



Application Of Bilimbii Juice In Reducing Cholesterol Levels Among Elderly Patients With Hyper Cholesterolemia

Meyliana Eka Puspita^{1*}, Fakruddin², Siti Nurafifah Qarimah³, Rudi Alfiandi⁴

^{1,2,3,4} Academy Of Nursing Kesdam Iskandar Muda, Banda Aceh, Indonesia.

Received: 2026-07-17

Revised: 2026-07-21

Accepted: 2026-07-22

Published: 2026-07-31

Corresponding Author: Fakruddin

Author Name*:

Meyliana Eka Puspita

Email*:

meylianaekapuspa@icloud.com

DOI:

<https://doi.org/10.63404/juka.v10i6.288>

© 2023 The Authors. This open access article is distributed under a (CC-BY License)



Phone*: 0821-8512-1206

Abstract: Hypercholesterolemia is a common health problem among older adults and is characterized by elevated blood cholesterol levels, which can increase the risk of cardiovascular disease. This condition is often associated with physiological changes due to the aging process, decreased organ function, and unhealthy dietary habits. Therefore, effective management is needed to prevent complications and improve the quality of life of older adults. One non-pharmacological therapy that can be used is bilimbi fruit juice (*Averrhoa bilimbi* L.), which contains flavonoids, pectin, and vitamin C that help reduce cholesterol levels by enhancing fat metabolism. This study aimed to describe the application of bilimbi fruit juice in reducing cholesterol levels among older adults with hypercholesterolemia. The study employed a case study design using a gerontological nursing care approach involving two older adults with cholesterol levels above the normal range. The intervention consisted of administering bilimbi fruit juice regularly for three consecutive days. Data were collected through interviews, observations, and cholesterol level measurements before and after the intervention. The results showed a decrease in cholesterol levels in both subjects. Subject I experienced a reduction from 220 mg/dL to 198 mg/dL, while Subject II experienced a reduction from 215 mg/dL to 167 mg/dL. These findings indicate that bilimbi fruit juice can be used as an effective independent nursing intervention to help control hypercholesterolemia in older adults.

Keywords: Older Adults, Hypercholesterolemia, Bilimbi Fruit Juice

How to Cite:

Meyliana, E.P., Fakhruddin, F., Qarimah, S.N., & Alfiandi, R. (2026). Application Of Bilimbii Juice In Reducing Cholesterol Levels Among Elderly Patients With Hyper Cholesterolemia. *Jurnal Keperawatan Akimba*, 10(6), 10-15. <https://doi.org/10.63404/juka.v10i6.288>

Introduction

Older adults are the final stage of human life development (Anggoro, 2008). Aging is characterized by a gradual decline in physical endurance, making older adults more susceptible to various diseases (Festi, 2018). An older adult is defined as an individual aged 60 years or above (Maryam, 2009).

As individuals enter old age, they experience a natural aging process marked by the gradual deterioration of body systems, including decreased organ function and physical capacity. This decline increases the vulnerability of older adults to various degenerative diseases, such as diabetes mellitus (DM), rheumatoid arthritis, hypertension, gout arthritis, stroke, and hypercholesterolemia (Oktaviani et al., 2019).

Hypercholesterolemia is a common metabolic disorder characterized by elevated levels of cholesterol in the blood plasma and is considered a major risk factor for cardiovascular disease (Yani, 2019). In general, a healthy total cholesterol level is below 200 mg/dL, while levels between 200–239 mg/dL are considered borderline high. Hypercholesterolemia is often caused by uncontrolled consumption of foods high in fat, resulting in an increasing number of individuals experiencing this condition (Uda et al., 2023).

According to the World Health Organization (WHO) and other reports published in 2019, the global prevalence of hyperlipidemia or high cholesterol is approximately 45%, while the prevalence is around 30% in Southeast Asia and 35% in Indonesia. These figures refer to total cholesterol levels above the normal range, which significantly increase the risk of cardiovascular diseases.

Based on the 2018 Basic Health Research (Riskesdas), the prevalence of hypercholesterolemia in Indonesia among individuals aged over 15 years is categorized by age group as follows: 1.9% among those aged 15–24 years, 4.4% among those aged 25–34 years, 6.5% among those aged 35–44 years, 10.5% among those aged 45–54 years, 12.6% among those aged 55–64 years, 10.6% among those aged 65–74 years, and 7.8% among individuals aged over 75 years. These data indicate that the highest prevalence of hypercholesterolemia occurs in the 55–64-year age group.

According to the Aceh Provincial Health Profile (2019), the prevalence of high cholesterol was 47.9%. The districts with the highest prevalence were West Aceh (13.4%), Aceh Besar (12.9%), Bireuen (10.6%), and Banda Aceh (9.8%).

There are two main approaches to reducing cholesterol levels: pharmacological and non-pharmacological therapies. Pharmacological treatment commonly involves lipid-lowering medications such as fibrates, statins, nicotinic acid, and bile acid sequestrants. However, these medications may cause adverse effects,

require long-term use, and often result in poor patient adherence. Therefore, non-pharmacological interventions have become an important alternative.

Non-pharmacological therapies do not involve medication and include regular physical exercise, consumption of bay leaf decoction, reflexology massage, avocado juice, and bilimbi (*Averrhoa bilimbi*) juice. Among these alternatives, this study focuses on the use of bilimbi juice as a non-pharmacological intervention to reduce cholesterol levels in older adults with hypercholesterolemia.

Bilimbi fruit (*Averrhoa bilimbi*) is widely available and easily obtained by the community because the plant grows naturally in home gardens as well as in forests (Surialaga et al., 2013). Bilimbi contains several bioactive compounds, including flavonoids, pectin, saponins, and vitamin C, all of which have cholesterol-lowering properties. Flavonoids inhibit the excessive production of low-density lipoprotein (LDL), thereby reducing the risk of cardiovascular disease. Pectin lowers cholesterol by binding cholesterol and bile acids in the intestine and facilitating their excretion through the feces (Masruhen, 2014). Meanwhile, vitamin C promotes the conversion of cholesterol into bile acids and increases high-density lipoprotein (HDL) levels by participating in the reverse cholesterol transport process (Kusumastuti, 2015).

A study conducted by Salwan (2022) demonstrated that the administration of bilimbi juice effectively reduced cholesterol levels among older adults. Before the intervention, 10 respondents (50%) had elevated cholesterol levels. Following the intervention, there was a significant reduction in cholesterol levels, with the mean pre-test cholesterol level decreasing from 232.40 mg/dL to a mean post-test level of 169.00 mg/dL after three days of bilimbi juice administration (Salwan, 2022).

Similarly, a study by Rosmin Ilham (2018) reported that among 10 respondents in the intervention group, the mean cholesterol level before consuming bilimbi juice ranged from 206 mg/dL to 236 mg/dL. After the intervention, cholesterol levels decreased, ranging from 195 mg/dL to 206 mg/dL. Participants consumed 50 mL of bilimbi juice twice daily, in the morning and evening, throughout the intervention period (Rosmin Ilham, 2018).

Method

This study employed a descriptive case study approach. A descriptive study is a research method conducted with the primary objective of providing an objective description of a particular phenomenon or condition. Descriptive research is commonly used to identify, describe, and address problems encountered in a specific setting (Wulandari & Hartutik, 2022).

The purpose of this case study was to evaluate the implementation of bilimbi (*Averrhoa bilimbi*) juice as a non-pharmacological intervention for reducing cholesterol levels among older adults. This study was conducted through a series of steps, including data collection, data classification, data processing, and the formulation of conclusions and research reports (Swarja, 2015). The study aimed to examine the implementation of bilimbi (*Averrhoa bilimbi*) juice as a non-pharmacological intervention for reducing cholesterol levels among older adults with hypercholesterolemia.

The objective of this case study was to investigate the application of bilimbi juice in reducing cholesterol levels among older adults with hypercholesterolemia in Cot Mancang Village, Blang Bintang District, Aceh Besar Regency, Indonesia. Two participants were selected as the subjects of this case study, referred to as Subject I and Subject II. Both participants met the predetermined inclusion criteria, including being 60–64 years of age, willing to participate and provide informed consent, cooperative throughout the study, and not currently receiving any other non-pharmacological therapy.

This study was conducted from September 8 to September 10, 2025. The researcher implemented the administration of bilimbi (*Averrhoa bilimbi*) juice as a non-pharmacological intervention to reduce cholesterol levels among older adults with hypercholesterolemia in Cot Mancang Village, Blang Bintang District, Aceh Besar Regency, Indonesia. The intervention was carried out for three consecutive days.

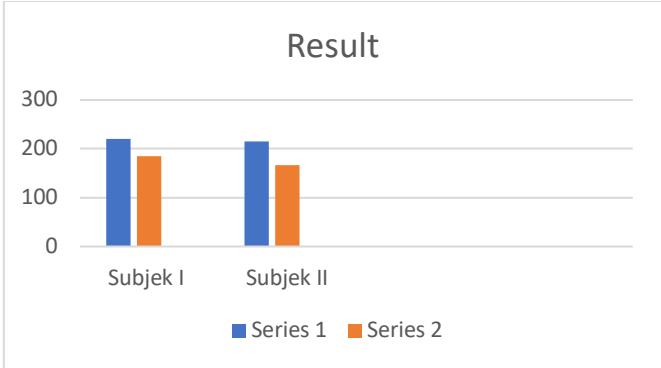
The instruments used in this case study included an informed consent form, an assessment form, a standard operating procedure (SOP), an observation checklist, a cholesterol meter (GlucoCheck device), and bilimbi juice.

Result and Discussion

Based on the findings of this study, the implementation of bilimbi (*Averrhoa bilimbi*) juice was found to reduce cholesterol levels among older adults with hypercholesterolemia in Cot Mancang Village.

Graphs

Table 1. Results of Cholesterol Levels in Subjects I and II



Based on Figures I and II, a reduction in cholesterol levels was observed in both Subject I and Subject II from the first day to the third day of the intervention. Subject I had a baseline cholesterol level of 220 mg/dL, which decreased to 185 mg/dL after the intervention. Similarly, Subject II's baseline cholesterol level decreased from 215 mg/dL to 167 mg/dL following the intervention.

Based on the findings of this study, the administration of bilimbi (*Averrhoa bilimbi*) juice resulted in a reduction in cholesterol levels among older adults with hypercholesterolemia. Subject I experienced a decrease in total cholesterol from 220 mg/dL to 185 mg/dL, while Subject II showed a reduction from 215 mg/dL to 167 mg/dL following the intervention.

According to the researcher's interpretation, the observed reduction in cholesterol levels in both subjects after the administration of bilimbi juice may be attributed to the bioactive compounds present in the fruit, particularly flavonoids, pectin, and vitamin C, which have been reported to possess cholesterol-lowering properties. Flavonoids help inhibit the excessive production of low-density lipoprotein (LDL), pectin binds cholesterol and bile acids in the intestine to facilitate their excretion, and vitamin C promotes cholesterol metabolism by enhancing its conversion into bile acids and supporting high-density lipoprotein (HDL) function. These mechanisms may have contributed to the reduction in cholesterol levels observed in this study.

These findings are supported by Masruhen (2014), who reported that bilimbi (*Averrhoa bilimbi*) contains bioactive compounds, including flavonoids, pectin, and vitamin C, which contribute to cholesterol reduction. Flavonoids inhibit the excessive production of low-density lipoprotein (LDL), thereby reducing the risk of cholesterol accumulation. Pectin lowers cholesterol by binding cholesterol and bile acids in the intestine, facilitating their excretion through the feces. In addition, vitamin C enhances the conversion of cholesterol into bile acids, promotes cholesterol excretion, and increases high-density lipoprotein (HDL) levels by supporting reverse cholesterol transport. These

mechanisms collectively contribute to the cholesterol-lowering effects of bilimbi fruit.

Based on the findings of this study, several factors were identified as contributing to the successful implementation of bilimbi (*Averrhoa bilimbi*) juice therapy, including family support and adherence to the intervention.

The first factor contributing to the success of the therapy was family support. In this study, family support was primarily provided in the form of emotional support. Family involvement included encouraging the participants throughout the intervention, providing attention and emotional care, and supporting the implementation of the therapy. This support also helped the older adults adhere more consistently to the prescribed intervention schedule, thereby enhancing the effectiveness of the therapy.

According to the researcher's interpretation, family support is considered one of the key factors contributing to the success of the intervention. Family involvement, such as assisting in the preparation of the therapy and providing attention and emotional support to the older adults, can create a sense of comfort and security that enhances the effectiveness of the intervention. Furthermore, this support encourages older adults to adhere more consistently to the prescribed therapy schedule, thereby improving treatment outcomes.

These findings are consistent with the study conducted by Hasibuan and Hasna (2021), which stated that family support plays an important role in enhancing the effectiveness of health interventions, including therapies aimed at reducing elevated cholesterol levels. Family involvement in providing time, attention, and meeting the needs of older adults during the intervention contributes to greater adherence to the prescribed therapy and improves the overall success of the treatment.

The second factor contributing to the success of the intervention was adherence to the therapy. According to the findings of this study, adherence was influenced by both the participants' commitment to the intervention and the support provided by their families. Subject I and Subject II consistently complied with the prescribed intervention by consuming bilimbi (*Averrhoa bilimbi*) juice every morning and evening for three consecutive days at regular intervals.

According to the researcher's interpretation, the consistent and regular administration of the intervention is an important factor contributing to its effectiveness. Maintaining the prescribed frequency and schedule of bilimbi juice consumption may have enhanced the therapeutic effect, thereby supporting the reduction in cholesterol levels observed in both participants.

These findings are supported by Kozier and Barbara (2010), who stated that treatment adherence can

influence therapeutic outcomes by up to 100%. Adherence is therefore considered one of the most important determinants of the effectiveness of a health intervention.

According to the researcher's interpretation, advancing age may contribute to increased cholesterol levels due to the gradual decline in organ function associated with physiological changes that occur during the aging process. In this study, Subject I was 61 years old, while Subject II was 63 years old, both of whom were within the age group at higher risk for hypercholesterolemia.

These findings are supported by Widjaya, Sabrina, Pupadewi, and Wijayanti (2018), who reported that advancing age is associated with an increased risk of hypercholesterolemia, partly due to physiological changes and lifestyle factors, including inadequate control of dietary intake, particularly the consumption of foods high in fat. These factors contribute to elevated blood cholesterol levels and increase the risk of developing hypercholesterolemia.

Sex is also a factor that may influence elevated cholesterol levels. Based on the findings of this study, both participants were female. According to the researcher's interpretation, women are more likely to experience increased cholesterol levels after menopause due to hormonal changes, particularly the decline in estrogen levels. These hormonal changes can adversely affect lipid metabolism, resulting in increased total cholesterol and low-density lipoprotein (LDL) levels, thereby increasing the risk of hypercholesterolemia.

These findings are consistent with Karyatin (2019), who reported that premenopausal women generally have lower cholesterol levels than men of the same age. Before menopause, estrogen promotes protein anabolism, including the formation of high-density lipoprotein (HDL), which plays a protective role in lipid metabolism. In contrast, postmenopausal estrogen deficiency contributes to increased blood cholesterol levels and a higher risk of atherosclerosis.

Based on the data collected in this study, both Subject I and Subject II frequently consumed foods that were high in fat, oily, and prepared with coconut milk, and they did not consistently maintain a healthy dietary pattern. According to the researcher's interpretation, a diet high in fat may contribute to the accumulation of fatty plaques within the walls of blood vessels, leading to narrowing of the vessels and impaired blood flow. These findings are supported by Nurrahmani (2012), who stated that individuals who consume a diet high in saturated fat are at greater risk of developing hypercholesterolemia. Saturated fats, commonly found in meat, butter, cheese, and cream, increase the levels of low-density lipoprotein (LDL) cholesterol in the bloodstream, thereby contributing to elevated total

cholesterol levels and an increased risk of cardiovascular disease.

Conclusion

Based on the findings of this study, bilimbi (*Averrhoa bilimbi*) juice was effective in reducing cholesterol levels in both participants. Subject I experienced a decrease in total cholesterol from 220 mg/dL to 185 mg/dL, while Subject II showed a reduction from 215 mg/dL to 167 mg/dL following the intervention.

Based on the results and discussion of this case study, several factors were identified as contributing to elevated cholesterol levels, including age, sex, genetic predisposition, and dietary habits, particularly the consumption of foods high in saturated fat. In addition, the success of the intervention was influenced by participants' adherence to the prescribed therapy and family support, both of which played important roles in enhancing the effectiveness of the intervention.

Acknowledgments

The author would like to express sincere gratitude to the Director Academy Of Nursing Kesdam Iskandar Muda Banda Aceh and to the academic supervisor for their invaluable guidance, leadership, and unwavering support throughout the completion of this study. Their dedication to advancing the institution has been a constant source of motivation and inspiration, encouraging us to continue learning, growing, and striving for excellence. The author also prays that they are blessed with good health, continued success, and wisdom in leading the institution toward even greater achievements.

Author Contributions

Meyliana Eka Puspita: Conceptualization, methodology, investigation, data collection, data curation, formal analysis, interpretation of the findings, writing original draft preparation, and manuscript preparation.

Fakruddin: Supervision, methodology, validation, critical review of the manuscript, writing review and editing, and final approval of the manuscript.

Both authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

Funding

This research received no external funding

Conflicts of Interest

The authors declare that there are no conflicts of interest related to the conduct of this study or the publication of this article. This research was conducted independently for academic purposes, and no financial, commercial, or personal relationships influenced the study design, data collection, data analysis, interpretation of the findings, or the decision to publish the results.

References

- Hasibuan, R., & Hasna, A. (2021). The role of family support in the effectiveness of insomnia therapy among older adults. *Jurnal Kesehatan Jiwa*, 6(2), 76–83.
- Khairani, N., Zulkifli, A., & Marlina, R. (2022). The impact of the aging process on the quality of life of older adults. *Jurnal Keperawatan Medisina*, 11(1), 54–60.
- Kozier, B. (2010). *Fundamentals of nursing: Concepts, process, and practice* (7th ed.). EGC.
- Maryam, S., et al. (2010). *Nursing care for older adults*. Trans Info Medika.
- Masruhen. (2014). Effect of *Averrhoa bilimbi* L. fruit infusion administration on cholesterol levels. Akademi Farmasi Putra Indonesia.
- Ministry of Health of the Republic of Indonesia. (2018). *Basic Health Research (Riskesdas) 2018*. Ministry of Health of the Republic of Indonesia.
- Sari, I., & Fadjri, K. (2021). The relationship between dietary patterns and cholesterol levels among adults at Batoh Community Health Center, Lueng Bata District, Banda Aceh. *Journal of Health*, 4(2), 106–110.
- Surialaga, S., Dhianawaty, D., Martiana, A., & S, A. A. (2013). Antihypercholesterolemic effect of *Averrhoa bilimbi* L. fruit juice on hypercholesterolemic Swiss Webster mice. *Majalah Kedokteran Bandung (MKB)*, 45(2), 125–129.
- Utama, R. D., & Indasah. (2021). *Cholesterol and its management*. Strada Press.
- Wardhani, P. K., Yurianti, R., & Kameliawati, F. (2020). The relationship between maternal age, parity, and the incidence of hypertension among pregnant women at Rajabasa Indah Community Health Center. *Jurnal Ilmu Kesehatan Indonesia (JIKSI)*, 1(2), 1–7.
- Wulandari, S. R., Winarsih, W., & Istichomah, I. (2023). Improving the health status of older adults through health education and health screening

in Mrisi Hamlet, Yogyakarta. *Pengabdian Masyarakat Cendekia (PMC)*, 2(2), 58–61.