Original Article

Effect of Family-Centered Nursing-Based Health Education on Activities of Daily Living among Elderly Hypertensive Patients in Indonesia: A Quasi-Experimental Study

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ABSTRACT

Background: Hypertension is a common chronic condition in the elderly, leading to decreased independence in performing Activities of Daily Living (ADL). Family support is a key determinant in maintaining the independence of the elderly. However, the family's role is still not optimal. Health education based on family-centered nursing (FCN) is expected to empower patients and families to manage hypertension and improve functional abilities.

Methods: A quasi-experimental design with a non-equivalent control group was applied to evaluate the effect of Family-Centered Nursing (FCN)-based education on Activities of Daily Living (ADL) among elderly hypertensive patients. 64 participants meeting the inclusion criteria were selected using simple random sampling from the Rubaru Community Health Center, Indonesia. Data were collected using the validated Barthel Index questionnaire and analyzed with the Wilcoxon and Mann–Whitney tests using SPSS version 25.

Results: Based on the paired t-test, the daily living activities score, p-value <.001, and the Independent test, p-value < .001 was obtained for both the control and treatment groups. This demonstrates the influence of family-centered nursing education on the independence of daily living activities of hypertension sufferers in the work area of the Rubaru Community Health Center.

Conclusion: Family-centered nursing education has an impact and is effective on the daily living activities of older people with hypertension in the Rubaru Community Health Center (Puskesmas) area. It is recommended that the Community Health Center integrate family-based education programs into routine health services for the elderly.

Keywords: Activities of Daily Living; Family-Centered Nursing; Health education; Hypertension; Patients.

Implications for Practice:

- Family-centered nursing (FCN) interventions focus on collaboration among nurses, patients, and families, promoting a holistic approach to nursing that addresses individual needs and family context.
- Educational methods that engage the family are more effective in changing patient behavior than those directed solely at individuals. Healthcare professionals should create family-oriented educational materials adapted to the patient's socio-cultural background.
- Healthcare facilities, particularly at the primary care level, including community health centers and clinics, should consider incorporating the FCN approach into nursing care protocols for patients with hypertension as part of their preventive and promotional efforts..

Introduction

Hypertension continues to be a critical public health issue worldwide, as it is a leading risk factor for death globally and is a non-communicable disease. Hypertension occurs most frequently in the elderly (Goorani et al., 2024). It is commonly experienced by people over 60, who experience functional changes and impaired bodily functions that impact their daily activities (Kario et al., 2024). Problems that can occur in daily living activities include basic activities such as eating, changing clothes, bathing, and walking(Sugimoto & Yamamoto, 2022).

Furthermore, daily activities such as sweeping, exercising, and muscle movement can improve heart function. The ability to perform daily living activities (ADL) will decline in older people with long-term hypertension. As a result, they require assistance and depend on others (Li et al., 2024). Interviews with five hypertension patients at the study site revealed that, on average, they experienced a decline in ADL. Approximately 70% of patients, three out of five, reported uncontrolled urination and inability to climb and descend stairs, which can be considered a decline in ADL with a mild level of dependence (Sugimoto & Yamamoto, 2022).

The prevalence of hypertension is also a global concern, with estimates by the World Health Organization (WHO) (Organization, 2023). The incidence of hypertension was expected to increase by 29% by 2025. Around 1.28 billion people worldwide suffer from hypertension, around 1 in 3 people are diagnosed with hypertension, and 10.44 million people die from complications of hypertension each year (Lu et al., 2024). Sumenep Regency reported 36,054 cases of hypertension in 2022, which increased to 46,493 cases in 2023. Meanwhile, at the Rubaru Community Health Center, around 547 respondents were recorded as suffering from hypertension in 2022. In 2023, 340 respondents with hypertension were recorded; in 2024, the number of hypertension sufferers recorded at the Community Health Center increased by 50% from 2023 to 676.

Hypertension can lead to various serious complications such as kidney disease, heart disease, peripheral vascular disease, cerebral (brain) disorders, and stroke, which can lead to death (Suprayitno & Damayanti, 2020). If a sufferer lacks physical activity or does not exercise, the heart must work harder to pump blood, which increases the pulse rate and raises blood pressure (Kurniasih et al., 2017). Carrying out daily activities will be difficult for people with hypertension who experience long-term complications (Rabadia et al., 2024).

One solution that can be applied to improve daily living activities for hypertension is through family-centered nursing intervention. Nursing theory can be applied to families, as family-centered nursing is the ability of nurses to provide family nursing care, thereby making family members independent so that the health of all family members is improved and the family can overcome health problems (Almaini et al., 2025). Providing emotional, social, and practical support to patients and families to help them adapt to the illness or health problems they face (McCarthy & Guerin, 2022). Therefore, this study aimed to examine the effectiveness of family-centered nursing education on ADL among elderly hypertensive patients in Indonesia

Methods

Study Design

This study was a nonrandomized quasi-experimental study with a non-equivalent control group, in which observations were conducted through an initial pretest. The

intervention was then administered, followed by a posttest to evaluate changes in daily living hypertensive patients before and after the educational treatment. The educational intervention was delivered using family-centered nursing education. This study aimed to measure the effectiveness of the intervention in increasing daily living. The research was conducted at Rubaru Health Center, Sumenep Regency, Indonesia, from April 5 to June 31, 2025, and adjusted to the schedule of the elderly integrated health post at the Rubaru Health Center, Sumenep Regency, Indonesia.

Participants

The population in this study was 66 elderly patients with hypertension in the Rubaru Community Health Center's work area. The inclusion sample criteria for this study were being willing to participate, without comorbidities such as major depression, being able to communicate, and having a history of hypertension. While the exclusion criteria are pregnant women, those who have chronic diseases such as asthma and heart failure, and are not willing to be respondents. In this study, the authors used a simple random sampling technique. This is the most straightforward sampling technique. The sample size was determined using the Slovin formula, resulting in 57 samples. To anticipate dropout, the authors added 10% of the total sample size, resulting in a total sample size of 64 elderly patients with hypertension.

Instruments

The measurement instrument used was a Barthel Index questionnaire titled Daily Living Activities for the Elderly with Hypertension in the Rubaru Community Health Center" (Puskesmas Rubaru). The validity and reliability of the modified Barthel Index instrument in this study were tested. The validity and reliability of the Barthel Index questionnaire were found to be very good (>0.75), except for the item controlling bowel movements, which had an ICC of 0.645, which was good (0.4-0.75). The internal consistency reliability of this study was obtained with a Cronbach's coefficient of 0.938. This Instrument was a standard questionnaire for ADL examination in the elderly, based on the book on the implementation of elderly health services in community health centers (Kemenkes, 2017) and guidelines for community health centers in implementing elderly health activities in elderly health posts (Kemenkes, 2020)

Intervention

The intervention implemented in this study was Family-Centered Nursing (FCN)-based health education, designed to empower elderly hypertensive patients and their families to improve their ability to perform Activities of Daily Living (ADL). The intervention emphasized collaborative learning between nurses, patients, and family members, focusing on shared responsibility in hypertension management and functional independence.

The FCN-based education was delivered through four structured sessions conducted once a week for four consecutive weeks, with each session lasting approximately 60 minutes. The educational content was adapted from national hypertension management guidelines and adjusted to the socio-cultural context of elderly participants. The sessions included:

Session 1 – Understanding Hypertension: Introduction to the definition, causes, risk factors, and prevention strategies of hypertension. Families were encouraged to recognize symptoms and risk behaviors in daily life.

Session 2 – Blood Pressure Monitoring and Medication Adherence: Education on the importance of routine blood pressure measurement, correct medication use, and adherence strategies. Family members

were trained to assist patients in daily medication schedules.

Session 3 – Lifestyle and Diet Modification: Discussion on balanced nutrition, low-salt diet, and the role of regular physical activity. Families were taught to prepare healthy meals and motivate patients to remain active.

Session 4 – Physical Exercise and Family Support: Demonstration of hypertension-friendly exercises, relaxation techniques, and ways to provide emotional and motivational support to the elderly.

At the end of each session, participants received leaflets summarizing the key messages and were encouraged to practice them at home. The same cycle was repeated in the second month to reinforce the knowledge and behavior changes.

All sessions were conducted by the principal researcher, assisted by trained community health nurses. A structured checklist was used to monitor the preparation, delivery, and evaluation process to ensure intervention fidelity. Nurses documented participant engagement, feedback, and any difficulties encountered. Any adverse events or discomfort during sessions were promptly managed according to clinical protocols.

Data Collection

The treatment group received family-centered nursing-based education delivered in four sessions, each lasting 60 minutes, over four consecutive weeks. The intervention consisted of structured health education on hypertension, conducted in the Rubaru Community Health Center service area by researchers assisted by trained community health center nurses.

- Week 1: Introduction to hypertension, including definitions, risk factors, and prevention strategies.
- Week 2: Education on the importance of regular blood pressure checks and medication adherence.
- Week 3: Education on consistent and compliant medication consumption throughout the program.
- Week 4: Education and demonstration of hypertension exercise movements, highlighting their benefits and encouraging participants to follow them.

In the second month, the same four-session cycle of education was repeated to reinforce the material. At the end of the second month, participants underwent an evaluation of their quality of life related to hypertension.

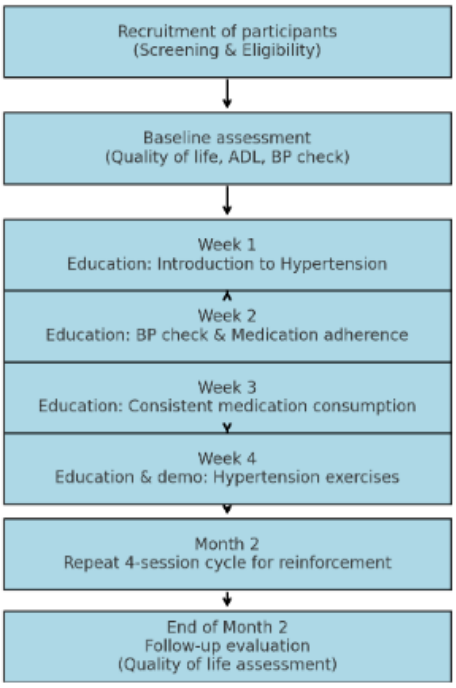

Figure 1. recruitment and intervention timeline flowchart

This study applied a *fidelity monitoring* mechanism in the form of a checklist. Each intervention session was documented by the researcher or nurse, covering three components:

1. Preparation – ensuring the environment was safe and appropriate for elderly participants.
2. Implementation – delivering all protocol-based educational content, maintaining clear communication, and engaging participants actively.
3. Closure – providing feedback, documenting participant responses, and recording any complaints or barriers.

Safety monitoring was also included. Healthcare professionals were trained to observe and document any adverse events, discomfort, or complaints during sessions. If any issues arose, participants were managed promptly according to clinical procedures and referred to medical staff when necessary.

Handling of Missing Data: To address potential missing data, the study adopted the following procedures:

- Participants who missed one session were given summary material in written form (leaflet) and brief counseling before the next session.
- If participants missed more than two consecutive sessions, they were excluded from the final analysis to maintain data quality.
- For outcome questionnaires, if responses were incomplete, participants were contacted for clarification or assisted during follow-up visits. In cases where missing responses could not be recovered, data were handled using listwise deletion.

Data Analysis

Data analysis was conducted using both univariate and bivariate approaches. Univariate analysis was used to describe the demographic characteristics of the respondents. Bivariate analysis was used to assess the effect of the family center nursing education intervention on daily activities. The data presented as a table is then analyzed using SPSS 25. To determine whether the supportive educational system improves the daily living activities of older people with hypertension in the Rubaru Community Health Center work area. This study conducted statistical tests using the Wilcoxon and Mann-Whitney tests to determine whether there is an effect.

Ethical Considerations

This study has adhered to the ethical standards set by the Health Research Ethics Committee of the Faculty of Health Sciences, Universitas Wiraraja, with the approval number 275.1/KEPK/III/2025, and informed consent was secured from all participants, ensuring confidentiality, voluntary participation, and the right to withdraw at any time without consequence.

Results

Based on **Table 1** shows that almost all of the respondents with hypertension are women, as many as 42 respondents (65,5%). *Most respondents with hypertension were farmers (43.8%).”* (43.8%). Almost all of the respondents, Daily Living Activities for the Elderly With Hypertension, aged 66-70 years, had daily living activities for 34 respondents (53.1%).

Table 1 Distribution of Respondents by Gender, Age, and Occupation (n=60)

Characteristic	Category	n (%)
Gender	Man	22 (34.4%)
	Woman	42 (65.6%)
Age (years)	60-65	18 (28.1%)
	66-70	34 (53.1%)
	70-75	12 (18.8%)
Occupation	Farmer	28 (43.8%)
	Housewife	15 (23.4%)
	Self-employed	21 (32.8%)

Based on **Table 2,** the control group's average daily living activities score before and after the given Family-centered nursing education was 13,87±2,02, and the daily living activities score of the control group after the given Family-centered nursing education was 13,90±2,05. The results of the paired t-test on the daily living activities score, p=0.325, indicate that there is no significant difference in the daily living activities scores in the control group before and after the given family-centered nursing education. The intervention group's average daily living activities score before and after the given Family-centered nursing education was 14,06±2,16, and the daily living activities score of the intervention group after the given Family-centered nursing education was 15,40±1,84. The results of the paired t-test, daily living activities score, $p < .001$, indicate that there is a significant difference in the daily living activities scores in the control group before and after the given family-centered nursing education. The average daily living activities score of the control group after giving family-centered nursing education was 13,90±2,05. The daily living activities of the intervention group after giving family-centered nursing education were 15,40,3±1,87. The results of the independent test of the daily living activities score, $p < .001$, mean a significant difference in the daily living activities scores in the control group and intervention group after giving family-centered nursing education. The results of Cohen's d =0.077009.

Table 2. Differences in the mean *Daily Living Activities* for the Elderly With Hypertension before and after the Given family-centered nursing education in the control group in the Work Area Community Health Center, Rubaru.

Variable	Score	Mean	SD	Pvalue
Daily Living Activities (control group)	Pre	13,87	2,02	0,325
	Post	13,9	2,05	
Daily Living Activities (Intervention group)	Pre	14,06	2,16	0,000
	Post	15,4	1,84	
Daily Living Activities	Post Control	13,9	2,05	0,003
	Post Intervention	15,4	1,84	

Discussion

Based on the results of the independent test, the P-value = 0.003 was obtained, which showed an influence of FCN-based education on the daily living activities of hypertension sufferers. The application of a family model for families which is an integration of the concept of the Self Care and Family-Centered Nursing (SCFCN) nursing model and theory using supportive education to families conducted three times over three weeks greatly influenced the independence of families caring for family members suffering from hypertension which was marked by an increase in knowledge and independence of hypertension sufferers during the post-test (Alsaleh et al., 2024) the results of this study are supported by other studies showed that implementing the family-centered empowerment model improves the quality of life of patients with hypertensi (Hamedani et al., 2022). Mohalli et al. studied the effect of the family-centered empowerment model on empowerment indices of patients with hypertension and showed that the knowledge, self-esteem, and self-efficacy of patients with hypertension increased in the experimental group (Mohalli et al., 2021)

The application of family-centered nursing was carried out using a family nursing care approach method including the stages of assessment, planning,

implementation, and evaluation including intervention strategies including the application of modality therapy (food combining), behavioral therapy, counseling and (coaching), community empowerment to achieve community competence, building coalitions to achieve the desired goals with various potential parties (Correia et al., 2025). This model can also be used in creating implementation strategies, such as providing education to families in relevant areas in health promotion, such as education, communication, management, and psychosocial skills, improving the quality of information communication programs and skills education, and providing training to families with older people who experience hypertension (Isnaini et al., 2025)

Daily living activities are essential for maintaining stable blood pressure and preventing complications (Ojangba et al., 2023). Research conducted by Aldiansa (2023) indicates that individuals with good preventive behaviors experience a higher quality of life in their daily activities (Hu et al., 2024). Conversely, those with poor preventive behaviors may struggle with daily tasks. Modifying behaviors through regular exercise or engaging in household activities—such as sweeping, watering plants, or walking around the house—can enhance overall health, strengthen the body, and help lower blood pressure. Physical activity is particularly important for the elderly to prevent complications associated with hypertension. However, aging can lead to challenges in daily activities due to declines and changes in physiological function(Sekome et al., 2024).

Education empowers individuals, groups, and communities to maintain, improve, and protect their health through increasing knowledge, willingness, and ability from, by, and for individuals, groups, and communities by local cultural factors (Suprayitno et al., 2021). Changes that occur based on the results of the research obtained are because families have increased their knowledge by being given education and the willingness and ability to receive information provided by researchers so that families can carry out five family health tasks, namely recognizing health problems, deciding on appropriate actions for hypertension sufferers, caring for family members who suffer from hypertension, modifying the environment to create a healthy, clean, neat and harmonious environment, and being able to utilize health facilities to check the health of older people who suffer from hypertension so that they can increase the independence of hypertension sufferers (Charchar et al., 2024).

Family-centered nursing education can empower families who care for elderly people with hypertension so that families can carry out five family tasks: maintain, improve, and protect the health of sick family members. Changes that occur based on the results of the research obtained are because families have increased their knowledge by being given education and the willingness and ability to accept information provided by researchers, so that families can care for family members who suffer from hypertension, so that the patient's ADL abilities can improve. The family-centered model of care emphasizes that care provides good outcomes with family support and increased family support and involvement of the ill family member (Keshvari, 2015). This educational model also enables families to know how to fulfill their own needs, can increase understanding of what families should do about their problems with existing resources, plus outside support, and increases the ability to decide on appropriate actions to improve the healthy living standards of their family members (Boonyathee, 2021).

Family-centered nursing-based health education interventions have been shown to contribute to improved activities of daily living (ADL) performance in elderly people with hypertension through biological and psychosocial mechanisms. Family education improves adherence to medication, a low-salt diet, and blood pressure monitoring, resulting in more stable hypertension control and a reduced risk of symptoms or complications that can impair physical function (Nasution & bin Sansuwito, 2024). At the same time, family involvement provides instrumental support in basic activities and emotional support that strengthens the elderly's motivation and self-efficacy (Aprilatutini et al., 2024). Family encouragement to remain physically active helps maintain muscle strength, balance, and flexibility, which are essential for maintaining independence in ADL. Furthermore, educated families are better able to recognize early signs of hypertension complications, enabling timely interventions to prevent severe functional decline. Thus, the combination of disease control, family support, and maintaining physical activity makes a family-based approach effective in maintaining the independence of elderly people with hypertension (Isnaini et al., 2025).

Implications and limitations

The intervention in this study was a Family-Centered Nursing (FCN)-based health education program designed to empower elderly patients with hypertension and their families in improving Activities of Daily Living (ADL). The intervention was implemented through four structured sessions conducted weekly for four weeks, each lasting approximately 60 minutes. The educational content included understanding hypertension, blood pressure monitoring and medication adherence, lifestyle and dietary modifications, as well as physical exercise and family support. Each session emphasized active participation of both patients and family members through discussion, demonstration, and counseling, supported by printed educational materials for home practice. The intervention was delivered by the researcher and trained community health nurses at the Rubaru Community Health Center, with fidelity monitored using a structured checklist to ensure consistency, participant engagement, and documentation of feedback. This FCN-based intervention aimed to enhance family knowledge, motivation, and skills in supporting hypertensive elderly patients to achieve better independence and improved quality of life.

Relevance to for Practice

Applying family-centered nursing-based health education to patients with hypertension is highly relevant in clinical practice, as it involves the family as an active part of the care process. This approach improves patient and family knowledge regarding hypertension management and encourages emotional support, adherence to therapy, and sustainable lifestyle changes. This method can be implemented as a nursing intervention strategy in primary care and the community to improve the quality of life for patients with hypertension. Integrating cultural and social aspects into the Self-Care and Family-Centered Nursing (SCFCN) model is crucial to ensure that interventions are not only clinically effective but also acceptable, understood, and implemented by families within their cultural context. This approach will strengthen educational success, increase family independence, and support the quality of life of older adults with hypertension.

Conclusion

This study aimed to determine the effect of Family-Centered Nursing (FCN)-based education on the daily activities of hypertension patients. These findings emphasize the importance of family involvement through supportive education in improving the independence and quality of life of hypertension patients. Consequently, nursing practice needs to emphasize family empowerment as the primary care partner. Future research can explore the effectiveness of the FCN model in other chronic diseases and strategies for sustainable implementation at the community level.

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CrediT Authorship Contributions Statement

Emdat Suprayitno : Conceptualization, Methodology, Writing - Original Draft

Mujib Hannan : Supervision, Validation, Formal Analysis

Syaifurrahman Hidayat : Investigation, Resources, Data Curation,

Dian Permatasari : Review & Editing, Visualization,

Nailiy Huzaimah : Project Administration, Funding Acquisition

Conflicts of Interest

There is no conflict of interest.

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Supplementary Materials

Supplementary File S1: Questionnaire contains the full questionnaire used for data collection.

References

Almaini, A., Sumarni, T., Khoirini, F., & Hartoyo, M. (2025). The relationship of family support with the quality of life of hypertension in the elderly. *Malahayati International Journal of Nursing and Health Science*, *8*(1), 8–15. https://doi.org/doi.org/10.33024/minh.v8i1.661

Alsaleh, F. A. I., Alharbi, H. N. O., Aljohani, H. N. S., Aljohani, M. T. F., Alkhaibari, H. A. S., Alfaden, A. H., Alhojaily, M. M., & Aljohany, S. S. (2024). The Role of Family-Centered Nursing Theories in Enhancing Primary Healthcare Services. *Journal of International Crisis and Risk Communication Research*, *7*(S7), 151.

Aprilatutini, T., Yustisia, N., Wasalamah, B., & Masdar, M. (2024). The Effect Of Supportive Education Nursing Intervention On Self-Efficacy Of Family Caregivers Caring For Dependent Elderly: Randomized Controlled Trial. *Ankara Medical Journal*, *24*(4). https://doi.org/10.5505/amj.2024.73669

Bernadetha, S. K. M., Nurhidayati, S. K., Ns Nasrullah, S. K., Dewi Arwini Bugis, S. K., NS, M. K., & Puji Lestari, M. P. (2023). *Pengantar promosi kesehatan dan perilaku kesehatan*. SELAT MEDIA PATNERS.

Charchar, F. J., Prestes, P. R., Mills, C., Ching, S. M., Neupane, D., Marques, F. Z., Sharman, J. E., Vogt, L., Burrell, L. M., & Korostovtseva, L. (2024). Lifestyle management of hypertension: International Society of Hypertension position paper endorsed by the World Hypertension League and European

Society of Hypertension. *Journal of Hypertension*, *42*(1), 23–49.

Correia, T., Martins, M. M., Barroso, F., Pinho, L., Longo, J., & Valentim, O. (2025). Patient and Family-Centered Care to Promote Inpatient Safety: An Exploration of Nursing Care and Management Processes. *Nursing Reports*, *15*(7), 260. https://doi.org/doi.org/10.3390/nursrep15070260

Goorani, S., Zangene, S., & Imig, J. D. (2024). Hypertension: a continuing public healthcare issue. *International Journal of Molecular Sciences*, *26*(1), 123. https://doi.org/doi.org/10.3390/ijms26010123

Hamedani, M. A., Salar, A., & Kermansaravi, F. (2022). Effect of family-centered empowerment model on quality of life of patients with hypertension. *Medical-Surgical Nursing Journal*, *10*(1). https://doi.org/doi.org/10.5812/msnj.117259.

Hu, Y., Yang, Y., Gao, Y., Zhao, L., Chen, L., Sui, W., & Hu, J. (2024). The impact of chronic diseases on the health-related quality of life of middle-aged and older adults: the role of physical activity and degree of digitization. *BMC Public Health*, *24*(1), 2335. https://doi.org/10.1186/s12889-024-19833-8

Isnaini, N., Dewi, F. T., Madyaningrum, E., & Noviana, U. (2025). Family-Centered Education for Older Adults with Hypertension: A Scoping Review. *Iranian Journal of Public Health*, *54*(1), 36. https://doi.org/10.18502/ijph.v54i1.17573

Kario, K., Okura, A., Hoshide, S., & Mogi, M. (2024). The WHO Global report 2023 on hypertension warning the emerging hypertension burden in globe and its treatment strategy. *Hypertension Research*, *47*(5), 1099–1102. https://doi.org/doi.org/10.1038/s41440-024-01622-w

Li, Y., Jiang, M., Ren, X., Han, L., Zheng, X., & Wu, W. (2024). Hypertension combined with limitations in activities of daily living and the risk for cardiovascular disease. *BMC Geriatrics*, *24*(1), 225.

Lu, W., Yuan, J., Liu, Z., Su, Z.-H., Shen, Y.-C., Li, S., & Zhang, H. (2024). Worldwide trends in mortality for hypertensive heart disease from 1990 to 2019 with projection to 2034: data from the Global Burden of Disease 2019 study. *European Journal of Preventive Cardiology*, *31*(1), 23–37.

McCarthy, E., & Guerin, S. (2022). Family-centred care in early intervention: A systematic review of the processes and outcomes of family-centred care and impacting factors. *Child: Care, Health and Development*, *48*(1), 1–32. https://doi.org/https://doi.org/10.1111/cch.12901

Mohalli, F., Mahmoudirad, G. H., Alhani, F., Ebadinejad, Z., & Foroozanfar, H. (2021). The effect of family-centered empowerment model on the indicators of the ability of patients with hypertension. *IJNR*, *13*, 8–14. https://doi.org/10.21859/ijnr-130502

Nasution, N., & bin Sansuwito, T. (2024). Effectiveness of Family-Center Nursing to improve self-care and family health independence. *International Journal of Chemical and Biochemical Sciences*, *25*, 19. https://doi.org/# https://doi.org/10.62877/100-IJCBS-24-25-19-100

Ojangba, T., Boamah, S., Miao, Y., Guo, X., Fen, Y., Agboyibor, C., Yuan, J., & Dong, W. (2023). Comprehensive effects of lifestyle reform, adherence, and

related factors on hypertension control: A review. *The Journal of Clinical Hypertension*, *25*(6), 509–520.

Organization, W. H. (2023). *Global report on hypertension: the race against a silent killer*. World Health Organization.

Rabadia, J. P., Thite, V. S., Desai, B. K., Bera, R. G., & Patel, S. (2024). Cardiovascular System, Its Functions and Disorders. In *Cardioprotective Plants* (pp. 1–34). Springer.

Sekome, K., Gómez-Olivé, F. X., Sherar, L. B., Esliger, D. W., & Myezwa, H. (2024). Sociocultural perceptions of physical activity and dietary habits for hypertension control: voices from adults in a rural sub-district of South Africa. *BMC Public Health*, *24*(1), 2194.

Sugimoto, K., & Yamamoto, K. (2022). Hypertension, the decline of activities of daily living (ADL) and frailty. *Hypertension Research*, *45*(4), 629–634. https://doi.org/https://doi.org/10.1038/s41440-021-00846-4

Suprayitno, E., & Damayanti, C. N. (2020). Self Care Management of Hypertensive Patients in Pangarangan Village Sumenep City District, Sumenep Regency. *Proceedings of International Interdisciplinary Conference on Sustainable Development Goals (IICSDGs)*, *3*(1), 23–27.

Suprayitno, E., Yasin, Z., Karamah, I., & Puspitasari, D. I. (2021). Psychoeducation Reduces Anxiety In Elderly With Hypertension In Nambakor Village Saronggi District Sumenep. *Journal of Vocational Nursing*, *2*(2), 108–112. https://doi.org/10.20473/jovin.v2i2.30796

