dose of 3000 mg/kg mouse body weight. Meanwhile, this study used a dose of 10 grams without considering the body weight of the research subjects. If the subject's body weight is 60 kg, then the dose obtained is 167 mg/body weight^{2,3,12}. This research also only used boiled papaya leaf water, while some research on animals used extraction.

The age of 58% of the research subjects was 60 years or more, included in the elderly group. In the elderly there is a decline in metabolism^{19,20} so it is possible that 30 minutes is not enough to get the effect of reducing blood sugar levels in research subjects. In this study, fasting was not required so it was possible that the research subjects had breakfast first before going to the PTM Posyandu. So it might interfere with the research results.

CONCLUSION

The present study demonstrated that boiled papaya leaf water, at a dose of 10 grams in 100 ml of water, did not significantly reduce blood glucose levels in diabetes mellitus patients. These findings differ from several experimental animal studies, likely due to differences in dosage, extraction methods, and subject characteristics. Further research is recommended using adjusted doses based on body weight, longer observation periods, and alternative preparation methods such as mashing or filtration to optimize bioactive compound release. Additionally, dietary control prior to blood glucose measurement should be considered to minimize potential confounding factors.

Author contribution statement: **Djadid Subchan:** Conceptualization, Methodology, Software
Hasmar Fajriana: Supervision, Formal Analysis. **Nurarifah:** Investigation, Data Curation, Writing
original draft. **Firdaus Syafi'i:** Writing - Review & Editing.

Conflicts of Interest: The authors declare that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

Source of Funding: The research was funded by the Commitment Making Officer on behalf of the Palu Ministry of Health Polytechnic of Health written in the agreement letter number DP.04.03/F.L/ 615.1 /2024 dated February 16, 2024. The funder did not influence the study design, data collection, analysis, or publication of the findings.

Acknowledgments: Thanks to the Banggai District Government for granting research permits, and the Simpong Health Center staff who were directly involved in this research. Without permission and assistance from the health center staff, this research would not have been possible.

REFERENCES

1. Saras T. Daun Pepaya: Manfaat, Penggunaan, dan Khasiat dalam Kesehatan dan Kecantikan. Wahyu A, editor. Semarang: Tiram Media; 2023. 80 p.
2. Tangkumahat FG, Rorong JA, Fatimah F. Pengaruh Pemberian Ekstrak Bunga dan Daun Pepaya (*Carica papaya* L.) Terhadap Kadar Glukosa Darah Tikus Wistar (*Rattus norvegicus* L.) Yang Hiperglikemik. *J Ilm Sains* [Internet]. 2017;17(2):143. Available from: <https://doi.org/10.35799/jis.17.2.2017.17681>
3. Kurniasari EYP, Retnoningrum D, Subchan P. Pengaruh Pemberian Ekstrak Dan Serbuk Daun Pepaya (*Carica Papaya*) Terhadap Kadar Glukosa Darah. *Diponegoro Med J (Jurnal Kedokt Diponegoro)* [Internet]. 2019;8(1):572–9. Available from: <http://ejournal3.undip.ac.id/index.php/medico>
4. Kementerian Kesehatan Republik Indonesia. Tetap Produktif, Cegah Dan Atasi Diabetes Mellitus. Pusat Data dan Informasi Kementerian Kesehatan RI. 2020.
5. WHO. Diabetes [Internet]. 2023. Available from: <https://www.who.int/news-room/fact-sheets/detail/diabetes>
6. Lestari N, Ichsan B. Diabetes Melitus Sebagai Faktor Risiko Keparahan Dan Kematian Pasien Covid-19: Meta-Analisis Diabetes Mellitus As a Risk Factor for Severity and Mortality of Covid-19 : a Meta-Analysis. *Biomedika* [Internet]. 2020;13(1):83–94. Available from: <https://doi.org/10.23917/biomedika.v13i1.13544>
7. Rahayu LAD, Admiyanti JC, Khalda YI, Ahda FR, Agistany NFF, Setiawati S, et al. Hipertensi, Diabetes Mellitus, Dan Obesitas Sebagai Faktor Komorbiditas Utama Terhadap Mortalitas Pasien Covid-19: Sebuah Studi Literatur. *JIMKI J Ilm Mhs Kedokt Indones* [Internet]. 2021;9(1):90–7. Available from: <https://doi.org/10.53366/jimki.v9i1.342>
8. Hikmawati I, Setiyabudi R. Hipertensi Dan Diabetes Militus Sebagai Penyakit Penyerta Utama Covid-19 Di Indonesia Hypertension and Diabetes Mellitus As Covid-19 Comorbidities in Indonesia. *Pros Semin Nas Lppm Ump* [Internet]. 2020;0(0):95–100. Available from: <https://digitallibrary.ump.ac.id/1049/1/Artikel.pdf>
9. Ndera ML, Supriyatni N, Rahayu A. Faktor Komorbid terhadap Covid-19 di Puskesmas Kota Tahun 2020. *J Biosainstek* [Internet]. 2021;3(2):1–9. Available from: <https://doi.org/10.52046/biosainstek.v3i2.723>
10. Nanda CCS, Indaryati S, Koerniawan D. Pengaruh Komorbid Hipertensi dan Diabetes Mellitus terhadap Kejadian Covid-19. *J Keperawatan Florence Nightingale* [Internet]. 2021;4(2):68–72. Available from: <https://doi.org/10.52774/jkfn.v4i2.72>
11. Dharmarathna SLCA, Wickramasinghe S, Waduge RN, Rajapakse RPVJ, Kularatne SAM. Does *Carica papaya* leaf-extract increase the platelet count? An experimental study in a murine model. *Asian Pac J Trop Biomed*. 2013;3(9):720–4.

12. Solikhah TI, Setiawan B, Ismukada DR. Antidiabetic activity of papaya leaf extract (*Carica Papaya* L.) isolated with maceration method in alloxan-induced diabetic mice. *Syst Rev Pharm* [Internet]. 2020;11(9):774–8. Available from: <https://doi.org/10.31838/srp.2020.9.109>
13. Singh SP, Kumar S, Mathan S V., Tomar MS, Singh RK, Verma PK, et al. Therapeutic application of *Carica papaya* leaf extract in the management of human diseases. *DARU, J Pharm Sci* [Internet]. 2020;28(2):735–44. Available from: <https://doi.org/10.1007/s40199-020-00348-7>
14. Notoatmodjo S. *Metodologi Penelitian Kesehatan*. Jakarta: PT Rineka Cipta; 2018. xix+243.
15. Watson K. How Long Does It Take for Water to Pass Through Your Body? *Health Line.com* [Internet]. 2023; Available from: <https://www.healthline.com/health/digestive-health/how-long-does-it-take-for-water-to-pass-through-your-body#vs-other-liquids>
16. Riyanto A. *Pengolahan Dan Analisis Data Kesehatan*. Pertama. Setiawan A, editor. Yogyakarta: Nuha Medika; 2009. v + 159 pages.
17. Astiarani Y, Kristian K. Studi Deskriptif Pengunjung Posbindu PTM di Dua Rukun Warga Kelurahan Pejagalan. *Damianus J Med*. 2019;18(1):22–32.
18. Pratama A, Darajat A. Karakteristik Lansia yang Berkunjung Ke Posbindu Di Wilayah Kerja UPT Panghegar Kota Bandung. *J Keperawatan* [Internet]. 2020;XI(3):1–5. Available from: <https://jurnal.usk.ac.id/INJ/article/view/20651>
19. Shimokata H, Kuzuya F. Aging, basal metabolic rate, and nutrition. *Nihon Ronen Igakkai Zasshi* [Internet]. 1993;30(7):572–6. Available from: <https://doi.org/10.3143/geriatrics.30.572>
20. Purtiantini. *Kebutuhan Gizi pada Lansia*. Kemenkes RI, Dirjen Yankes [Internet]. 2023; Available from: https://yankes.kemkes.go.id/view_artikel/2354/kebutuhan-gizi-pada-lansia