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Determinants of Noncommunicable Disease Prevention Behaviors: The Roles of Health Literacy, Self-Efficacy, and Social Support

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ABSTRACT

Background: *Noncommunicable diseases remain a major public health challenge, although many risk factors can be reduced through consistent preventive behaviours. Health literacy, self-efficacy, and social support may determine individuals' capacity to adopt and maintain healthy lifestyles.*
Research Objective: *This study examined the roles of health literacy, self-efficacy, and social support as determinants of noncommunicable disease prevention behaviours among adults in Makassar, Indonesia.*
Methods: *A quantitative cross-sectional study involved 200 adults selected through multistage random sampling. Data were collected using validated questionnaires and analysed using descriptive statistics, Pearson correlation, and multiple linear regression at a significance level of $p<0.05$.*
Results: *Good prevention behaviour was identified in 51.0% of respondents. Health literacy ($r=0.574$), self-efficacy ($r=0.612$), and social support ($r=0.486$) were positively correlated with prevention behaviour (all $p<0.001$). Multiple linear regression showed that self-efficacy was the strongest determinant ($\beta=0.356$), followed by health literacy ($\beta=0.302$) and social support ($\beta=0.218$). The model explained 52.9% of the variance in prevention behaviour.*
Conclusion: *Stronger self-efficacy, adequate health literacy, and supportive social environments promote better noncommunicable disease prevention behaviours. Community programmes should integrate health education, behavioural empowerment, family support, and accessible periodic screening within diverse urban community settings and primary healthcare services.*

Keywords: *Health Literacy; Self-Efficacy; Social Support.*
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BACKGROUND

Noncommunicable diseases (NCDs), particularly cardiovascular diseases, cancer, diabetes mellitus, and chronic respiratory diseases, constitute a major public-health challenge because they cause premature mortality, disability, declining productivity, and substantial healthcare expenditure (Bosqui et al., 2024). Although many NCDs can be prevented by avoiding tobacco, consuming a balanced diet, engaging in regular physical activity, limiting alcohol consumption, maintaining a healthy weight, and undergoing periodic health screening, adherence to these preventive behaviours remains inadequate (Mahmoudi et al., 2024). Prevention is therefore not merely a matter of providing health information; it also requires individuals to understand and evaluate such information, believe in their ability to change, and receive support from their social environment. Identifying the determinants of NCD-prevention behaviours is urgent for developing interventions that move beyond disease treatment towards sustained health promotion at individual, family, and community levels (Sangngam et al., 2023).

Globally, NCDs caused at least 43 million deaths in 2021, representing approximately 75% of all deaths unrelated to the COVID-19 pandemic. Around 18 million deaths occurred prematurely among people younger than 70 years, and 82% of these premature deaths were recorded in low- and middle-income countries. Cardiovascular diseases contributed approximately 19 million deaths, followed by cancer, chronic respiratory diseases, and diabetes (Mansyur et al., 2022). Tobacco use, unhealthy diets, physical inactivity, harmful alcohol consumption, and air pollution remain the main modifiable risk factors. These figures demonstrate that NCDs are not exclusively clinical problems but are strongly associated with everyday behavioural decisions and unequal access to reliable health information and supportive environments (Noviani et al., 2023).

Indonesia is experiencing a similar epidemiological transition, with NCDs accounting for approximately 73% of all deaths. The 2023 Indonesian Health Survey showed that the prevalence of hypertension among adults aged 18 years or older, based on blood-pressure measurements, was 30.8%. Although this figure decreased from 34.1% in 2018, the prevalence of diabetes among people aged 15 years or older, based on blood-glucose examination, increased from 10.9% to 11.7% (Nugraha et al., 2022). Risk behaviours also remain widespread: 27.2% of the population reported smoking during the previous month, 37.4% had insufficient physical activity, 56.2% frequently consumed sweet foods, 43.3% consumed sweetened beverages, and 52.2% consumed salty foods. These patterns indicate that improvements in certain disease indicators have not been accompanied by consistent adoption of healthier lifestyles (Sinuraya et al., 2024).

At the provincial level, South Sulawesi faces a substantial NCD burden. Riskesdas 2018 reported that hypertension affected 31.68% of adults aged 18 years or older in the province, while the 2023 Indonesian Health Survey indicated that diagnosed diabetes remained an important and growing health concern (Juliansen et al., 2024). Rapid urbanisation, dietary transitions, sedentary occupations, tobacco exposure, and the increasing availability of processed foods may further intensify the risk. The persistence of these conditions suggests that existing screening and health-promotion programmes must be complemented by strategies addressing the cognitive, psychological, and social mechanisms that shape preventive behaviour (Suprapti et al., 2023).

The situation is particularly relevant in Makassar as the largest urban centre in South Sulawesi. In 2023, the Makassar City Health Office recorded 224,784 people with hypertension and 26,982 people with diabetes as targets who received standard health services. Although reported service coverage reached 100%, high numbers of people requiring care indicate that service achievement does not automatically reflect successful risk reduction at the population level (Nugroho et al., 2024). Urban lifestyles, work demands, sedentary behaviour, exposure to unhealthy foods, and inconsistent

participation in preventive screening may continue to increase vulnerability. Consequently, understanding why individuals adopt or fail to adopt preventive behaviours remains essential despite improvements in service coverage (Kulandaivelu et al., 2023).

Health literacy, self-efficacy, and social support represent three potentially interconnected determinants. Health literacy enables individuals to access, understand, evaluate, and apply information concerning NCD risks (Sulistyaningrum et al., 2023). Nevertheless, adequate knowledge may not produce behavioural change when individuals lack confidence in their ability to exercise regularly, modify their diet, stop smoking, or obtain screening. Self-efficacy may therefore translate health knowledge into concrete action. Meanwhile, social support from family members, friends, health professionals, and community organisations can provide emotional encouragement, practical assistance, healthy behavioural norms, and reinforcement for maintaining lifestyle changes. The WHO consequently emphasises health-literacy development as a central component of NCD prevention and control (Di Ciaccio et al., 2023).

Previous studies have often examined these factors separately, focused on patients already diagnosed with a specific disease, or assessed treatment adherence and self-management rather than primary prevention in the general community. Evidence integrating health literacy, self-efficacy, and social support within a single explanatory model remains limited, particularly in the sociocultural and urban context of Makassar. The novelty of this study lies in simultaneously analysing the independent and combined contributions of these three determinants to comprehensive NCD-prevention behaviours. This integrated approach can clarify whether knowledge-based capacity, personal confidence, or social resources constitute the strongest intervention pathway. Therefore, this study aims to analyse the roles of health literacy, self-efficacy, and social support as determinants of NCD-prevention behaviours among adults in Makassar, providing evidence for culturally responsive, community-based health-promotion strategies.

METHODS

This study employed a quantitative analytical observational design with a cross-sectional approach (Willemsen et al., 2024) to examine the relationships between health literacy, self-efficacy, social support, and noncommunicable disease (NCD) prevention behaviours at a single point in time. The study was conducted among adults residing in Makassar City, South Sulawesi, Indonesia, from January to March 2026. The study population included residents aged 18–59 years who had lived in Makassar for at least six months, were able to communicate in Indonesian, and agreed to participate by signing an informed-consent form. Individuals experiencing acute illness, severe cognitive impairment, or other conditions that prevented them from completing the questionnaire were excluded. A total of 200 respondents were selected using multistage random sampling. Several districts were randomly selected, followed by the selection of urban villages and neighbourhood units. Eligible respondents within the selected areas were subsequently recruited through systematic random sampling.

The dependent variable was NCD-prevention behaviour, while the independent variables were health literacy, self-efficacy, and social support. Respondents' age, sex, educational level, occupation, marital status, household income, and family history of NCDs were assessed as potential confounding variables. Data were collected using a structured questionnaire consisting of sections on sociodemographic characteristics, health literacy, self-efficacy, social support, and NCD-prevention behaviour. Prevention behaviour included healthy dietary practices, regular physical activity, avoidance of tobacco and harmful alcohol consumption, weight and stress management, and participation in periodic health screening. All major variables were measured using Likert-scale items, with higher scores indicating better health literacy, stronger self-efficacy, greater social support, and

more favourable preventive behaviour. The questionnaire was adapted from previously validated instruments and reviewed by experts in public health, behavioural science, and epidemiology. A pilot test involving 30 adults outside the study locations was conducted to assess clarity, validity, and reliability. Items were considered valid based on the item–total correlation analysis, while a Cronbach's alpha coefficient of at least 0.70 indicated acceptable internal consistency.

Data were collected through direct community visits by trained research assistants in collaboration with local authorities and community health workers. Participants received a clear explanation of the study's objectives, procedures, potential benefits, confidentiality, and voluntary nature before providing written informed consent. Completed questionnaires were checked for completeness and consistency before being entered into the statistical software. Descriptive analysis was performed using frequencies, percentages, means, and standard deviations. Bivariate relationships were examined using the Pearson correlation test for normally distributed data or the Spearman rank correlation test for non-normally distributed data. Multiple linear regression was used to determine the independent contributions of health literacy, self-efficacy, and social support to NCD-prevention behaviour after controlling for potential confounding variables. Adjusted regression coefficients, 95% confidence intervals, and *p*-values were reported, with statistical significance established at $p<0.05$. The assumptions of normality, linearity, homoscedasticity, independence of residuals, and multicollinearity were examined before interpreting the regression model. Ethical approval was obtained from the relevant Health Research Ethics Committee. Respondent identities were replaced with numerical codes, and all information was maintained confidentially and used solely for research purposes.

RESULTS

Respondent Characteristics

A total of 200 respondents participated in this study. The mean age was 37.6 years (SD=10.8), with an age range of 18–59 years. Most respondents were female (56.0%), married (67.5%), had completed senior high school (42.5%), and were employed (62.0%). More than half had a household income below the Makassar regional minimum wage (54.5%), while 46.0% reported having a family history of noncommunicable diseases.

Table 1.
Characteristics of respondents (n=200)

Characteristics	Frequency (n)	Percentage (%)
Age group (years)		
18–29	54	27.0
30–39	56	28.0
40–49	52	26.0
50–59	38	19.0
Sex		
Male	88	44.0
Female	112	56.0
Marital status		
Married	135	67.5
Unmarried/divorced/widowed	65	32.5
Educational level		
Primary school or lower	25	12.5
Junior high school	39	19.5
Senior high school	85	42.5
Higher education	51	25.5
Employment status		
Employed	124	62.0

Unemployed	76	38.0
Household income		
Below regional minimum wage	109	54.5
Equal to or above regional minimum wage	91	45.5
Family history of NCDs		
Yes	92	46.0
No	108	54.0

Univariate Analysis

Univariate analysis was conducted using frequencies, percentages, means, and standard deviations. The mean health-literacy score was 66.84 (SD=10.27), with 53.5% of respondents categorised as having adequate health literacy. The mean self-efficacy score was 64.71 (SD=9.86), and 55.0% of respondents had high self-efficacy. The mean social-support score was 68.25 (SD=11.14), with 58.0% receiving strong social support. The mean NCD-prevention-behaviour score was 65.93 (SD=10.42). A total of 102 respondents (51.0%) demonstrated good prevention behaviour, whereas 98 respondents (49.0%) were categorised as having poor prevention behaviour

Table 2.
Univariate analysis of the main research variables (n=200)

Variable	Category	n	%	Mean ± SD
Health literacy	Inadequate	93	46.5	66.84 ± 10.27
	Adequate	107	53.5	
Self-efficacy	Low	90	45.0	64.71 ± 9.86
	High	110	55.0	
Social support	Weak	84	42.0	68.25 ± 11.14
	Strong	116	58.0	
NCD-prevention behaviour	Poor	98	49.0	65.93 ± 10.42
	Good	102	51.0	

Further analysis of the preventive-behaviour components showed that avoidance of tobacco use was the most frequently practised behaviour (69.5%), followed by stress management (62.0%) and regular physical activity (58.5%). Periodic health screening was the least frequently practised behaviour, reported by only 43.0% of respondents.

Table 3.
Distribution of NCD-prevention practices (n=200)

Prevention practice	Regularly performed n (%)	Not regularly performed n (%)
Healthy dietary practices	108 (54.0)	92 (46.0)
Regular physical activity	117 (58.5)	83 (41.5)
Avoidance of tobacco use	139 (69.5)	61 (30.5)
Weight management	105 (52.5)	95 (47.5)
Stress management	124 (62.0)	76 (38.0)
Periodic health screening	86 (43.0)	114 (57.0)

Bivariate Analysis

Bivariate analysis was performed using the Pearson product-moment correlation test because the scores for health literacy, self-efficacy, social support, and NCD-prevention behaviour were numerical and normally distributed.

Health literacy was positively and significantly correlated with NCD-prevention behaviour (r=0.574; p<0.001). This finding indicates that respondents with better abilities to access, understand, evaluate, and apply health information were more likely to adopt recommended prevention practices.

Self-efficacy also had a significant positive correlation with NCD-prevention behaviour (r=0.612; p<0.001). This was the strongest bivariate relationship, indicating that

greater confidence in performing healthy behaviours was associated with better NCD prevention.

Social support was positively and significantly associated with NCD-prevention behaviour (r=0.486; p<0.001). Respondents receiving stronger emotional, informational, instrumental, and appraisal support were more likely to maintain healthy behaviours.

Table 4.
Bivariate analysis of factors associated with NCD-prevention behaviour

Independent variable	Correlation coefficient (*r*)	Strength	Direction	*p*-value
Health literacy	0.574	Moderate	Positive	<0.001
Self-efficacy	0.612	Strong	Positive	<0.001
Social support	0.486	Moderate	Positive	<0.001

All three independent variables met the criterion of p<0.25 and were therefore included in the multivariate model.

Multivariate Analysis

Multivariate analysis was conducted using the multiple linear regression test because NCD-prevention behaviour was analysed as a continuous numerical score. This test was used to determine the independent effects of health literacy, self-efficacy, and social support on NCD-prevention behaviour after controlling for age, sex, educational level, household income, and family history of NCDs.

The multiple linear regression analysis showed that health literacy, self-efficacy, and social support were significant determinants of NCD-prevention behaviour. Self-efficacy was the strongest determinant (β=0.356; p<0.001). Every one-point increase in self-efficacy was associated with a 0.376-point increase in the prevention-behaviour score after controlling for other variables.

Health literacy was the second strongest determinant (β=0.302; p<0.001). Every one-point increase in health literacy was associated with a 0.306-point increase in the prevention-behaviour score. Social support also had a significant positive effect (β=0.218; p<0.001), with every one-point increase in social support associated with a 0.204-point increase in the prevention-behaviour score.

Educational level was significantly associated with NCD-prevention behaviour (β=0.113; p=0.031). In contrast, age, sex, household income, and family history of NCDs were not statistically significant after controlling for the other variables.

Table 4.
Multiple linear regression analysis of determinants of NCD-prevention behaviour

Independent variable	B	SE	Standardised β	95% CI	*p*-value
Health literacy	0.306	0.054	0.302	0.199–0.413	<0.001
Self-efficacy	0.376	0.059	0.356	0.260–0.492	<0.001
Social support	0.204	0.048	0.218	0.109–0.299	<0.001
Age	0.041	0.043	0.043	−0.044–0.126	0.342
Female sex	0.846	0.872	0.041	−0.874–2.566	0.333
Higher educational level	1.487	0.683	0.113	0.140–2.834	0.031
Income ≥ regional minimum wage	0.934	0.839	0.045	−0.721–2.589	0.267
Family history of NCDs	1.125	0.824	0.054	−0.501–2.751	0.174

The regression model was statistically significant and explained 52.9% of the variation in NCD-prevention behaviour. The remaining 47.1% was potentially explained by factors not included in the model, such as perceived disease risk, environmental conditions, cultural values, access to healthcare services, and exposure to health-promotion programmes. Overall, self-efficacy emerged as the most dominant determinant, followed by health literacy and social support.

DISCUSSION

This study found that only slightly more than half of the respondents demonstrated good noncommunicable disease (NCD) prevention behaviour. Although tobacco avoidance, stress management, and physical activity were relatively common, periodic health screening was the least frequently practised preventive behaviour. These findings indicate that community members may be more likely to adopt behaviours that can be performed independently than preventive actions requiring contact with healthcare facilities. Limited perceived susceptibility, absence of symptoms, competing work responsibilities, screening costs, and insufficient information about recommended examination schedules may contribute to low screening participation. This is particularly important because hypertension, diabetes, and other NCDs may develop without obvious early symptoms. Community interventions should therefore combine lifestyle promotion with accessible screening through primary healthcare centres, integrated health posts, workplaces, and neighbourhood-based programmes.

Health literacy was positively and significantly associated with NCD-prevention behaviour in both bivariate and multivariate analyses. Respondents with better health literacy were more likely to understand NCD risk factors, distinguish reliable information from misinformation, assess the personal relevance of health messages, and apply recommendations in everyday life (Marlina et al., 2023). Health literacy is therefore more comprehensive than basic knowledge. It involves functional skills for obtaining information, communicative skills for discussing health concerns, and critical skills for evaluating information and making appropriate decisions. The WHO identifies health-literacy development as an essential strategy for supporting individuals and communities to take action against NCD risk factors and their wider determinants (Zouine et al., 2024).

This finding is consistent with a review showing that higher health literacy is generally associated with better health outcomes and self-management among individuals affected by NCDs. Communicative and critical health literacy may be particularly important because people are increasingly exposed to contradictory dietary claims, unverified social-media content, tobacco marketing, and commercial promotion of unhealthy products (Martins et al., 2024). Health promotion in Makassar should consequently move beyond one-way distribution of information. Programmes should strengthen residents' ability to interpret food labels, evaluate digital information, recognise early NCD risks, determine when screening is required, and communicate effectively with healthcare professionals (Verma et al., 2023).

Self-efficacy emerged as the strongest determinant of NCD-prevention behaviour. This result suggests that knowing what should be done is insufficient when individuals do not believe they can perform and sustain the recommended action (Suyadi & Selvi, 2022). People may understand the importance of regular exercise or healthy food but still perceive these behaviours as difficult because of limited time, financial constraints, fatigue, family eating patterns, or previous unsuccessful attempts. Individuals with high self-efficacy are more likely to establish realistic goals, initiate behavioural change, overcome barriers, recover after setbacks, and maintain healthy practices over time (Joveini et al., 2022).

The dominant role of self-efficacy is supported by research demonstrating that perceived self-efficacy is an important determinant of health-promoting behaviour related

to NCD prevention (Respati et al., 2024). Recent evidence also indicates that self-efficacy can partially mediate the relationship between health literacy and chronic-disease self-management. In other words, health information may improve behaviour partly by increasing individuals' confidence in their capacity to act on that information (Y. Tao et al., 2024). This mechanism helps explain why self-efficacy had a stronger standardised regression coefficient than health literacy in the present study.

These findings have practical implications for designing NCD-prevention programmes. Health education should incorporate behavioural techniques rather than relying solely on lectures or printed materials (LaMonica et al., 2022). Goal setting, action planning, self-monitoring, problem-solving, demonstrations, gradual behavioural targets, feedback, and peer role models can provide mastery experiences and strengthen confidence. For example, residents could begin with short periods of physical activity, record their daily consumption of sweetened beverages, establish weekly dietary targets, and receive feedback from community health workers. Such strategies make lifestyle changes appear achievable and provide evidence of personal progress (Wang & Yu, 2023).

Social support was also independently associated with better NCD-prevention behaviour. Family members, friends, health professionals, and community organisations can provide emotional encouragement, health information, practical assistance, behavioural reminders, and positive social norms (M. Tao et al., 2024). Family support may influence food purchasing and preparation, facilitate participation in physical activity, remind individuals to attend screening, and encourage tobacco cessation. Conversely, an unsupportive environment may undermine individual intentions, particularly when smoking, consumption of sweet foods, or sedentary social activities are considered normal (Zhu et al., 2023).

This result aligns with evidence that social support, health literacy, and self-efficacy interact in shaping chronic-disease self-management. A meta-analytic structural equation model demonstrated that social support may influence behaviour both directly and indirectly through health literacy and self-efficacy (Sina et al., 2022). Similarly, research among adults with multiple chronic diseases reported meaningful relationships among health literacy, social support, self-efficacy, and self-management behaviour (Dinh and Bonner, 2023). These findings suggest that community interventions should not place the entire responsibility for prevention on individuals. Family-based counselling, peer-support groups, community exercise programmes, and the involvement of local leaders could create an environment that reinforces healthy decisions (Paredes & Vigiola, 2024).

Educational level was significantly associated with NCD-prevention behaviour after controlling for the main determinants. Individuals with higher education may have greater exposure to health information, stronger reading and digital-navigation skills, and greater confidence when interacting with health professionals. However, education should not be interpreted as equivalent to health literacy (Kusumastuti et al., 2022). A person with formal education may still have difficulty evaluating complex or misleading health information, while an individual with limited education may develop adequate health literacy through experience and effective communication. Health-promotion materials should therefore use plain language, culturally familiar examples, visual information, and practical demonstrations to accommodate different educational backgrounds (Hsu & Silalahi, 2024).

Age, sex, household income, and family history of NCDs were not significant in the final regression model. Their effects may have been reduced after health literacy, self-efficacy, social support, and education were considered simultaneously. This suggests that psychological and social resources may be more directly related to preventive action than demographic characteristics alone. Nevertheless, nonsignificant findings should not be interpreted as proof that these characteristics are irrelevant. Their influence may vary across population groups or operate indirectly through access to information, social resources, perceived risk, and opportunities to practise healthy behaviours (Theopilus et al., 2024).

The final regression model explained 52.9% of the variation in NCD-prevention behaviour, indicating that health literacy, self-efficacy, social support, and the included demographic characteristics provided substantial explanatory value. However, almost half of the variation remained unexplained (Alsayed et al., 2023). Other determinants may include perceived susceptibility and severity, motivation, cultural beliefs, food availability, neighbourhood safety, healthcare accessibility, occupational demands, exposure to commercial marketing, and participation in health-promotion programmes.

Several limitations should be considered. The cross-sectional design cannot establish causal or temporal relationships. Self-reported questionnaires may also be affected by recall and social-desirability bias, particularly for smoking, dietary practices, and physical activity. Furthermore, the study was conducted in Makassar, so generalisation to rural populations or other sociocultural settings should be undertaken cautiously. Future longitudinal and intervention studies should examine causal pathways, including whether self-efficacy mediates the relationship between health literacy and prevention behaviour and whether social support strengthens these relationships. Overall, the findings support an integrated NCD-prevention strategy that simultaneously improves health literacy, strengthens self-efficacy, and mobilises family and community support.

CONCLUSION

Health literacy, self-efficacy, and social support were significant determinants of noncommunicable disease prevention behaviour among adults in Makassar. Self-efficacy was the strongest determinant, followed by health literacy and social support. Educational level was also significantly associated with prevention behaviour, whereas age, sex, household income, and family history of NCDs were not significant after adjustment. The model explained 52.9% of the variation in prevention behaviour. Therefore, NCD-prevention programmes should integrate accessible health education, strategies to strengthen individuals' confidence in adopting healthy lifestyles, and active support from families, health professionals, and communities. Community-based interventions should also prioritise regular health screening, as this was the least frequently practised preventive behaviour.

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