**Poltekita: Jurnal Ilmu Kesehatan**
e-ISSN: 2527-7170 | p-ISSN: 1907-459X
Volume 20 Issue 1, 2026, page 96-105
DOI: 10.33860/jik.v20i1.4309
Website:https://ojs.polkespalupress.id/index.php/JIK
Publisher: Poltekkes Kemenkes Palu

**Original Research**

# Non-Communicable Disease Early Detection Among Older Adults in Gorontalo: Baseline Findings for a Family-Centered Nursing Digital System

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**ARTICLE INFO**

**Article History:**
**Received:** 2025-11-12
**Published:** 2026-03-31

**Keywords:**

Non-Communicable Diseases; Elderly; Family Centered Nursing; Early Detection; Digital Technology;

**ABSTRACT**

**Background**: Non-Communicable Diseases are a major health concern among the elderly, especially in developing regions such as Gorontalo, Indonesia. Early detection and continuous monitoring are often limited due to low health literacy, inadequate family involvement, and limited access to healthcare services. To address these challenges, the development of a Family Centered Nursing based digital system is proposed as an innovative approach to empower families in managing elderly health. This system aims to integrate digital health monitoring, family education, and early warning features to support preventive care and reduce complications among the elderly.
**Methods**: A descriptive quantitative design was used, involving 125 elderly respondents and their families selected through purposive sampling. Data were collected using a structured questionnaire on non-communicable disease status and components of Family Centered Care, then analyzed using descriptive statistics.
**Results**: The study findings indicate a high proportion of participants who screened positive for NCD indicators based on the early-detection checklist, with 114 of 125 (91.2%) classified as NCD-positive. Regarding Family-Centered Nursing (FCN), most families demonstrated low involvement, with 101 (80.8%) categorized as low and 24 (19.2%) categorized as high. These results suggest that family participation in older adults' health monitoring and early detection remains limited, highlighting the need to strengthen family engagement and awareness to support preventive health behaviors and improve well-being and quality of life.
**Conclusion**: This study highlights the importance of developing family-based digital systems to improve family involvement, health literacy, and disease prevention among older adults. The integration of digital tools such as health apps for early detection of NCDs can strengthen the role of families in supporting early detection, prevention, and management of noncommunicable diseases in older adults. By empowering families through accessible technology and tailored health information, this system can encourage continuous monitoring, timely intervention, and adherence to preventive practices.

## INTRODUCTION

Non-communicable diseases (NCDs) such as hypertension, diabetes mellitus, and heart disease remain among the greatest challenges in global health care. Older adults are particularly vulnerable because physiological changes associated with aging increase susceptibility to chronic conditions and their complications (Preston & Biddell, 2021). When not detected and managed early, NCDs can reduce quality of life, increase dependency, and add a substantial economic burden to both families and health systems (Ben Olina et al., 2024; Mullins et al., 2022). Global reports frequently cited in the literature indicate that NCDs contribute to the majority of deaths worldwide, with older adults facing higher risks of complications and adverse outcomes (Arifin et al., 2022; Mendis et al., 2024; Sharma et al., 2025).

In Indonesia, the prevalence of NCDs among older adults continues to rise, yet many cases are identified only at advanced stages when complications have already occurred (Yuyun Rahayu Fitri et al., 2025). Late detection increases treatment costs, extends the duration of care, and heightens the risk of disability and mortality (Anggraini & Setyaningrum, 2023). These patterns highlight persistent gaps in routine screening, symptom recognition, and sustained monitoring, particularly at the household and community levels.

This challenge is also evident in Gorontalo Province. Preliminary reports suggest a high proportion of older adults in Gorontalo live with NCDs (Ento et al., 2025; Mohi et al., 2023). The burden is often concentrated among women aged 60–74 years, with low educational attainment and not working (Siahaan et al., 2023). Such demographic and socio-economic conditions can create "double vulnerability," in which limited health literacy, reduced access, and constrained family resources jointly contribute to low awareness and limited family involvement in early detection (Anisa & Juliannisa, 2022; Nurwati & Listari, 2021). Low health literacy may prevent families from understanding the importance of routine health checks and early warning signs (Morimoto et al., 2022), while economic constraints can limit access to formal health services (Shahid et al., 2022). As a result, older adults often seek care when symptoms are severe, shifting health services toward treatment rather than prevention (Coughlin et al., 2020).

Community-based early detection efforts through elderly health posts and primary services are ongoing; however, obstacles remain, including limited health workers, inconsistent education, and low utilization of health technology at the family level (Lusi et al., 2024; Rohalia & Sukmana, 2024). The Family-Centered Nursing (FCN) approach—positioning families at the forefront of supporting older adults' health—has been shown to improve care quality and engagement (Seniwati et al., 2023; Yusuf et al., 2024). Nevertheless, FCN implementation in Gorontalo is still limited, partly due to the lack of practical, digital innovations that can assist families in daily monitoring and timely decision-making.

The contribution of this study is to position FCN as a guiding framework for the planned development of a digital early detection and monitoring tool that is responsive to the socio-economic context of older adults in Gorontalo. Rather than evaluating a finalized application, this research provides baseline evidence on NCD burden, symptom knowledge, and family involvement—key determinants that can inform design requirements, contents, and workflow of a future family-centered digital solution (Seniwati et al., 2023; Yusuf et al., 2024). In line with the growing opportunity of digital health to bridge service gaps, especially at the household level, the proposed direction emphasizes feasibility and usability for families, such as simple symptom logging, reminders for routine checks, and accessible health education, with potential alignment to primary care and community-based services.

This study aims to describe the self-reported prevalence of NCDs among older adults in Gorontalo, levels of NCD-related symptom knowledge, and the extent of family involvement in early detection and routine monitoring, as a basis for designing a family-centered nursing–based digital screening/monitoring tool.

## METHODS

### Study design

This study employed a quantitative descriptive design using a survey approach. This design was selected to objectively describe respondent characteristics, the health conditions of older adults, and the level of family involvement in care using a Family-Centered Nursing (FCN) approach (Chairil & Rambe, 2022). The study focused on baseline profiling to support the planned development of an FCN-based digital application for early detection and monitoring of non-communicable diseases (NCDs) among older adults.

### Setting and study period

The study was conducted in Mongolato Village, Telaga District, Gorontalo Regency, Gorontalo Province, Indonesia, a rural setting. Data collection took place from August to October 2025. Recruitment was carried out through the Posyandu Lansia (elderly health post) during routine community health activities.

### Participants, eligibility, and sampling

The target population comprised community-dwelling adults aged ≥45 years living with their families in Gorontalo Regency. Participants were eligible if they: (1) were ≥45 years old, (2) lived with at least one family member in the same household, and (3) agreed to participate after receiving study information and providing written informed consent. Individuals were excluded if they were unable to complete the interview due to severe cognitive impairment, acute illness, or communication limitations at the time of data collection.

Although many studies define "older adults" at ≥60 or ≥65 years, this study intentionally included individuals aged 45–59 years as a pre-elderly (middle-aged) group. The rationale was prevention-oriented: NCD risk factors and early symptoms often begin to emerge during midlife, and strengthening FCN-related family involvement and early detection practices during this period may reduce complications in later life. Therefore, findings were described using three age strata: 45–59 years (middle-aged/pre-elderly; n = 54), 60–74 years (elderly; n = 63), and >75 years (older elderly; n = 8).

A purposive sampling strategy was used. Potential participants were approached when they attended Posyandu Lansia sessions; those who met the inclusion criteria were invited to participate. A total of 125 participants were enrolled (n = 125). Because the primary purpose was descriptive baseline profiling to inform system design, a formal power calculation was not applied. The sample size was determined pragmatically based on feasibility and the availability of eligible participants attending the Posyandu during the data collection period. Thus, this study should be interpreted as a descriptive/pilot study intended to generate initial design inputs rather than to test causal hypotheses.

For coordination and contextual understanding of the local elderly program implementation, the researchers communicated with the Head of the Community Health Center (Puskesmas) and the nurse responsible for the elderly program to facilitate field coordination; however, they were not included as respondents in the quantitative survey analysis.

### Instrument and measures

Data were collected using a structured questionnaire validated by community nursing experts. The instrument consisted of three main sections:

1. Demographic characteristics: sex and age.
2. Socioeconomic characteristics: highest education level and employment status.
3. Health and FCN-related family involvement variables:
    - NCD status (hypertension, diabetes mellitus, and heart disease) assessed using 10 items related to the presence of NCD conditions and/or indicators captured in the questionnaire.
    - Family involvement based on FCN principles in prevention, routine monitoring, and early detection assessed using 8 items (e.g., support for healthy lifestyle,

encouragement of routine checks, symptom recognition, and assistance in seeking care).

For descriptive categorization, scores were classified using a 50% cut-off: values ≥50% were categorized as high/present, and values <50% as low/absent, consistent with the study's descriptive purpose. The questionnaire used simple language to facilitate comprehension among respondents with low educational attainment.

**Data collection procedures**

Data collection was conducted in several stages. First, the researchers performed a literature review and developed the instrument. Second, the questionnaire was piloted to ensure clarity and comprehensibility. Third, data were collected through surveys and structured interviews with eligible participants attending Posyandu Lansia sessions. The questionnaire was completed by the eligible participant, assisted by a family member who accompanied the participant to the Posyandu when needed (e.g., for clarification or reading support). Fourth, responses were coded and entered into statistical software for analysis.

**Data analysis**

Data were analyzed using descriptive quantitative analysis. Frequencies and percentages were calculated for each variable (sex, age category, education level, employment status, NCD status, and FCN-related family involvement status). Results were presented in frequency distribution tables and bar graphs to facilitate interpretation.

**Ethics approval and informed consent**

This study received an Ethical Exemption from the Health Research Ethics Committee (Komite Etik Penelitian Kesehatan/KEPK), Faculty of Health Sciences, Universitas Muhammadiyah Gorontalo (KEPK FIKES UMGO) (No. 047/KEPK-FIKES/X/2025). The exemption letter was issued on July 16, 2025 and is valid until July 16, 2026. The protocol was proposed by Dr. Rosmin Ilham, S.Kep., Ns., MM (principal investigator) entitled *"Early detection of non-communicable diseases in the elderly through a family-centred nursing approach"*. The protocol was declared ethically appropriate in accordance with the seven WHO 2011 standards (social value, scientific value, equitable assessment of burdens and benefits, risk–benefit assessment, persuasion/exploitation, confidentiality and privacy, and informed consent), referring to the 2016 CIOMS Guidelines.

Participation was voluntary. Prior to data collection, participants received an explanation of the study objectives, procedures, potential benefits, and minimal risks and provided written informed consent. Confidentiality was maintained by using codes/initials instead of names, restricting access to the dataset to the research team, and using the data solely for research purposes. Participants could decline participation or withdraw at any time without any consequences.

**RESULTS**

**Table 1. Respondent Statistics**

| Variables | n | % |
|---|---|---|
| **Type Gender** | | |
| Male | 21 | 16.8 |
| Female | 104 | 83.2 |
| **Age** | | |
| Middle aged (45-59) | 54 | 43.2 |
| Elderly (60-74) | 63 | 50,4 |
| Older elderly (>75) | 8 | 6.4 |
| **Education** | | |
| Elementary School | 80 | 64,1 |
| Junior High School | 22 | 17.6 |
| High School | 21 | 16.8 |

| Variables | n | % |
|---|---|---|
| Bachelor's/Associate's Degree | 2 | 1.6 |
| **Occupation** | | |
| Not Working | 110 | 88% |
| Working | 15 | 12% |

Table 1 illustrates the distribution of key demographic and health-related characteristics among the elderly respondents in this study. Of the 125 survey respondents, the demographic characteristics and health status were recorded as follows. Most respondents were female (n = 104; 83.2%), while only 21 were male (16.8%). The age distribution showed that the majority were elderly (60–74 years; n = 63; 50.4%), followed by pre-elderly 45–59 (n = 54; 43.2%), and elderly ≥75 years (n = 8; 6.4%). The educational level was dominated by elementary school graduates (SD) with 80 people (64.1%), followed by junior high school (SMP) with 22 (17.6%), senior high school (SMA) with 21 (16.8%), and only 2 people (1.6%) with a D3/S1 degree. Most respondents were unemployed (n = 110; 88.0%), and only 15 (12.0%) were employed.

**Table 2. Univariate Analysis Based on Early Detection Status of Non-Communicable Diseases (NCDs) and Family-Centered Care**

| Variables | n | % |
|---|---|---|
| **NCD Status** | | |
| No NCD | 11 | 8.8 |
| There is NCD | 114 | 91.2 |
| **Family Centered Nursing** | | |
| High | 24 | 19.2 |
| Low | 101 | 80.8 |

Table 2 presents the results of the early-detection checklist classification for NCD indicators and the level of Family-Centered Nursing (FCN) involvement among participants in Gorontalo. Based on the checklist classification, 114 respondents (91.2%) were categorized as NCD-positive (screen-positive), while 11 respondents (8.8%) were categorized as NCD-negative (screen-negative) (N = 125). Importantly, this figure represents screening/early-detection classification derived from questionnaire responses, rather than clinically confirmed medical diagnoses. The high proportion of screen-positive participants suggests substantial needs for strengthening early detection and routine monitoring at the household and community levels.

Regarding FCN involvement, only 24 respondents (19.2%) were categorized as having high family involvement, whereas the majority, 101 respondents (80.8%), were categorized as low. These findings indicate that family engagement in older adults' health monitoring and early detection remains limited. While family members may accompany older adults to community health activities, their involvement in routine monitoring and preventive practices at home appears insufficient, underscoring the importance of strategies to enhance family participation and support.

**Table 3. Distribution of respondents' answers regarding non-communicable diseases and family-centered nursing**

| Statement | Yes | | No | |
|---|---|---|---|---|
| | n | % | n | % |
| **Early Detection of Non-Communicable Diseases (NCDs) among the Elderly** | | | | |
| 1. I know that early-stage hypertension often shows no symptoms. | 87 | 69.6 | 38 | 30.4 |
| 2. I know that headaches and dizziness can be symptoms of advanced hypertension. | 88 | 70.4 | 37 | 29.6 |
| 3. I know that excessive thirst and frequent urination are symptoms of diabetes. | 36 | 28.8 | 89 | 71.2 |
| 4. I understand that fatigue and unexplained weight loss can indicate diabetes. | 34 | 27.2 | 91 | 72.8 |

| | Statement | Yes | | No | |
|---|---|---|---|---|---|
| | | n | % | n | % |
| 5. | I know that chest pain and shortness of breath can be symptoms of heart disease. | 33 | 26.4 | 91 | 73.6 |
| 6. | I understand that fatigue and swelling in the legs or hands can be signs of heart disease. | 28 | 22.4 | 97 | 77.6 |
| 7. | I know that chronic cough and shortness of breath are symptoms of lung disease. | 8 | 6.4 | 117 | 93.6 |
| 8. | I understand that excessive mucus production and fatigue may indicate lung problems. | 8 | 6.4 | 117 | 93.6 |
| 9. | I know that joint pain, swelling, and redness are symptoms of gout. | 12 | 9.6 | 113 | 90.4 |
| 10. | I understand that early detection of these symptoms can help prevent complications. | 107 | 85.6 | 18 | 14.4 |
| | **Family-Centered Nursing (Role of Family in Elderly Care)** | | | | |
| 11. | The family is involved in decisions related to the elderly's examination or treatment. | 69 | 55.2 | 56 | 44.8 |
| 12. | The nurse clearly explains the elderly's health condition to the family. | 122 | 97.6 | 3 | 2.4 |
| 13. | The family feels adequately equipped with knowledge from health workers to care for the elderly at home. | 17 | 13.6 | 108 | 86.4 |
| 14. | The family collaborates with the nurse in planning elderly care. | 1 | 0.8 | 124 | 99.2 |
| 15. | The family regularly monitors the elderly's blood pressure or blood sugar at home. | 10 | 8.0 | 115 | 92.0 |
| 16. | The family reminds the elderly to exercise regularly. | 12 | 9.6 | 113 | 90.4 |
| 17. | The family always accompanies the elderly to health facilities for treatment. | 89 | 71.2 | 36 | 28.8 |
| 18. | The family is sensitive to signs such as frequent dizziness, weakness, or excessive thirst in the elderly. | 60 | 48.1 | 65 | 52.1 |

Table 3 shows the distribution of respondents' answers regarding early detection of non-communicable diseases (NCDs) and the implementation of family-centered care among the elderly in Gorontalo. The findings show that the majority of respondents (69.6%–70.4%) are aware that early-stage hypertension often shows no symptoms and that headaches or dizziness can indicate severe hypertension. However, knowledge about other NCDs such as diabetes, heart disease, and lung disease is relatively low, with only 22.4%–28.8% recognizing common symptoms. This indicates that awareness of NCDs among older adults and their families is still limited to certain conditions, highlighting the need for more comprehensive education and prevention efforts. In terms of Family-Centered Care, the findings show that although most families (97.6%) reported that nurses explained the health conditions of older adults clearly, the level of family involvement in overall care remained low. Only 13.6% of families felt sufficiently equipped with knowledge to care for the elderly at home, and only 8%–10% routinely monitored the elderly's blood pressure, blood sugar, or encouraged regular exercise. Meanwhile, 71.2% of families accompanied the elderly to health facilities, indicating strong emotional involvement but limited participation in daily health maintenance activities. These results highlight the importance of developing a digital-based Family-Based Care system to enhance the role of families in the early detection, monitoring, and management of non-communicable diseases (NCDs) in the elderly. By integrating digital health technology, families can receive real-time guidance, health education, and reminders to actively participate in maintaining the health of the elderly. Such innovations are expected to strengthen family empowerment and improve the effectiveness of preventive care for the elderly population in Gorontalo.

## DISCUSSION

This study provides baseline evidence on (1) NCD early-detection screening classification and (2) Family-Centered Nursing (FCN) involvement among community-dwelling adults aged ≥45 years in a rural area of Gorontalo Regency. The findings indicate that a high proportion of participants were classified as NCD-positive based on the early-detection checklist, while FCN involvement was predominantly low. These patterns suggest an important gap between health needs and family engagement in routine monitoring and early detection activities. However, because the study is descriptive and cross-sectional, the findings should be interpreted as patterns and potential associations, rather than causal relationships.

The high proportion of participants classified as NCD-positive is consistent with concerns about chronic disease burden among older populations and the potential for late recognition of symptoms and risks (Arifin et al., 2022; Mendis et al., 2024; Sharma et al., 2025). In Gorontalo, previous reports also describe a substantial NCD burden among older adults and highlight demographic and socio-economic vulnerabilities that may influence awareness and prevention behaviors (Ento et al., 2025; Mohi et al., 2023; Siahaan et al., 2023). In the present study, low FCN involvement may reflect barriers commonly linked to limited health literacy and constrained resources, which can reduce families' capacity to support routine checks and early detection at home (Anisa & Juliannisa, 2022; Morimoto et al., 2022; Nurwati & Listari, 2021; Shahid et al., 2022). Importantly, these interpretations remain tentative; the data do not establish whether low family involvement leads to worse health status or vice versa.

### Alternative explanations for the high NCD-positive proportion

Several methodological factors may help explain why the NCD-positive proportion appears very high. First, selection bias is plausible due to purposive sampling and recruitment through Posyandu Lansia. Individuals who attend community health posts may be more likely to have existing health concerns, seek monitoring, or be encouraged by family members to participate, which can over-represent those with health problems compared with the general community.

Second, the measurement method can influence the estimate. In this study, NCD status was based on an early-detection checklist classification derived from questionnaire responses, rather than objective clinical measurements or verified medical records. This approach is useful for screening and design inputs, but it does not provide clinically confirmed prevalence. Differences between screening classification and medical diagnoses may inflate or otherwise alter the observed proportion.

Third, the lower age cut-off (≥45 years) changes the structure of the sample by including a pre-elderly (45–59 years) group. Midlife adults may already experience risk factors and early symptoms, but combining age strata without careful interpretation could distort comparisons with studies that define "older adults" at ≥60 or ≥65 years. To address this, results should be interpreted with age stratification (45–59; 60–74; >75), and future studies may consider probability sampling or age-standardized comparisons.

### FCN involvement and implications for early detection

The predominance of low FCN involvement suggests that routine preventive practices may not yet be embedded at the household level. Families may accompany older adults to services but still face barriers to consistent monitoring, symptom recognition, and timely decision-making at home. This aligns with literature emphasizing that family engagement is central to supporting older adults' health, and FCN approaches may strengthen continuity of care when families are equipped with practical guidance and support (Seniwati et al., 2023; Yusuf et al., 2024). Nevertheless, given the descriptive nature of this study, FCN should be framed as a promising direction rather than a proven solution in this specific setting.

### Feasibility considerations for an FCN-based digital application

The findings support the need to explore a digital tool, but feasibility must be considered carefully in this rural population. Many participants and caregivers may have limited literacy, and

caregivers' age and technology familiarity may vary. Technology access (smartphone availability, internet stability, data costs) can also influence uptake. Therefore, an FCN-based digital application should prioritize simple language, visual cues, and low-burden workflows (e.g., checklists with icons, short prompts, and reminders). Offline or low-data functionality and short training sessions delivered through Posyandu Lansia can improve usability. Integration with the local health system is also critical: the application should align with existing workflows in Posyandu Lansia and Puskesmas, enabling families to receive consistent guidance and facilitating referral or follow-up when warning signs are detected. These considerations reinforce that the present study should be viewed as baseline needs assessment informing design requirements, rather than evidence of effectiveness.

**Study limitations**

This study has several limitations that should be considered when interpreting the findings. The cross-sectional design prevents establishing causality or directionality between NCD classification and FCN involvement. The small, purposive sample from a single rural Posyandu Lansia limits generalizability and may introduce selection bias. Additionally, NCD status was based on self-reported data without objective clinical measurements, which may lead to misclassification. The ≥50% cut-off used for categorization may be arbitrary and influence the results. There is also potential for information and social desirability bias, as participants may overreport knowledge or involvement. Furthermore, the study lacks detailed clinical indicators such as blood pressure or glucose levels. Therefore, the findings should be considered preliminary, and further research with larger, representative samples and objective measures is needed.

## CONCLUSION

This descriptive baseline study indicates a high proportion of participants classified as NCD-positive based on the early-detection checklist and a predominance of low Family-Centered Nursing (FCN) involvement in routine monitoring and early detection. These findings suggest a gap between health needs and family engagement, supporting the rationale for developing a family-centered digital tool to facilitate symptom monitoring, reminders for routine checks, and accessible health education at the household level, with linkage to community-based services.

Next steps should include (1) prototype development guided by the needs identified in this study, (2) usability and acceptability testing with the target users (older adults, family caregivers, and local health workers), and (3) pilot evaluation using a randomized or quasi-experimental design to assess feasibility, engagement, and preliminary effectiveness before wider implementation.

**Author's Contribution Statement: Rosmin Ilham:** Conceptualization, Writing – Original Draft. **Rizal Lamusu:** Methodology, Software. **Mohamad Ilyas Abas:** Software, Validation. **Rona Febriona:** Investigation, Supervision, Writing – Review & Editing.

**Conflicts of Interest:** The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

**Source of Funding Statements:** This work was supported by an institutional research grant scheme (Contract/Grant No. 137/C3/DT.05.00/PL/2025). The funding agency had no role in the study design, data collection and analysis, interpretation of results, decision to publish, or manuscript preparation.

**Acknowledgments:** The authors thank the Department of Nursing and the Institute for Research and Community Service (LP2M), Universitas Muhammadiyah Gorontalo, for institutional and technical support. The authors also express their sincere appreciation to the older adult participants and their family members in Mongolato Village, Telaga District, Gorontalo Regency (rural setting) for their time, cooperation, and willingness to participate. We also thank the village authorities and community leaders for their assistance in facilitating coordination during the fieldwork and data collection.

## REFERENCES


Anggraini, K., & Setyaningrum, D. A. W. (2023). Deteksi Dini Faktor Risko Penyakit Tidak Menular (PTM) pada Lansia Duri Pulo Jakarta Pusat. Inovasi Jurnal Pengabdian Masyarakat, 1(2), 57–62. https://doi.org/10.54082/ijpm.119

Anisa, R., & Juliannisa, I. A. (2022). Pengaruh Faktor Sosial Ekonomi Terhadap Partisipasi Dalam Program Keluarga Berencana Di Kota Bekasi. Ikraith-Ekonomika, 5(3), 168–179. https://doi.org/10.37817/ikraith-ekonomika.v5i3.2452

Arifin, H., Chou, K. R., Ibrahim, K., Fitri, S. U. R., Pradipta, R. O., Rias, Y. A., Sitorus, N., Wiratama, B. S., Setiawan, A., Setyowati, S., Kuswanto, H., Mediarti, D., Rosnani, R., Sulistini, R., & Pahria, T. (2022). Analysis of Modifiable, Non-Modifiable, and Physiological Risk Factors of Non-Communicable Diseases in Indonesia: Evidence from the 2018 Indonesian Basic Health Research. Journal of Multidisciplinary Healthcare, 15(September), 2203–2221. https://doi.org/10.2147/JMDH.S382191

Ben Olina, Y., Ernawati, Aisah, S., Setyawati, D., Shofyan Baidhowy, A., Nurkharistna Al Jihad, M., & Arifianto, N. (2024). Meningkatkan kesadaran hidup sehat melalui skrining deteksi dini penyakit tidak menular di lingkungan Universitas Muhammadiyah Semarang. SALUTA: Jurnal Pengabdian Kepada Masyarakat, 4(1),26-32. https://doi.org/10.26714/sjpkm.v4i1.16404

Chairil, & Rambe, I. W. U. (2022). Tingkat Kepuasan Lansia Tentang Pelayanan Kesehatan di Panti Khusnul Khotimah Pekanbaru. Photon: Jurnal Sain Dan Kesehatan, 12(2), 76– 84. https://doi.org/10.37859/jp.v12i2.3446

Coughlin, S. S., Vernon, M., Hatzigeorgiou, C., & George, V. (2020). Health Literacy, Social Determinants of Health, and Disease Prevention and Control. Journal of Environment and Health Sciences, 6(1). https://pmc.ncbi.nlm.nih.gov/articles/PMC7889072/

Ento, M. N. H., Djamaluddin, N., Antu, M. S., & Dumar, B. (2025). Hubungan Tingkat Kecemasan Dengan Tekanan Darah Pada Penderita Hipertensi Di Puskesmas Kabila The Relationship Between Anxiety Levels and Blood Pressure in Hypertension Patients at the Kabila Community Health Center. 8(8), 5239–5249. https://doi.org/10.56338/jks.v8i8.8452

Lusi, B., Musa, D. T., Apriyani, E., Reza, L., & Vera, J. (2024). Efektivitas Program Posyandu Lansia dalam Meningkatkan Kesejahteraan Lansia di Desa Pak Laheng Kecamatan Toho. Jurnal Intervensi Sosial Dan Pembangunan (JISP), 5(2), 162–178. https://doi.org/10.30596/jisp.v5i2.19519

Mendis, S., Graham, I., Hammerich, A., Mikkelsen, B., Kavousi, M., Pathirana, R., Zheleznyakov, E., & Narula, J. (2024). Promoting Global Cardiovascular Health to Advance the Sustainable Development Agenda. JACC: Advances, 3(12, Part 2), 101388. https://doi.org/10.1016/j.jacadv.2024.101388

Mohi, N. Y., Irwan, I., & Ahmad, Z. F. (2023). Faktor - Faktor Yang Berhubungan Dengan Kejadian Hipertensi Pada Lansia Di Wilayah Kerja Puskesmas Wonggarasi I. Journal Health & Science : Gorontalo Journal Health and Science Community, 8(1), 1–13. https://doi.org/10.35971/gojhes.v8i1.21060

Morimoto, A., Koh, C., Yasumoto, R., Furuki, H., Watanabe, K., Tsuzuki, C., & Sonoda, N. (2022). Relationship between communicative and critical health literacy, health information sources, and participation in health checkups among middle-aged Japanese community residents. Preventive Medicine, 161, 107112. https://doi.org/10.1016/j.ypmed.2022.107112

Mullins, S., Hosseini, F., Gibson, W., & Thake, M. (2022). Physiological changes from ageing regarding pain perception and its impact on pain management for older adults. Clinical Medicine (London, England), 22(4), 307–310. https://doi.org/10.7861/clinmed.22.4.phys

Nurwati, R. N., & Listari, Z. P. (2021). Pengaruh Status Sosial Ekonomi Keluarga Terhadap Pemenuhan Kebutuhan Pendidikan Anak. Share : Social Work Journal, 11(1), 74. https://doi.org/10.24198/share.v11i1.33642

Preston, J., & Biddell, B. (2021). The physiology of ageing and how these changes affect older people. Medicine, 49(1), 1–5. https://doi.org/10.1016/j.mpmed.2020.10.011

Rohalia, A, & Sukmana, H. (2024). Efektivitas Program Posyandu Cempaka Dalam Penurunan Stunting di Desa Tambak Kalisogo. Journal Publicuho, 7(3), 1427–1442. https://doi.org/10.21070/ups.4112

Seniwati, T., Wanda, D., & Nurhaeni, N. (2023). Effects of Patient and Family-Centered Care on Quality of Care in Pediatric Patients: A Systematic Review. Nurse Media Journal of Nursing, 13(1), 68–84. https://doi.org/10.14710/nmjn.v13i1.48114

Shahid, R., Shoker, M., Chu, L. M., Frehlick, R., Ward, H., & Pahwa, P. (2022). Impact of low health literacy on patients' health outcomes: a multicenter cohort study. BMC Health Services Research, 22(1), 1148. https://doi.org/10.1186/s12913-022-08527-9

Sharma, M., Akhter, M. S., Roy, S., & Srejon, R. (2025). Future Issues in Global Health: Challenges and Conundrums. International Journal of Environmental Research and Public Health, 22(3), 1–19. https://doi.org/10.3390/ijerph22030325

Siahaan, J. M., Manurung, K., & Turisna, Y. O. (2023). Hubungan Karakteristik Lanjut Usia Dengan Activity of Daily Living Di Desa Silantomjulu. Jurnal Online Keperawatan Indonesia, 6(1), 53–65. https://doi.org/10.51544/keperawatan.v6i1.4314.

Yusuf, A., Purba, J. M., Putri, D. E., Aditya, R. S., Alruwaili, A. S., & AlRazeeni, D. M. (2024). Family-Centered Care Experiences in Elderly with Chronic Diseases in Communities: Qualitative Study of Patients, Families, Nurses, and Volunteers. Health Equity, 8(1), 338–350. https://doi.org/10.1089/heq.2024.0009

Yuyun Rahayu Fitri, S., Ulfah Rifa, S., Fitri, atul, & Nurhamsyah. (2025). Pendidikan Kesehatan tentang Pencegahan Penyakit Tidak Menular pada Lansia. Media Karya Kesehatan, 8(1), 136–147. https://jurnal.unpad.ac.id/mkk/article/download/59663/25484.