International Review of Practical Innovation, Technology and Green Energy (IRPITAGE)| ISSN(e): 2808-8611
Volumes 5 No. 1 (2025)

EDUCATION ON HYPERTENSION PREVENTION FOR GENERATION Z

Tahara Dilla Santi[1]*, Aditya Candra[2], Ika Waraztuty[3], Andri[4], Muhammad Yani[5], Said Aandy Saida[6]
Faculty of Public Health, Universitas Muhammadiyah Aceh, Indonesia[1]
Faculty of Medicine, Universitas Abulyatama, Indonesia[2,4,5,6]
Faculty of Medicine, Universitas Syiah Kuala, Aceh[3]
Department of Public Health,Universitas Syiah Kuala, Aceh[5]
Corresponding E-mail: tahara.dilla@unmuha.ac.id[1]*

Received : 21 April 2025	Published : 16 June 2025
Revised : 29 April 2025	DOI : https://doi.org/10.54443/irpitage.v5i1.3165
Accepted : 17 May 2025	Link Publish : https://radjapublika.com/index.php/IRPITAGE/

Abstract

Hypertension is a significant public health problem and a risk factor for cardiovascular disease and other complications. According to Riskesdas data, the prevalence of hypertension sufferers under the age of 18 was 25.8% in 2013 and increased to 34.1% in 2018. This community service aims to increase the knowledge of Generation Z, namely students who live in the Muhammadiyah Patronage House in Banda Aceh City. Educational activities were carried out using the Participatory Action Research (PAR) method and were carried out on October 27, 2024, at the Muhammadiyah Patronage House prayer room with 25 students as participants. Participants were given a knowledge questionnaire before and after the activity, and the data were analyzed using SPSS. The extension instrument was a PowerPoint presentation. Educational activities took place in an orderly and smooth manner and had a positive impact on increasing student knowledge.

Keywords: ***hypertension, generation Z, educational, knowledge, students***

INTRODUCTION

Hypertension in adolescents (Generation Z) is a significant challenge. It must be a serious concern, because if it is not controlled, it will have a greater risk of suffering from coronary heart disease or heart failure as adults. Hypertension is known as a silent killer, so adolescents are often unaware that they have become sufferers. From a physiological point of view, it is known that a person's risk of developing hypertension increases with age. According to the 2020 Population Census, most of Indonesia's population is Generation Z (Gen Z) at 27.94%, followed by the Millennial Generation at 25.8%, and Pre-Boomers at 1.87% (1,2).

Several studies have shown that the prevalence of hypertension at a younger age (Generation Z) and productive age is increasing. Sarkar's research shows that the risk of hypertension increases with age, and the risk is higher in women than in men. Women have lower stress management. In addition, hypertension is also inherited following the Mendelian Inheritance Pattern with the assumption that if a family member suffers from hypertension, it will be passed on to the next generation. Other studies state that hypertension is caused by changes in hormonal function resulting in increased blood pressure. Another thing, stress will stimulate the brain to produce more Adrenal Corticotropin Hormone (ACTH), which can stimulate an increase in Cortisol Releasing Factor (CRF) and have an impact on increased cortisol levels, changes in the hormones Angiotensin and Aldosterone. Scientific studies show that Generation Z who consume alcohol and smoke have a greater risk of experiencing hypertension (3–6).

Hypertension in Generation Z can be caused by various factors such as lifestyle, diet, obesity, family history of hypertension, gender, race or ethnicity, low birth weight, excessive salt consumption, smoking, and lack of physical activity. Hypertension risk factors are divided into two groups: modifiable and unmodifiable. Non-modifiable risk factors include age, history of hypertension, gender, and race. Because this cannot be changed, interventions can be carried out on modifiable risk factors such as adopting a healthy lifestyle, consuming healthy foods with the right sodium and fat content, avoiding fast food and junk food, and doing physical activity through regular exercise for 20 to 25 minutes, 3-5 times per week (7).

The low knowledge of Generation Z about hypertension and its prevention is a serious problem, so it is essential to carry out educational activities. Good knowledge will increase students' motivation to improve their

quality of life by avoiding hypertension risk factors. One of the efforts made to enhance students' knowledge about hypertension prevention is by conducting education as part of public health promotion.

LITERATURE REVIEW

Disease patterns in Indonesia have undergone an epidemiological transition over the past two decades from infectious diseases, which were initially the main burden, to non-communicable diseases. This trend is increasing and starting to threaten from a young age. The primary non-communicable diseases include hypertension, diabetes mellitus, cancer, and chronic obstructive pulmonary disease (8,9).

Hypertension is a condition of systolic blood pressure ≥ 140 mmHg and diastolic blood pressure ≥ 90 mmHg (Ministry of Health of the Republic of Indonesia, 2020). This disease is known as a silent killer with the highest prevalence in the world. Risk factors for hypertension include predisposing and precipitating factors such as age, gender, family history, genetics, stress, obesity, lifestyle, smoking, alcohol consumption, and unhealthy diet (4).

Blood pressure is influenced by stroke volume and total peripheral resistance. If one of them increases, it causes hypertension. The human body has a system that prevents this condition and maintains blood pressure stability in the long term. The fast control system involves cardiovascular reflexes, chemoreceptors, ischemia response, and the central nervous system. The slow reaction control system through fluid transfer between capillary circulation and the interstitial cavity is controlled by the hormones angiotensin and vasopressin. Then, the potent system involves various organs that occur in the long term (10–12)

The mechanism of hypertension is the formation of angiotensin II from angiotensin I by angiotensin I converting enzyme (ACE). Angiotensin II plays a role in increasing blood pressure through two pathways. First, it increases the secretion of antidiuretic hormone (ADH), triggers thirst, decreases urine secretion, and increases osmolality and concentration the body's homeostasis to this condition by increasing extracellular fluid volume from intracellular fluid. As a result, blood volume increases, and blood pressure increases. The second pathway stimulates the secretion of aldosterone from the adrenal cortex. Aldosterone will reduce the excretion of NaCl (salt) by reabsorbing it from the renal tubules. The increase in NaCl concentration is followed by an increase in the volume of extracellular fluid and an increase in blood pressure (5,6,13). Traditional medicine using herbal plants to control high blood pressure and prevent cardiovascular diseases has existed since ancient times (14–18).

METHOD

Community empowerment using the Participatory Action Research (PAR) method was carried out on October 27, 2024, with 25 students who lived in the Muhammadiyah Aceh Orphanage. The activity began with a pretest before being given education to measure participants' knowledge regarding hypertension and its prevention. Knowledge is a collection of facts, truths, and information from experience. The information obtained must be understood and applied according to its rules. Education is given to students to increase their knowledge so that they can apply knowledge about preventing hypertension. The educational activities provided to students began with a pretest and continued with the presentation of educational materials related to hypertension, risk factors, and prevention tips for Generation Z. The service team invited participants to discuss and gave door prizes to active participants who could answer questions asked by the team. This activity ended with post-test questions to determine the extent of the participant's knowledge and understanding of the education provided (Fig.1)

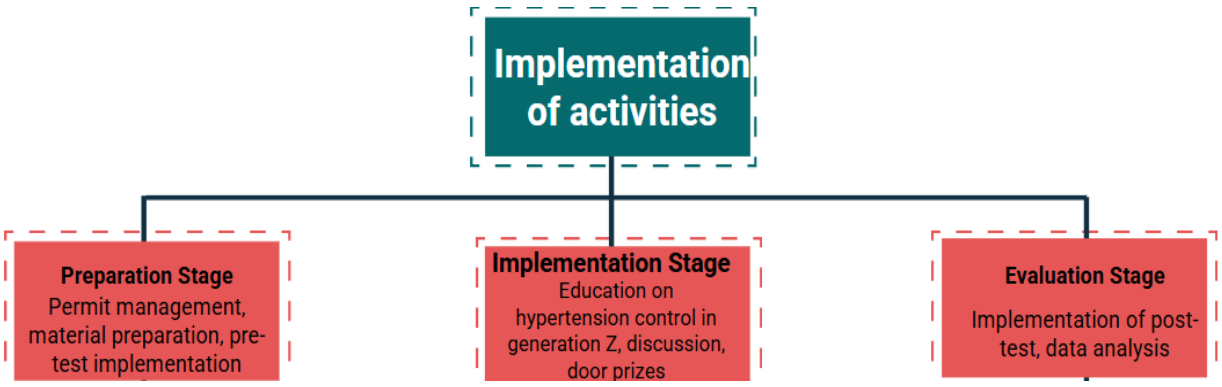

Fig 1. Stages of implementing community service activities

RESULTS AND DISCUSSION

The results of the measurement of students' knowledge levels conducted at the beginning of the meeting (pre-test) showed that their knowledge about hypertension was still low. The lowest pre-test score was 60, the highest was 80 (Fig 2). They did not know the systolic and diastolic values for hypertension. Many students still did not know the risk factors for hypertension. Hypertension is still considered an older adult's disease and does not require routine monitoring and treatment.

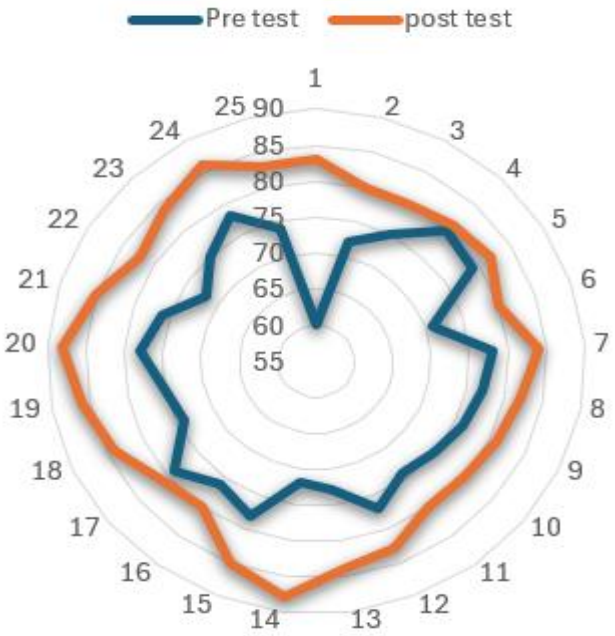

Fig 2. Student pre-test and post-test scores

The community service activities took place in an orderly, and students were very enthusiastic about listening to the educational materials presented by the team. After the educational activities (Fig.3), the team discussed the topic with the participants and gave door prizes as a form of appreciation for the participants' activeness. At the end of the activity, the team gave a post-test to see the increase in knowledge after being given education, which was marked by an increase in scores. The post-test results showed the lowest score of 80 and the highest score of 86. Pre-test and post-test data described the level of student knowledge, which was analyzed using a paired T-test. The analysis results showed a significant difference (p-value 0.0001) in student knowledge after being given education compared to before. These results indicate an increase in knowledge about hypertension and its prevention in 25 students who were the subjects of this empowerment activity.

Fig. 3. The community service activities

Providing health education is expected to prevent and reduce disease incidence and promote health (19,20). Providing education about hypertension has proven to be more effective in younger age groups (Generation Z) because they are more open to changes and developments in science so that it is more effective and can be disseminated. The delivery of education to Generation Z must pay attention to the proper communication techniques. Communication is the transfer of a message/information from the source to the recipient, which is delivered as well as possible to be adequately understood (21,22). Health communication is needed to convey messages and decision-

making that can affect health management by providing information, creating awareness, changing attitudes, and motivating students to prevent hypertension. Providing health information is expected to prevent and reduce disease incidence and as a means of health promotion (23).

Health education intervention is one of the actions that can improve students' knowledge. Health education is a collection of experiences that support habits, attitudes, and knowledge related to health (24). This activity helps students realize that natural herbal ingredients have been proven to control blood pressure for generations. The plants utilized for herbal remedies include garlic and other plants (6,8,29,30,9,16–18,25–28). This is supported by Notoatmodjo's theory (2003) that health education can change a person's knowledge in taking health-related actions (31).

CONCLUSION

The conclusion that can be drawn from the community service activities for students living in the Muhammadiyah Aceh foster home is that there is an increase in knowledge about hypertension and its prevention in the subjects of this activity. The activities took place orderly and smoothly, and the participants were enthusiastic about listening to the educational materials provided.

REFERENCES

1. Mi-Jeong K. Millennials' Blood Pressure Alert: Suboptimal Hypertension Management in Child, Adolescent and Young Adults. Korean Circ J. 2021;51(7).
2. Naam Fajar B. The Challenges of Millennial And Gen-Z Generation Workforce In Indonesia. J Econ Account Manag Sci [Internet]. 2023;5(1). Available from: https://jeams.unmerbaya.ac.id/index.php/jeams/article/view/39
3. Meher M, Pradhan S PS. . 2023 A 12;15(4):e37467. Risk Factors Associated With Hypertension in Young Adults: A Systematic Review. Cureus. 2023;15(4).
4. Candra, A., Santi, T., Yani, M., Mawaddah D. Skrinning Tekanan Darah pada Masyarakat Desa Baet Lampuot Tahun 2022. J Abdimas UNAYA [Internet]. 2022;3(2):15–20. Available from: http://jurnal.abulyatama.ac.id/index.php/Abdimas
5. Candra A, Santi TD, Yani M, Mawaddah DS. Faktor-Faktor yang Berhubungan dengan Kejadian Hipertensi di Desa Baet Lampuot Aceh Besar. Media Kesehat Masy Indones. 2022;21(6):418–23.
6. Putri MN, Santi TD, Arbi A. Faktor-Faktor Yang Berhubungan Dengan Kepatuhan Kontrol Berobat Pasien Hipertensi Rawat Jalan Di Puskesmas Kuta Alam Kota Banda Aceh Tahun 2023. J Kesehat Tambusai. 2023;4(3):3261–3269.
7. Prahassiwi AA, Sukendra DM. Risk Behavior and Psychological Stress on the Incidence of Hypertension among Productive Age in Urban Communities. Int J Sci Soc. 2024;6(1):99–115.
8. Alkausar MR, Zakaria R, Dilla Santi T. Determinan Peningkatan Tekanan Darah Pada Pekerja Kilang Padi Di Desa Meunasah Blang Kecamatan Darul Aman Kabupaten Aceh Timur. J Med Malahayati. 2024;7(4):1050–8.
9. Santi TD. Uji Toksisitas Akut dan Efek Antiinflamasi Ekstrak Metanol dan Ekstrak n-Heksana Daun Pepaya (Carica papaya L). Pharm Sci Res [Internet]. 2015;2(2):101–14. Available from: https://scholarhub.ui.ac.id/psr/vol2/iss2/5/
10. Candra A, Santi TD. Buku Ajar Fisiologi Manusia. Mitra Cendikia Media; 2023.
11. Robinson C, Chanchlani R. High Blood Pressure in Children and Adolescents: Current Perspectives and Strategies to Improve Future Kidney and Cardiovascular Health. Kidney Int Rep [Internet]. 2022;7(5):954–70. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC9091586/
12. Annisa NS, Haryanto J, Kristiawati K. Exploring the risk factors associated with hypertension in children: A systematic review. Pediomaternal Nurs J [Internet]. 2024;10(1):33–8. Available from: https://e-journal.unair.ac.id/PMNJ/article/view/54528
13. Amukti DP, Humolungo DTWS, Ardilla M, Bachri MS, Ma'ruf M. Pemberian edukasi pada usia remaja terhadap penyakit hipertensi. J Pembelajaran Pemberdaya Masy. 2024;5(2):251–8.
14. Santi TD, Candra A, Zakaria R. Counseling and Training of Intervention Model Local Plants to Overcome Stunting (TALAS) for Health Workers at Montasik Health Center, Aceh Besar. IRPITAGE [Internet].

2023;4(2):287–91. Available from: https://radjapublika.com/index.php/IRPITAGE
15. Santi TD, Candra A. Analisis Senyawa Fitokimia Daun Moringa Oleifera Dari Kawasan Geotermal Aceh Besar Sebagai Kandidat Antiinflamasi. Media Penelit dan Pengemb Kesehat [Internet]. 2024;34(4):857–66. Available from: https://jurnal.polkesban.ac.id/index.php/jmp2k/article/view/2638
16. Santi TD, Candra A, Amin FA, Rizki CMF. Ethnopharmacological Study of Medicinal Plants in Gampong Atong, Aceh Besar. Proceeding Int Conf Soc Technol Educ Heal Sci [Internet]. 2025;2(1):1–7. Available from: https://proceeding.umpri.ac.id/index.php/ISTEHS/article/view/71/80
17. Candra A, Fahrimal Y, Yusni, Azwar, Santi TD. Phytochemistry and antifatigue activities of Carica papaya leaf from geothermal, coastal and urban areas, Indonesia. Narra J [Internet]. 2024;4(1):1–9. Available from: https://narraj.org/main/article/view/321
18. Santi TD. Effect of Moderate Physical Activity to Muscle Fatigue on Untrained People. IOP Conf Ser Mater Sci Eng [Internet]. 2019;506(1):0–5. Available from: https://iopscience.iop.org/article/10.1088/1757-899X/506/1/012028/pdf
19. Candra A, Santi TD. Peduli Gempa Pidie Jaya: Sebuah Aksi Kemanusiaan," Indonesia. J Inov dan Pengabdi Mas. 2022;1(3):29–31.
20. Santi TD, Candra A. Penyuluhan Rumah Bebas Asap Rokok Di Desa Baet Lampuot Kecamatan Suka Makmur Kabupaten Aceh Besar. J Abdimas Unaya. 2022;3(2):1–5.
21. Santi TD, Candra A. Penyuluhan Jajanan Sehat Untuk Anak Indonesia Sehat. J Inov Dan Pengabdi Masy Indones. 2022;1(2):9–11.
22. Candra A, Santi TD, Yani M, Maidayani M. Sosialisasi Pencegahan Stunting di Wilayah Kerja Puskesmas Kuta Malaka. J Abdimas Unaya [Internet]. 2023;4(1):6–11. Available from: http://jurnal.abulyatama.ac.id/index.php/Abdimas/article/view/3928/pdf_1
23. Santi TD. Pemberdayaan Kesehatan Masyarakat. Mitra Cendikia Media; 2022.
24. Sari DP, Mahmudah N. Edukasi Gejala dan Bahaya Hipertensi pada Siswa SMAN 15 Jakarta Utara. Kami Mengabdi. 2022;2(2):1–6.
25. Candra A, Fahrimal Y, Yusni, Azwar, Santi TD. Soil Chemistry, Phytochemistry, and GC-MS Profils of Moringa Leaves (Moringa oleifera) as an Antifatigue Candidate From Geothermal, Coastal, and Urban Areas in Aceh Besar District and Banda Aceh Municipality, Indonesia. Rasayan J Chem [Internet]. 2023;16(3):1333–41. Available from: https://rasayanjournal.co.in/admin/php/upload/4032_pdf.pdf
26. Santi TD, Zakaria R, Candra A, Dharma Nauval M. Analysis Active Compounds of Carica papaya, Averrhoa bilimbi, and Chromolaena odorata Leaves from Geothermal Area. AIP Conf Proc [Internet]. 2023;2583(January). Available from: https://pubs.aip.org/aip/acp/article-abstract/2583/1/090004/2875609/Analysis-active-compounds-of-Carica-papaya?redirectedFrom=fulltext
27. Santi TD, Siregar TN, Sutriana A, Andini R, Candra A. Phytochemical test and optimization of transdermal patches of Carica papaya extract : Formulation design of candidate drug for wound healing. Biodiversitas [Internet]. 2022;23(6):2904–13. Available from: https://smujo.id/biodiv/article/view/10922
28. Santi TD, Candra A. Skrining Fitokimia Dan Karakteristik Salep Daun Averrhoa bilimbi. BIOMA J Biol Makassar [Internet]. 2023;8(1):23–31. Available from: https://journal.unhas.ac.id/index.php/bioma/article/view/23338
29. Santi TD, Siregar TN, Sutriana A, Andini R, Candra A. Wound Healing Activity of Transdermal Patches of Carica Papaya, Chromolaena Odorata, and Averrhoa Bilimbi Leaves on Incision Wounds of Hyperglycemic Rat. Trends Sci [Internet]. 2023;20(12):6944. Available from: https://tis.wu.ac.th/index.php/tis/article/view/6944
30. Candra A, Santi TD, Yani M, Saida SA, Waraztuty I, Bastian F. Differences In Pulse Rate And Lactic Acid Levels In Athletes Before And After Light And Medium Intensity Physical Activities. Medalion J [Internet]. 2024;2(2):75–80. Available from: https://medalionjournal.com/index.php/go/article/view/113/111
31. Notoatmodjo S. Pendidikan dan Perilaku Kesehatan Masyarakat. Jakarta: Rineka Cipta; 2003.