International Journal of Public Health Science (IJPHS)
Vol. 15, No. 3, September 2026, pp. 678~686
ISSN: 2252-8806, DOI: 10.11591/ijphs.v15i3.27094

Health locus of control and health behaviour in Minangkabau metabolic disorder patients

Rida Yanna Primanita, Alfian Yanda Putra, Puput Nofia Rahma
Department of Psychology, Faculty of Psychology and Health, Universitas Negeri Padang, Padang, Indonesia

Article Info

Article history:

Received Mar 20, 2026
Revised Jun 24, 2026
Accepted Jul 12, 2026

Keywords:

Collectivistic culture
Health behaviour
Health locus of control
Metabolic disorders
Minangkabau

ABSTRACT

Metabolic disorders require sustained health behaviors, yet the psychological predictors of such behaviors may operate differently across cultures. This cross-sectional study examined whether health locus of control (HLOC) predicts multidimensional health behavior among Minangkabau adults with self-reported metabolic disorders in West Sumatra, Riau, and Jambi. A total of 274 participants completed multidimensional HLOC and health behavior scales. Reliability testing, descriptive statistics, Pearson correlations, multiple linear regression, and one-way ANOVA based on dominant HLOC type were conducted. Internal and powerful-others HLOC positively predicted total health behavior, whereas chance HLOC was not significant; however, the overall explanatory power was small ($R^2 = 0.048$). Health behavior did not differ meaningfully across dominant HLOC types, with very small effect sizes across diet, sleep, smoking, risky beverage consumption, and exercise ($\eta^2 < 0.02$). These findings suggest that in a collectivistic Minangkabau context, health behavior may be shaped not only by personal control beliefs but also by family, authority, and community norms. The cross-sectional design and self-reported diagnoses limit causal and clinical inference. Family-based education, community leader involvement, and culturally adapted health campaigns are recommended.

This is an open access article under the CC BY-SA license.

Corresponding Author:

Rida Yanna Primanita
Department of Psychology, Faculty of Psychology and Health, Universitas Negeri Padang
Padang, West Sumatra, Indonesia
Email: yannaprimanita@fip.unp.ac.id

1. INTRODUCTION

Metabolic disorders, including diabetes mellitus, hypertension, hypercholesterolemia, and overweight, remain major public health challenges because they are closely linked to noncommunicable disease morbidity, premature mortality, and long-term disability [1]. The Indonesia Health Survey (*Survei Kesehatan Indonesia*) 2023 shows that noncommunicable disease indicators, behavioral risk factors, and cardiometabolic measurements continue to be key public health concerns at the national level [2]. Hypertension and diabetes also require sustained lifestyle management because control depends not only on medication but also on repeated everyday behaviors such as diet, physical activity, sleep, smoking control, and adherence to health advice [3], [4]. For patients with metabolic disorders, therefore, health behavior is not simply a preventive choice but a continuing element of disease management.

One psychological concept commonly applied to understand health behavior is the health locus of control (HLOC). This construct is derived from Rotter's social learning theory, which suggests that people vary in their general expectations about whether outcomes are determined by their own actions or by external influences [5]. Wallston and colleagues later expanded this concept by developing a multidimensional model of HLOC, which differentiates three dimensions: internal, powerful-others, and chance HLOC [6], [7]. The

internal dimension reflects the perception that health outcomes are primarily shaped by an individual's own actions and behaviors. The powerful-others dimension refers to the belief that health is influenced by external agents such as physicians, family members, or other significant people. Meanwhile, the chance dimension describes the view that health is largely determined by fate, luck, or other uncontrollable circumstances [8].

Previous work has often treated internal HLOC as a protective orientation. Meta-analytic evidence indicates that HLOC is associated with specific health behaviors, although the magnitude and direction of association vary by behavior and population [9]. Studies on medication adherence and chronic disease self-management further show that control beliefs may relate to adherence, empowerment, and self-efficacy [10], [11]. However, these findings do not necessarily imply that internal HLOC is uniformly strong or universally protective across cultural settings. The theoretical assumption that personal control directly promotes healthier behavior may fit best in social contexts where individual agency is culturally emphasized.

Culture is therefore a critical issue. In individualistic cultures, autonomy and independent self-construal are central values, whereas in collectivistic cultures behavior is often regulated through relational obligation, family expectations, social norms, and respect for authority [12]-[14]. Social support itself is also culturally patterned; in some Asian contexts, implicit support, relational harmony, and socially embedded decision-making may be more salient than explicit individual assertion [15]. Cross-cultural research on perceived control suggests that the meaning and adaptiveness of control beliefs vary across cultural regions [16]. These findings imply that powerful-others HLOC should not automatically be interpreted as dependency or passivity in collectivistic societies.

The present study focuses on Minangkabau adults with metabolic disorders. Minangkabau society is known for a matrilineal kinship system and strong adat, religious, and communal structures [17]-[19]. Health decisions may therefore involve family members, customary expectations, religious considerations, and community figures. Indonesian health practices more broadly have also been discussed as being shaped by cultural meanings, religiosity, and social relationships. In such a context, personal control beliefs may remain relevant, but health behavior may also be guided by socially shared norms and collective regulation.

Several unresolved problems remain. First, most studies do not test whether internal HLOC maintains the same protective function in collectivistic populations with chronic metabolic conditions. Second, powerful-others HLOC is often interpreted through an individualistic lens, although in communal cultures it may represent relational embeddedness and norm-based support. Third, few studies examine HLOC alongside multiple behavioral domains rather than a single outcome. Fourth, previous studies rarely position culture as a boundary condition that may limit or reshape the predictive strength of personal control beliefs.

To address these gaps, this study examines the relationship between three HLOC dimensions and multidimensional health behavior among Minangkabau adults with metabolic disorders. This study makes three main contributions to the existing literature. First, it tests whether internal HLOC retains a protective association in a collectivistic context. Second, it evaluates whether powerful-others HLOC shows a neutral or positive pattern rather than a maladaptive one. Third, it interprets the magnitude of association and group differences to determine whether HLOC is a dominant predictor or only a limited component within a broader socio-cultural system.

The conceptual framework is shown in Figure 1. HLOC dimensions are expected to relate to health behavior, but the Minangkabau collectivistic context is treated as a boundary condition that may shape the strength and meaning of this relationship. The following sections demonstrate this framework through a cross-sectional correlational design, reliability assessment, regression testing, ANOVA based on dominant HLOC type, and discussion of theoretical and practical implications.

The hypotheses were as follows: H1, proposes that internal HLOC has a positive association with multidimensional health behavior; H2, powerful-others HLOC shows a neutral or positive association with health behavior in a collectivistic cultural context; H3, chance HLOC is negatively or non-significantly associated with health behavior; and H4, differences in health behavior across dominant HLOC types are not expected to be large, reflecting the possibility that social regulation may be more influential than individual control beliefs alone.

2. METHOD

2.1. Research design

This study employed a quantitative cross-sectional design with an explanatory correlational approach. The design was chosen because the main objective of the study was to investigate associations between HLOC dimensions and health behavior at a single time point, rather than to determine causal relationships. The reporting structure was aligned with the logic of observational study reporting, in which the population, variables, instruments, procedure, and analysis are described sufficiently to allow replication [20].

2.2. Conceptual and analytic framework

The analytic framework consisted of three predictor variables and one multidimensional outcome variable. The predictors were chance HLOC, powerful-others HLOC, and internal HLOC. The outcome was total health behavior, calculated from five behavioral domains: diet, sleep, smoking, risky beverage consumption, and exercise. Culture was not entered as a measured statistical variable because all participants were selected from the Minangkabau collectivistic context; instead, it was used as the interpretive boundary condition for evaluating the meaning and magnitude of the statistical relationships. Figure 1 presents the conceptual framework guiding the analysis. Culture in this figure is interpreted as a boundary condition for the HLOC-health behavior relationship.

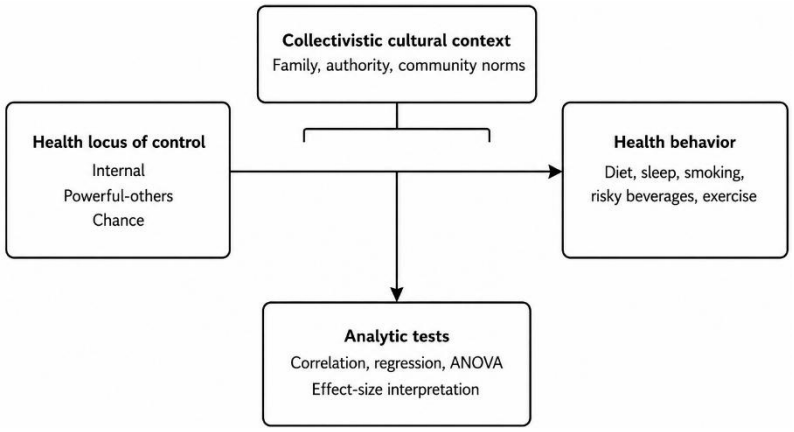

Figure 1. Conceptual framework showing the association between HLOC and multidimensional health behavior in a collectivistic cultural setting

2.3. Participants and sampling

Participants were 274 adults who self-identified as Minangkabau, were older than 18 years, resided in West Sumatra, Riau, or Jambi, and reported at least one metabolic disorder diagnosis or condition, including diabetes mellitus, hypertension, hypercholesterolemia, and/or overweight status. Participants were recruited purposively through community networks and healthcare-related contacts. Individuals were eligible when they met the cultural, age, residence, and health-condition criteria and were able to provide informed consent. The number of participants was considered adequate to conduct multiple regression with three independent variables. Using Cohen's power guideline, a sample of 274 provides sufficient power to detect small-to-moderate effects at $\alpha = 0.05$ [21].

2.4. Instruments

HLOC was assessed using a multidimensional scale consisting of internal HLOC (9 items), powerful-others HLOC (8 items), and chance HLOC (7 items). Responses were measured using a 4-point Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree). Each dimension score was computed as the average of its corresponding items, where higher values indicate a stronger orientation toward that specific control dimension. The multidimensional structure was theoretically grounded in the HLOC model [6]-[8]. Internal consistency was examined before hypothesis testing; all HLOC dimensions showed good reliability (Cronbach's $\alpha > 0.80$).

Health behavior was measured using a multidimensional scale covering diet (10 items), sleep (7 items), smoking (5 items), risky beverage consumption including sugary and alcoholic drinks (5 items), and exercise (5 items). Responses were recorded using a 4-point Likert scale. Unfavorable items were reverse-coded so that higher scores consistently represented healthier behavior. Each domain score was calculated as the item mean, and total health behavior was calculated as the mean of the five domains. All domains showed strong internal consistency, with Cronbach's alpha values exceeding 0.80. Cronbach's alpha was interpreted as an index of internal consistency rather than proof of unidimensional validity [22].

2.5. Data collection procedure

Data collection was carried out using both online and offline questionnaires in collaboration with local community networks and healthcare-related contacts. The procedure followed these steps. First,

potential participants received information about the study purpose, voluntary participation, confidentiality, and eligibility criteria. Second, participants who agreed to participate provided informed consent. Third, participants completed demographic and health-condition questions, followed by the HLOC and health behavior scales. Fourth, responses were screened for completeness and eligibility. Fifth, data were anonymized before analysis so that individual responses could not be linked to personal identity. Participants were advised that they could withdraw from the study at any time without penalty or consequences.

2.6. Data preparation and scoring

Data preparation involved checking eligibility, missing responses, response consistency, reverse coding of unfavorable items, and calculation of dimension means. Dominant HLOC type was determined by comparing each participant's mean score on internal, chance HLOC, and powerful-others. The highest mean score was used to classify the participant into a dominant HLOC category. Cases with tied highest HLOC dimension scores were retained for correlation and regression analyses but excluded from the dominant-type ANOVA to avoid arbitrary classification.

2.7. Data analysis

IBM SPSS Statistics version 26 was used for all data analyses. The analysis was conducted in six steps. First, descriptive statistics were calculated for all HLOC and health behavior dimensions. Second, Cronbach's alpha was used to evaluate internal consistency reliability. Third, Pearson correlations were used to describe bivariate associations among HLOC and health behavior dimensions. Fourth, multiple linear regression was used to test H1-H3, with total health behavior as the dependent variable and internal, powerful-others, and chance HLOC as simultaneous predictors. Fifth, one-way ANOVA was used to test H4 by comparing health behavior domains across dominant HLOC types. Sixth, effect sizes were reported and interpreted to distinguish statistical significance from practical significance. A significance threshold of 0.05 was applied.

3. RESULTS AND DISCUSSION

3.1. Descriptive statistics and reliability

Each dimension exhibited strong internal consistency (Cronbach's $\alpha > 0.80$). Table 1 summarizes the means, standard deviations, and correlations among HLOC dimensions and health behavior domains. The key pattern is that associations between HLOC dimensions and specific health behavior domains were generally weak, whereas correlations among health behavior domains were moderate. This indicates that diet, sleep, smoking, risky beverage consumption, and exercise were related as health behavior domains, but HLOC was not a strong correlate of each domain.

Table 1. Descriptive statistics and correlations among dimensions

No	Variable	M	SD	1	2	3	4	5	6	7	8
1	Internal	2.87	0.42	—							
2	Powerful	2.74	0.45	-0.34	—						
3	Chance	2.69	0.47	-0.02	-0.46	—					
4	Diet	2.72	0.38	0.15	0.07	0.02	—				
5	Sleep	2.60	0.41	0.05	0.07	-0.01	0.34	—			
6	Smoking	2.63	0.44	0.04	0.11	0.06	0.33	0.27	—		
7	Drink	2.71	0.46	0.18	0.02	0.02	0.28	0.27	0.50	—	
8	Exercise	2.58	0.43	0.01	0.05	0.00	0.47	0.42	0.32	0.32	—

3.2. Regression analysis of HLOC and total health behavior

Multiple linear regression was conducted to test whether chance, powerful-others, and internal HLOC predicted total health behavior. Table 2 presents the regression coefficients. Powerful-others HLOC and internal HLOC were positive and statistically significant predictors, whereas chance HLOC was not statistically significant. However, the model as a whole explained just 4.8% of the variation in overall health behavior. Therefore, the clinical and public health interpretation should emphasize the small magnitude of prediction rather than statistical significance alone.

Table 2. Multiple linear regression predicting total health behavior

Predictor	B	SE	β	t	p
Internal	0.160	0.051	0.16	3.14	0.002
Powerful others	0.159	0.053	0.16	2.99	0.003
Chance	0.096	0.051	0.10	1.87	0.063
Model summary	Intercept = 1.582	SE = 0.305	$p < 0.001$	$R^2 = 0.048$	

Figure 2 visualizes the standardized regression coefficients. The figure shows that internal and powerful-others HLOC had comparable small positive coefficients, whereas chance HLOC had a weaker and non-significant positive coefficient. The results offer partial support for H1, support H2, and support H3, as chance HLOC showed no significant relationship with health behavior.

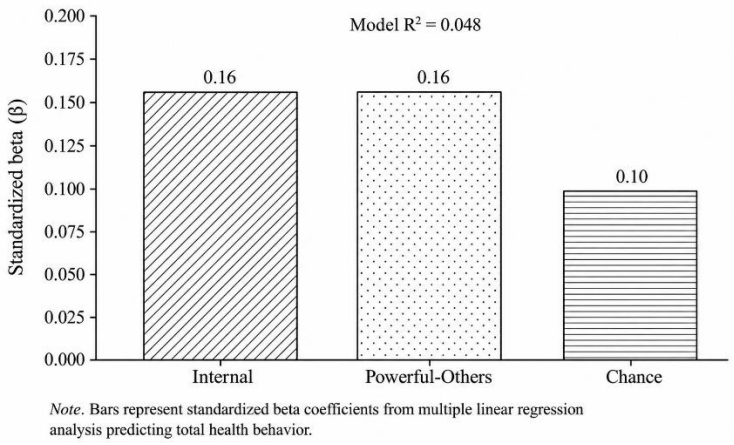

Figure 2. Standardized regression coefficients of HLOC dimensions predicting total health behavior

3.3. Differences in health behavior by dominant HLOC type

Participants were grouped according to their dominant HLOC type, and differences in health behavior domains across these groups were analyzed using one-way ANOVA. Table 3 presents the ANOVA results. None of the health behavior domains showed meaningful differences across dominant HLOC types. All η^2 values were below 0.02, indicating very small effect sizes. These findings support H4 and suggest that dominant HLOC type alone does not differentiate health behavior patterns in this sample.

Table 3. ANOVA results for health behavior by dominant HLOC type

Health behavior domain	F	p	η^2
Diet	1.73	0.179	0.013
Sleep	0.18	0.832	0.001
Smoking	0.24	0.786	0.002
Risky beverage consumption	1.14	0.320	0.008
Exercise	0.19	0.823	0.001

3.4. Summary of hypotheses

Table 4 summarizes the hypothesis-level interpretation. The findings show that HLOC had statistically detectable but practically limited associations with health behavior. This is important because a significant p-value can obscure the broader pattern: HLOC was not a dominant explanatory factor for multidimensional health behavior among Minangkabau adults with metabolic disorders.

Table 4. Summary of hypotheses and interpretation

Hypothesis	Result	Interpretation
H1: Internal HLOC positively predicts health behavior	Partially supported	Internal HLOC was significant, but the effect was small.
H2: Powerful-others HLOC is neutral or positive	Supported	Powerful-others HLOC was positive and significant, suggesting possible social-regulatory meaning.
H3: Chance HLOC is negative or non-significant	Supported	Chance HLOC was not statistically significant.
H4: Dominant HLOC types do not show large differences	Supported	ANOVA effects were very small across all behavioral domains.

3.5. Discussion

This study re-examined the assumption that internal HLOC is universally protective among individuals with metabolic disorders in a collectivistic Minangkabau context. The findings provide a nuanced answer. Internal HLOC showed a positive association with overall health behavior, although its contribution

was small. A positive relationship was also observed between powerful-others HLOC and health behavior, whereas no significant association was found for chance HLOC. Moreover, health behavior did not differ meaningfully across dominant HLOC types. Thus, the results do not reject HLOC theory but indicate that its explanatory power may be context-bound.

The small positive association between internal HLOC and health behavior is consistent with theories emphasizing agency, self-regulation, and perceived personal influence in health behavior [5], [8], [23]. However, the low proportion of explained variance indicates that beliefs about personal control alone are not sufficient to account for sustained health behavior in this population. This finding aligns with meta-analytic evidence that the relationship between HLOC and health behavior varies across behaviors and moderators [9]. It also supports chronic disease research showing that HLOC may operate together with empowerment, self-efficacy, and broader psychosocial factors rather than functioning as an isolated predictor [11].

A theoretically important finding is that powerful-others HLOC showed a positive rather than maladaptive association. In an individualistic interpretation, reliance on powerful others may be viewed as dependency. In a collectivistic context, however, influential others may provide legitimacy, reminders, advice, and normative pressure that support behavior change. In Minangkabau communities, family members, health workers, religious figures, and community leaders may function as socially recognized sources of guidance. This interpretation is consistent with cultural psychology, which emphasizes that agency can be relational and socially embedded rather than only individual [12], [15], [16].

The non-significant effect of chance HLOC also requires careful interpretation. Chance orientation is often associated with fatalism, but religious or destiny-related beliefs do not always produce passivity. In religiously grounded communities, acceptance of destiny may coexist with active effort, social responsibility, and treatment-seeking. Therefore, chance HLOC may not be a simple indicator of disengagement unless it is accompanied by low self-efficacy, poor health literacy, limited healthcare access, or discouraging illness experiences.

These results suggest that other factors may be more influential than HLOC in explaining health behavior. Possible stronger determinants include self-efficacy, health literacy, disease severity, symptom burden, family support, economic resources, food availability, access to healthcare, gendered household roles, peer norms, and community-level reinforcement. Social support has repeatedly been linked to chronic illness self-management [24]. Recent diabetes literature also indicates that family support and family-based interventions can improve self-management and glycemic outcomes [25]-[28]. Thus, in collectivistic settings, the pathway from control beliefs to behavior may be indirect and mediated by relational and structural conditions.

The theoretical contribution of this study is the proposition that HLOC should be treated as culturally sensitive rather than universally predictive. Internal HLOC remains relevant, but its protective function appears limited when behavior is embedded in communal norms and social expectations. Powerful-others HLOC may need to be reinterpreted in collectivistic contexts as a potential indicator of social regulation rather than merely external dependency. This expands HLOC theory by showing that the meaning of control depends on the social system in which control beliefs operate.

3.6. Practical implications

These results have practical relevance for public health programs focused on metabolic disorders within collectivistic populations. First, patient education should not focus solely on individual responsibility. It should also invite family members to understand diet, physical activity, sleep, medication routines, and risk behaviors so that household routines support healthier choices. Second, health campaigns should involve trusted community actors, such as religious leaders, customary leaders, women's groups, and community health volunteers, because these figures may strengthen the perceived legitimacy of health messages. Third, interventions should translate clinical advice into culturally acceptable routines, such as family meal planning, collective walking groups, community-based blood pressure or glucose monitoring, and locally meaningful messages about caring for the body. Fourth, programs should avoid blaming patients for weak personal control and instead address barriers such as cost, access, social expectations, and the availability of healthy options.

4. CONCLUSION

This study indicates that internal HLOC is positively related to health behavior among Minangkabau adults with metabolic disorders, although the association is small. Powerful-others HLOC also shows a small positive association, while chance HLOC is not a significant predictor. Health behavior does not differ meaningfully across dominant HLOC types. These findings indicate that HLOC is relevant, but insufficient to explain multidimensional health behavior in a collectivistic context. The study extends HLOC theory by

positioning culture as a boundary condition that shapes the meaning and strength of control beliefs. For practice, interventions should combine individual education with family-based support, community leader involvement, culturally adapted health campaigns, and structural support for healthier routines. Future studies should use longitudinal designs and clinically verified diagnoses to clarify causal pathways and intervention targets.

Several limitations need to be acknowledged. First, the cross-sectional design precludes causal inference. The findings show associations but cannot determine whether HLOC influences health behavior, whether healthier behavior strengthens control beliefs, or whether both are shaped by other factors. Second, metabolic disorder status was based on self-report, so misclassification is possible. Future research should consider adding clinical verification methods such as medical records, blood pressure readings, BMI, lipid profiles, and blood glucose measurements. Third, the use of self-report instruments for all variables may introduce recall bias and social desirability bias. Fourth, culture was interpreted through the Minangkabau sampling context rather than measured directly through validated individual-level collectivism or norm scales. Future research should use longitudinal designs, clinical verification, and multilevel models that include self-efficacy, family support, health literacy, religiosity, and community norms as mediators or moderators.

ACKNOWLEDGMENTS

The authors express their gratitude to the community members, healthcare-related contacts, and all Minangkabau participants who generously contributed their time to this study. They also acknowledge the support provided by the Department of Psychology, Faculty of Psychology and Health, Universitas Negeri Padang, throughout the research process.

FUNDING INFORMATION

The authors report that no financial support was obtained for this study.

AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Rida Yanna Primanita	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Alfian Yanda Putra		✓	✓	✓	✓	✓	✓	✓		✓				
Puput Nofia Rahma				✓		✓	✓	✓	✓	✓				

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

The authors report that there are no conflicts of interest concerning the publication of this article.

INFORMED CONSENT

All participants provided informed consent, and their confidentiality was ensured during the entire research process.

ETHICAL APPROVAL

The research involving human participants was conducted in accordance with relevant national regulations and institutional guidelines, following the principles of the Helsinki Declaration, and was approved by the Research Ethics Committee of Universitas Negeri Padang (No. 102/KEPK-UNP/12/2025, December 10, 2025).

DATA AVAILABILITY

The datasets and materials produced in this study are not publicly accessible and may be obtained from the corresponding author upon reasonable request, in accordance with ethical considerations.

REFERENCES

[1] World Health Organization, "Noncommunicable diseases," WHO. Accessed: Jan. 01, 2026. [Online]. Available: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases.

[2] Badan Kebijakan Pembangunan Kesehatan, "SKI 2023 dalam angka," Kemenkes BKPK. Accessed: Jan. 01, 2026. [Online]. Available: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases.

[3] WHO, "Global report on hypertension: the race against a silent killer," World Health Organization. Accessed: Dec. 01, 2025. [Online]. Available: https://www.who.int/publications/i/item/9789240081062.

[4] N. A. ElSayed *et al.*, "5. Facilitating positive health behaviors and well-being to improve health outcomes: standards of care in diabetes—2024," *Diabetes Care*, vol. 47, no. Supplement_1, pp. S77–S110, Jan. 2024, doi: 10.2337/dc24-S005.

[5] J. B. Rotter, "Generalized expectancies for internal versus external control of reinforcement," *Psychological Monographs: General and Applied*, vol. 80, no. 1, pp. 1–28, 1966, doi: 10.1037/h0092976.

[6] K. A. Wallston, B. Strudler Wallston, and R. DeVellis, "Development of the multidimensional health locus of control (MHLC) scales," *Health Education Monographs*, vol. 6, no. 1, pp. 160–170, Mar. 1978, doi: 10.1177/109019817800600107.

[7] H. Levenson, "Differentiating among internality, powerful others, and chance," in *Research with the locus of control construct*, H. M. Lefcourt, Ed., Academic Press, 1981, ch. 2, pp. 15–63.

[8] K. A. Wallston, "The validity of the multidimensional health locus of control scales," *Journal of Health Psychology*, vol. 10, no. 5, pp. 623–631, Sep. 2005, doi: 10.1177/1359105305055304.

[9] C. Cheng, M. W.-L. Cheung, and B. C. Y. Lo, "Relationship of health locus of control with specific health behaviours and global health appraisal: a meta-analysis and effects of moderators," *Health Psychology Review*, vol. 10, no. 4, pp. 460–477, Oct. 2016, doi: 10.1080/17437199.2016.1219672.

[10] L. M. West, R. Borg Theuma, and M. Cordina, "Health locus of control: Its relationship with medication adherence and medication wastage," *Research in Social and Administrative Pharmacy*, vol. 14, no. 11, pp. 1015–1019, Nov. 2018, doi: 10.1016/j.sapharm.2017.12.003.

[11] R. Wang *et al.*, "Patient empowerment and self-management behaviour of chronic disease patients: A moderated mediation model of self-efficacy and health locus of control," *Journal of Advanced Nursing*, vol. 78, no. 4, pp. 1055–1065, Apr. 2022, doi: 10.1111/jan.15077.

[12] H. R. Markus and S. Kitayama, "Culture and the self: Implications for cognition, emotion, and motivation," *Psychological Review*, vol. 98, no. 2, pp. 224–253, Apr. 1991, doi: 10.1037/0033-295X.98.2.224.

[13] H. C. Triandis, *Individualism and collectivism*. New York: Routledge, 1995. doi: 10.4324/9780429499845.

[14] G. Hofstede, "Dimensionalizing cultures: The Hofstede model in context," *Online Readings in Psychology and Culture*, vol. 2, no. 1, Dec. 2011, doi: 10.9707/2307-0919.1014.

[15] H. S. Kim, D. K. Sherman, and S. E. Taylor, "Culture and social support," *American Psychologist*, vol. 63, no. 6, pp. 518–526, 2008, doi: 10.1037/0003-066X.

[16] C. Cheng, S. F. Cheung, J. H. Chio, and M.-P. S. Chan, "Cultural meaning of perceived control: A meta-analysis of locus of control and psychological symptoms across 18 cultural regions," *Psychological Bulletin*, vol. 139, no. 1, pp. 152–188, Jan. 2013, doi: 10.1037/a0028596.

[17] T. Abdullah, "Adat and Islam: An examination of conflict in Minangkabau," *Indonesia*, vol. 2, p. 1, Oct. 1966, doi: 10.2307/3350753.

[18] E. Blackwood, "Webs of power: women, kin, and community in a Sumatran village," *Choice Reviews Online*, vol. 37, no. 11, 2000, doi: 10.5860/choice.37-6330.

[19] R. H. Barnes, E. E. Graves, and T. Kato, "The Minangkabau response to Dutch colonial rule in the nineteenth century," *Pacific Affairs*, vol. 55, no. 3, p. 529, 1982, [Online]. Available: https://books.google.com/books?id=tAZoI-7qWicC.

[20] E. von Elm, D. G. Altman, M. Egger, S. J. Pocock, P. C. Gøtzsche, and J. P. Vandenbroucke, "The strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies," *PLoS Medicine*, vol. 4, no. 10, p. e296, Oct. 2007, doi: 10.1371/journal.pmed.0040296.

[21] J. Cohen, "A power primer," *Psychological Bulletin*, vol. 112, no. 1, pp. 155–159, 1992, doi: 10.1037/0033-2909.112.1.155.

[22] M. Tavakol and R. Dennick, "Making sense of Cronbach's alpha," *International Journal of Medical Education*, vol. 2, pp. 53–55, Jun. 2011, doi: 10.5116/ijme.4dfb.8dfd.

[23] A. Bandura, "Health promotion by social cognitive means," *Health Education & Behavior*, vol. 31, no. 2, pp. 143–164, Apr. 2004, doi: 10.1177/1090198104263660.

[24] M. P. Gallant, "The influence of social support on chronic illness self-management: a review and directions for research," *Health Education & Behavior*, vol. 30, no. 2, pp. 170–195, Apr. 2003, doi: 10.1177/1090198102251030.

[25] S. Safaruddin and H. Permatasari, "Dukungan keluarga dengan manajemen diri diabetes pada pasien diabetes melitus tipe 2: tinjauan sistematik," *Jurnal Kesehatan Komunitas*, vol. 8, no. 2, pp. 195–204, Jun. 2022, doi: 10.25311/keskom.Vol8.Iss2.1148.

[26] M. Teli, R. Thato, F. Hasan, and Y. A. Rias, "Effectiveness of family-based diabetes management intervention on glycated haemoglobin among adults with type 2 diabetes: a systematic review and meta-analysis of randomized controlled trials," *Biological Research for Nursing*, vol. 26, no. 2, pp. 315–333, Apr. 2024, doi: 10.1177/10998004231218887.

[27] K. A. Matrook, D. L. Whitford, S. M. Smith, S. McGilloway, M. P. Piyasena, and S. Cowman, "Family-based interventions for adults with type 2 diabetes mellitus: A systematic review and meta-analysis," *Primary Care Diabetes*, vol. 19, no. 2, pp. 111–119, 2025, doi: 10.1016/j.pcd.2025.01.006.

[28] A. A. Baig, A. Benitez, M. T. Quinn, and D. L. Burnet, "Family interventions to improve diabetes outcomes for adults," *Annals of the New York Academy of Sciences*, vol. 1353, no. 1, pp. 89–112, Sep. 2015, doi: 10.1111/nyas.12844.

BIOGRAPHIES OF AUTHORS

Rida Yanna Primanita is affiliated with the Department of Psychology, Faculty of Psychology and Health, Universitas Negeri Padang, Padang, West Sumatra, Indonesia. She holds an academic background in psychology with a focus on clinical and health psychology. Her research interests include clinical psychology, public mental health, resilience, and psychosocial adaptation across developmental and social contexts. In scholarly work, she has contributed to research supervision, data interpretation, and critical manuscript revision in studies related to mental and health behavior. She contributed to the present study according to the roles indicated in the author contribution statement. She can be contacted at email: yannaprimanita@fip.unp.ac.id.

Alfian Yanda Putra is affiliated with the Department of Psychology, Faculty of Psychology and Health, Universitas Negeri Padang, Padang, West Sumatra, Indonesia. His professional background is in psychology with a focus on applied psychological services and community-based mental health. His research interests include psychological services, early-career adaptation, counseling, and community mental health support. His contributed to the present study according to the roles indicated in the author contribution statement. He can be contacted at email: alfian.yanda@gmail.com.

Puput Nofia Rahma is affiliated with the Department of Psychology, Faculty of Psychology and Health, Universitas Negeri Padang, Padang, West Sumatra, Indonesia. Her academic background is in psychology with a focus on applied and community-based psychological practice. Her professional interests include psychological services, counseling practice, workforce adjustment, and community mental health. She contributed to the present study according to the roles indicated in the author contribution statement. She can be contacted at email: puputnofiarahma@gmail.com.