



Strengthening Community-Based NCD Prevention through Service Quality and Availability: Lessons from Banjarmasin City

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ABSTRACT

The main cause of death both globally and nationally is Non-Communicable Diseases (NCDs). Integrated Non-Communicable Disease Posts (INCDs Posts) play a crucial role in early detection and control of NCD risk factors at the community acceptance of INCDs Posts services. This study aims to analyse the influence of accessibility, availability, and services on community acceptance of INCD Posts in Banjarmasin City. A cross-sectional design was used, with data analysed using Partial Least Squares-Structural Equation Modelling (PLS-SEM) on 654 respondents. The variables analysed included accessibility, availability, quality, and community acceptance of INCDs Post services. The results of the study indicate that service quality and availability have a positive and significant impact on community acceptance, while accessibility does not have a significant direct impact. Service quality also acts as a mediator between accessibility and acceptance, as well as between accessibility and availability. Overall, service quality and availability are the dominant factors influencing community acceptance. These findings recommend that health policies should shift from an access focused model to a quality-oriented framework. In particular, policymakers should prioritise capacity building and resource reliability over further infrastructure expansion in order to build public trust and ensure the long-term sustainability of community based non-communicable disease prevention programmes.

INTRODUCTION

One of the global public health challenges is Non-Communicable Diseases (NCDs), which cause approximately 70% of all deaths worldwide, or around 40 million lives each year.^{1,2} The four main behavioural risk factors associated with non-communicable diseases (NCDs) identified by the World Health Organisation (WHO) are tobacco use, physical inactivity, harmful alcohol consumption, and unhealthy diets. The epidemiological transition from communicable to non-communicable diseases in Indonesia highlights the urgency of strengthening health promotion and prevention efforts through the implementation of INCDs Post (Integrated Non-Communicable Disease Health Posts) as an important component of the national strategy for risk factor control.^{2,3}

Data from the 2018 Basic Health Research (*Riset Kesehatan Dasar/Riskesdas*) and the 2023 Health Indicator Survey (SKI) indicate variations in NCD trends, showing decreases in the prevalence of asthma, cancer, chronic kidney disease, and heart disease, but increases in stroke and diabetes mellitus.^{4,5} Hypertension remains highly prevalent, affecting more than 30% of the population in South Kalimantan. However, NCD service delivery has shown positive progress. The hypertension management achievement rate in South Kalimantan increased from 55.8% in 2022 to 57.2% in 2023, and then rose sharply to 95.8% in 2024. Meanwhile, diabetes mellitus service coverage exceeded 100% in both South Kalimantan province Banjarmasin City from 2022 to 2024.⁶⁻⁸ In 2023, health service coverage among the productive-age population in Banjarmasin City reached 81.4% (386,976 individuals) of the target population of 475,230, showing an increase compared to previous years. Meanwhile, 19.3% (74,879 individuals) were identified as being at risk of non-communicable diseases.⁹

In response to the evolving trends of non-communicable diseases, the Indonesian government, through the Ministry of Health, has implemented various prevention and control programs aligned with global and regional health policies. One of the key initiatives is the Integrated Non-Communicable Disease Services Program (*Pelayanan Terpadu Penyakit Tidak Menular*) at Primary Health Care facilities (*Fasilitas Kesehatan Tingkat Pertama/FKTP*),

which aims to support the achievement of the Minimum Service Standards (*Standar Pelayanan Minimal/SPM*) and the indicators outlined in the Ministry of Health's Strategic Plan 2020–2024. The PANDU PTM program encompasses comprehensive, integrated, and sustainable efforts to prevent, control, and manage diabetes mellitus, hypertension, and other non-communicable diseases. PANDU PTM is implemented following algorithms and using risk prediction tables as guidelines for services at the primary care level.³

Active community participation is also a key factor in the success of Non-Communicable Disease (NCDs) prevention and control, in addition to government programmes. The Integrated Non-Communicable Disease Post (INCDs Post) is a form of Community-Based Health Effort (*Upaya Kesehatan Bersumber Daya Masyarakat/UKBM*) that focuses on health promotion and prevention through early detection and risk factor monitoring, and health education.¹⁰ INCDs Post is an integrated community-based activity designed for the monitoring and early detection of non-communicable disease (NCDs) risk factors.⁸ INCDs Post is implemented by the community under the guidance of community health centers (*Puskesmas*) and targets all residents aged 15 years and above. At a more technical level, the implementation of INCDs Post is regulated through the Minister of Health Decree (*Keputusan Menteri Kesehatan/KMK*) Number HK.01.07/Menkes/2015 of 2023 on the Technical Guidelines for Integrated Primary Health Care Services (*Integrasi Layanan Primer/ILP*), and is legally reinforced by the Health Law of the Republic of Indonesia Number 17 of 2023 as the overarching regulatory framework.^{11,12}

The level of utilization and community acceptance of INCDs Post services still varies across regions. Although national data show an upward trend in the number of INCD Post units over the years, their functionality and the level of community participation remain inconsistent. In some regions, INCDs Post activities are active and carried out regularly, but in other regions, activity frequency remains low, a shortage of manpower, and low community participation. This phenomenon shows a gap between the quantitative increase in the number of INCDs Post facilities and the qualitative aspects of their utilization and the quality of their implementation.

According to the South Kalimantan Provincial Health Profile, the number of INCDs Post (Integrated Health Service Posts) has continued to increase, from 1,788 units in 2022 to 1,886 units in 2023 and 1,978 units in 2024.⁸ However, this increase has not been fully accompanied by improvements in the level of utilization and community participation. Low levels of community acceptance and involvement in INCDs Post activities may hinder optimal efforts for NCD prevention and control. Therefore, this study aims to analyze the level of community acceptance of INCDs Post services among the target population as program beneficiaries, and to examine aspects of accessibility, availability, and service quality from the community's perspective. Through this analysis, it is expected that a comprehensive understanding of the factors influencing the utilization of INCDs Post services can be obtained, which can then serve as a basis for policy recommendations to enhance the program's effectiveness in the field.

Although INCDs Post has been widely examined in previous studies, most existing research has predominantly focused on descriptive aspects such as service utilization rates, community participation, or individual-level determinants of service attendance. Previous research, which provides evidence from community-based and theory-based intervention reviews for non-communicable diseases, shows that most emphasise behavioural change outcomes without sufficiently analyzing how structural and service-related factors interact to shape service acceptance and utilization in real community settings.¹³ There is still a limited amount of research that simultaneously analyses the structural relationships between accessibility, availability, quality, and community acceptance, especially using analytical approaches capable of capturing the direct and indirect effects between these variables. Furthermore, previous research has not explicitly highlighted important conceptual gaps and the mechanisms through which service accessibility is transformed into sustained service acceptance in community-based health systems.

Therefore, the novelty of this study lies in the application of Structural Equation Modeling Partial Least Squares (SEM-PLS) to address these methodological and conceptual limitations by comprehensively examining the mediating roles

of service quality and service availability in shaping community acceptance of INCDs Post services. By utilizing this structural framework, this study explicitly tests several hypothesized relationships: first, that service accessibility significantly influences the perceived quality and availability of services; second, that quality and availability are the primary direct determinants of community acceptance; and third, that the influence of accessibility on acceptance is not direct but is significantly mediated by these two service attributes. Empirically, these hypotheses are tested to provide a deeper understanding of the mechanisms by which physical health infrastructure is implemented into sustainable community participation.

MATERIAL AND METHOD

This study used an analytical observational design with a cross-sectional approach. Gender composition was not considered in sample selection, as all individuals who met the inclusion criteria and had access to INCDs Post services were included in the study sample. The study population consisted of individuals aged 15 years and older who lived in the working area of INCDs Post and the Community Health Centre in Banjarmasin City. The sample included individuals who had used or received health services at INCDs Post at least once in the last six months. A total sampling technique was applied, in which all members of the population who met the inclusion criteria were included in the study sample. This approach was chosen because the entire target population could be encountered during the study period, which ran from December 2024 to February 2025, allowing for comprehensive data collection while increasing the representativeness of the study population and minimizing selection bias.

Five indicators are used to measure accessibility, namely: service schedule suitability (2 items), ease of reaching the location (3 items), availability of information (1 item), suitability of services to community needs (1 item), and ease of transportation (1 item). Three indicators are used to measure availability, including the ability of services to meet community needs (5 items), the presence of medical personnel and equipment (3 items), and the regularity of INCDs Post activities (1 item). Service quality is measured based on staff professionalism (3

items), user satisfaction (2 items), and clarity of information (1 item). In this study, eleven items were used to measure community acceptance of INCDs Post services, including intention to continue using the services, trust and satisfaction with the services, willingness to recommend the services to others, and perceived social support for the existence of INCDs Post. The measurement items were developed independently based on national guidelines on INCDs Post services and a review of relevant literature.

A structured questionnaire, whose validity and reliability had been tested through a preliminary study conducted prior to the main data collection, was used for primary data collection. The preliminary study involved people from nearby towns with similar characteristics in terms of INCD Post usage, to ensure the accuracy of the measurements and reliability of the measuring instruments. The questionnaire used a Likert scale to assess respondents' perceptions of accessibility, availability, quality, and acceptance. The survey was conducted in person to collect data from respondents at INCDs Post locations.

Respondent characteristics and variable distributions were described through univariate analysis. In addition, to explore the direct and indirect relationships between variables and independent variables on public acceptance, path analysis was used within a Partial Least Squares (PLS) framework, with a Structural Equation Modelling (SEM) approach. The measurement model was evaluated using Cronbach's alpha and composite reliability to assess internal consistency, with all values exceeding the recommended threshold of 0.70. Convergent validity was evaluated using Average Variance Extracted (AVE), with all constructs meeting the minimum criterion of 0.50. The Fornell-Larcker criteria were used to evaluate discriminant validity, showing that each construct was empirically distinct from the others. However, this study has limitations, including a cross-sectional design that does not allow for establishing definitive causal relationships. In addition, potential bias related to gender imbalance was acknowledged, as the sample was dominated by women, which may affect the generalization of the study results across genders. This study obtained ethical approval from the Health Research Ethics Committee. Data confidentiality was strictly maintained

and all respondents provided written consent prior to participation. This study was conducted with ethical approval for research and was approved by the Health Research Ethics Committee of the Faculty of Medicine and Health Sciences, Lambung Mangkurat University, with approval letter 185/KEPK-FKIK ULM/EC/X/2024, and approval date October 1, 2024.

RESULTS

Respondent Characteristics and Variable Distribution

The distribution and frequency characteristics of respondents base on age, gender, occupation, and educational level are presented in the Table 1.

Based on the respondents characteristics, the majority were women. This shows that women tend to be more active and have a higher awareness of routine health checks such as INCDs Post. In line with national data, it was found that women tend to participate more in health promotion and disease prevention activities compared to men. This illustrated the gender imbalance in INCDs Post participation. This imbalance may be influenced by differences in risk perception, social roles, and time availability between men and women. Low detection of non-communicable disease among men, who are epidemiologically at higher risk for conditions such as diabetes mellitus and hypertension.

According to classification by age, most respondents were in the middle age group (62.7%), which represents the population segment with a higher risk of developing non-communicable diseases such as diabetes mellitus and hypertension. Dominance of this age group indicates that the INCDs Post program has successfully reached the target population for early detection and control of NCDs risk factors. Nevertheless, the relatively low proportion of adolescents and young adults indicates that the productive age group remains underrepresented. This may suggest that INCDs Post activities are not yet sufficiently appealing or effectively integrated into youth-centered environments, such as the workplaces of educational institutions.

Most respondents had low to moderate levels of education, which may influence Most respondents had low to moderate levels of

education, which may influence their perception of the importance of regular health check-ups. This finding highlights the need to strengthen health education so that individuals with lower educational attainment can better comprehend the benefits and functions of INCDs Post. Educational background has the potential to shape levels of understanding, perceived benefits, and acceptance of INCDs Post services. Therefore, health communication and education strategies should be tailored to ensure that promotional messages are effectively delivered to community groups with limited health literacy.

Based on employment status, most respondents worked in the informal sector or were unemployed, indicating that INCDs Post activities are relatively more accessible to individuals with flexible working hours. However, these findings also highlight the need for targeted strategies to engage formal sector workers who may have limited time or opportunities to participate in INCDs Post activities.

Overall, the characteristics of respondents indicate that participation in INCDs Post activities is predominantly among middle-aged female with lower secondary education, most of whom are unemployed. These findings indicate that INCDs Post has successfully reached high-risk groups for Non-Communicable Diseases (NCDs). However, further efforts are needed to expand the programme's reach to younger populations and formal sector workers to ensure that NCD prevention interventions are distributed more equitably among different demographic groups.

The frequency distribution of independent and dependent variables (accessibility, availability, quality, and acceptance) is presented in the Table 2.

Based on the distribution of research variables from a total of 654 respondents, the majority of respondents gave positive assessments of all aspects of INCDs Post services in Banjarmasin City. As many as 57% of respondents rated their acceptance of INCDs Post services as good, while 43% rated it as poor. These findings indicate that the majority of the community has trust and satisfaction with the services provided. The community generally showed a willingness to continue using the services, support the existence of INCDs Post, and recommend it to others. However, some respondents still showed limited

acceptance, which may be due to a lack of social support, inadequate programme promotion, or inconsistent service quality at the field level.

Regarding accessibility, 56.7% of respondents rated accessibility as good, while 43.3% rated it as poor. These findings indicate that, in general, the public perceives INCDs Post services to be relatively accessible in terms of location, scheduling, and information availability. However, about one-third of respondents still experience barriers related to transportation, uneven distribution of service locations, or time constraints, which can hinder their regular participation. Therefore, efforts to improve accessibility should focus on ensuring a more even distribution of activity locations and providing more comprehensive and flexible information to the public.

A total of 71.3% of respondents rated the availability of services as good, while only 28.7% rated it as poor. This variable obtained the highest score among all observed variables, indicating that the availability of implementing personnel, medical equipment, and INCDs Post facilities and infrastructure is generally adequate. The regularity of activities and the ability of services to meet community needs in screening and health education further demonstrate the effectiveness of program implementation. Nevertheless, continuous evaluation remains necessary to ensure the sustained availability of equipment and personnel during each activity cycle.

Furthermore, the majority of respondents (72%) rated the quality of services as good, while 28% rated it as poor. These findings indicate that INCDs Post officers and cadres have provided professional services characterized by good communication and clear information delivery. The high level of public satisfaction with service quality also reflects strong trust in both the personnel and the service system. Nevertheless, continuous quality improvement efforts are needed to ensure that all activities remain consistent, responsive, and aligned with the needs and expectations of service users.

Overall, the distribution results show that INCDs Post in Banjarmasin City is viewed positively by most respondents. Three independent variables (accessibility, availability, and quality) have a positive contribution to public acceptance as a dependent variable. This indicates that the

better the accessibility, availability, and quality of services, the higher the community acceptance of INCDS Post. Although the achievements are quite good, it is necessary to focus improvement efforts on equal access to services and on strengthening the capacity and consistency of implementing staff, so that the programme's sustainability and effectiveness can be optimised.

Table 1. Frequency Distribution of Respondent Characteristics

Characteristics	n = 654	%
Gender		
Male	60	9.2
Female	594	90.8
Age Classification		
Adolescents (<18 Years)	14	2.1
Adults (18 – 40 Years)	230	35.2
Middle Age (≥40 Years)	410	62.7
Level of Education		
Low (No Schooling, Elementary School/Equivalent, Junior High School/Equivalent)	326	49.8
Secondary (High School/Equivalent)	263	40.2
Higher (Diploma, Bachelor's, and Postgraduated)	65	9.9
Work		
Unemployed	562	85.9
Formal	32	4.9
Informal	60	9.2

Source: Primary Data, 2024

Table 2. Frequency Distribution of Research Characteristics

Characteristics	n = 654	%
Acceptance		
Poor	281	43
Good	373	57
Accessibility		
Poor	283	43.3
Good	371	56.7
Availability		
Poor	188	28.7
Good	466	71.3
Quality		
Poor	183	28
Good	471	72

Source: Primary Data, 2024

Path Analysis

The relationships between variables in this study were analysed using Structural Equation Modelling (SEM) with a Partial Least Squares (PLS) approach. This method was used to test both the direct and indirect effects of the independent variables of accessibility, availability, and quality of INCDS Post services on the dependent variable, namely community acceptance of INCDS Post services. The PLS-SEM approach was chosen because it allows for the analysis of complex models involving latent constructs with multiple indicators, while also assessing the strength and direction of the relationships between variables. The results of the path analysis are presented in the Figure 1, which illustrates each variable's contribution to community acceptance.

The relationship between variables in the structural model was tested using the original sample value (O), T-statistics, and - values in the SEM-PLS framework to determine the magnitude of the direct effect among variables. The results of the direct effect testing are presented in Table 3, which outlines the direction and significance level of the relationship between accessibility, availability, service quality, and community acceptance of INCDS Post services.

The results of the structural model analysis indicate that the accessibility variable has a positive and significant effect on the availability of INCDS Post services, with a path coefficient of 0.301, a T-statistic of 7.632, and a p-value of 0.000. These findings suggest that higher levels of community accessibility are associated with greater service availability at INCDS Post. In addition, accessibility also has a positive and significant effect on service quality, with a coefficient of 0.557, a T-statistic of 14.101, and a p-value of 0.000, indicating that increased accessibility contributes to improved service quality. Conversely, the effect of accessibility on community acceptance is not significant (coefficient = 0.049; T-statistic = 1.053; p = 0.292). Although the relationship is positive, these results indicate that accessibility does not directly influence community acceptance of INCDS Post services.

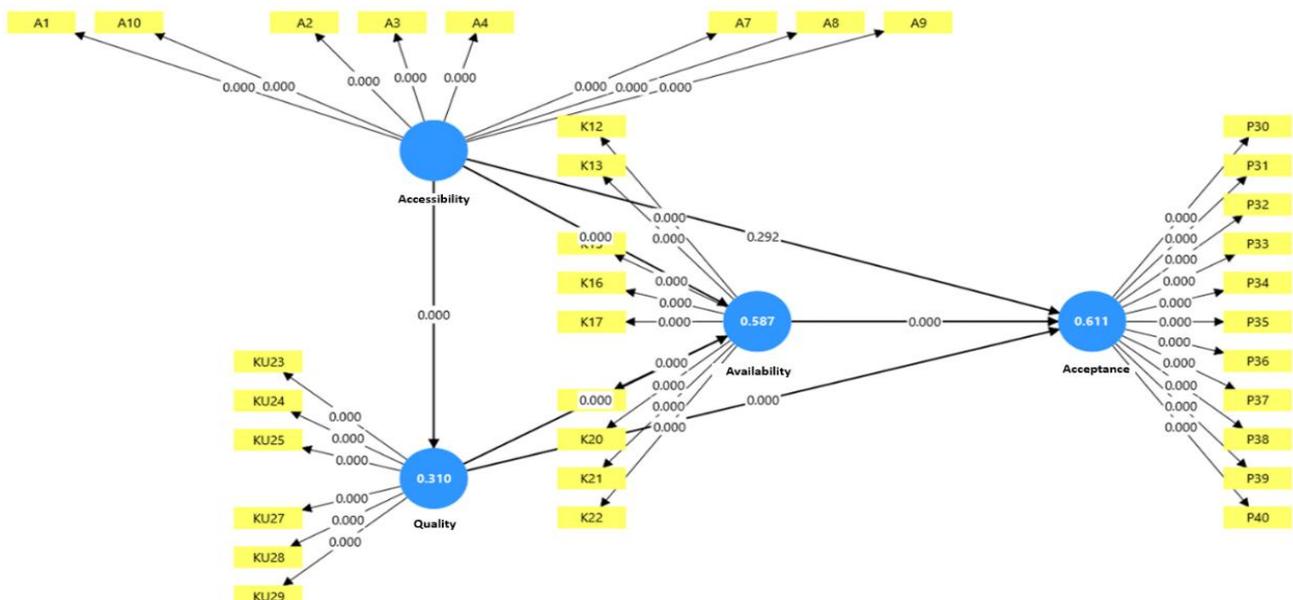
The availability variable was found to have a positive and significant effect on public acceptance, with a path coefficient of 0.333, a T value of 5.770, and a p value of 0.000. This indicates that higher availability of resources and infrastructure for INCDs Post services is associated with greater community acceptance. Furthermore, service quality demonstrated a positive and significant effect on both availability (coefficient = 0.557; T-statistic = 16.627; p = 0.000) and community acceptance (coefficient = 0.472; T-statistic = 10.138; p = 0.000) (Table 3). These findings suggest that high service quality not only enhances the availability of facilities and the implementation of INCDs Post activities but also strengthens public trust and acceptance of the program. Overall, the results confirm that service quality and availability serve as the main determinants of community acceptance, while accessibility contributes indirectly through these two variables.

The results of the indirect effect analysis between variables are presented in the Table 4. The results of the indirect effect analysis indicate that accessibility has a significant indirect effect on public acceptance through the quality variable, with a coefficient value of 0.263, T-statistic of 7.187, and p-value of 0.000. This finding suggests that improvements in accessibility can enhance public acceptance when accompanied by better service quality at INCDs Post. Further-

more, accessibility also shows an indirect effect on acceptance through the availability variable, with a coefficient value of 0.100, T-statistic of 4.985, and p-value of 0.000. This implies that ease of access can promote greater availability of services, which in turn strengthens community acceptance of INCDs Post activities.

The quality variable also shows a significant indirect effect on community acceptance through availability, with a coefficient of 0.186, T-statistic of 5.438, and p-value of 0.000. This finding confirms that good service quality can enhance the availability of facilities and personnel, which in turn increases community acceptance of INCDs Post. Additionally, accessibility exerts an indirect effect on availability through quality, with a coefficient value of 0.310, T-statistic of 11.735, and p-value of 0.000. This result indicates that improved accessibility can strengthen the availability of INCDs Post services when accompanied by enhancements in service quality.

Overall, these results indicate that the effect of accessibility on community acceptance is predominantly indirect, with service quality and availability acting as strong mediators. This implies that increasing community acceptance of INCDs Post services depends not only on ease of access but also on the quality of service delivery and the adequacy of supporting resources that ensure program sustainability.



Source: Primary Data, 2024

Figure 1. Results of Structural Equation Modeling (SEM-PLS) Path Analysis

Table 3. Results of Direct Influence Analysis between Research Variables

Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	p-values
Accessibility → Availability	0.301	0.300	0.039	7.632	0.000
Accessibility → Quality	0.557	0.558	0.040	14.101	0.000
Accessibility → Acceptance	0.049	0.050	0.047	1.053	0.292
Availability → Acceptance	0.333	0.338	0.058	5.770	0.000
Quality → Availability	0.557	0.557	0.033	16.627	0.000
Quality → Acceptance	0.472	0.471	0.047	10.138	0.000

Source: Primary Data, 2024

Table 4. Results of The Analysis of Indirect Effects among Research Variables

Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	p-values
Accessibility → Quality → Acceptability	0.263	0.263	0.037	7.187	0.000
Accessibility → Availability → Acceptability	0.100	0.101	0.020	4.985	0.000
Quality → Availability → Acceptability	0.186	0.188	0.034	5.438	0.000
Accessibility → Quality → Availability	0.310	0.311	0.026	11.735	0.000

Source: Primary Data, 2024

The results of the R-Square value are presented in in the Table 5. The coefficient of determination (R^2) was examined to assess the explanatory power of the structural model. As shown in table 5, the R^2 value for availability was 0.587, indicating that 58.7% of the variance in availability was explained by accessibility and service quality. The adjusted R^2 value (0.586) suggests that the model retains stable explanatory power after adjustment for the number of predictors. For service quality, the R^2 value was 0.310, indicating that 31.0% of the variance in service quality was explained by accessibility. This result suggests a moderate level of explanatory power. Meanwhile, the R^2 value for community acceptance reached 0.611, indicating that accessibility, availability, and service quality jointly explained 61.1% of the variance in acceptance. The adjusted R^2 value of 0.609 further confirms that the model demonstrates good predictive capability for community acceptance of INCDs Post services.

The results of the predictive relevance (Q^2) are presented in the Table 6. Predictive relevance of the model was evaluated using the PLS

Predict procedure. The results show that all endogenous variables had positive Q^2 values, namely 0.369 for availability, 0.305 for service quality, and 0.260 for community acceptance. The positive Q^2 values indicate that the model has good predictive relevance, as it is capable of predicting new observations better than a naïve benchmark based on mean values. In addition, the relatively low RMSE (0.801–0.864) and MAE (0.544–0.634) values across endogenous constructs suggest that the prediction errors are acceptable, supporting the robustness of the structural model.

Table 5. R-Square Value

	R-Square	R-Square Adjusted
Availability	0.587	0.586
Quality	0.310	0.309
Acceptance	0.611	0.609

Source: Primary Data, 2024

Table 6. Predictive Relevance (Q^2)

	Q^2 Predict	RMSE	MAE
Availability	0.369	0.801	0.544
Quality	0.305	0.839	0.603
Acceptance	0.260	0.864	0.634

Source: Primary Data, 2024

The results of the effect sizes (f^2) are presented in the Table 7. Effect size (f^2) analysis was conducted to assess the relative contribution of each exogenous variable to the endogenous constructs. The results indicate that accessibility had a moderate effect on availability ($f^2 = 0.151$) and a large effect on service quality ($f^2 = 0.450$), but a negligible effect on community acceptance ($f^2 = 0.004$). Service quality demonstrated a large effect on availability ($f^2 = 0.517$) and a moderate effect on community acceptance ($f^2 = 0.261$), indicating that service quality is a dominant predictor within the structural model. Availability showed a small-to-moderate effect on community acceptance ($f^2 = 0.118$), suggesting that while availability contributes to acceptance, its influence is less pronounced compared to service quality. Overall, the effect size analysis confirms that service quality plays a central role in strengthening both service availability and community acceptance of INCDS Post, while accessibility primarily influences acceptance indirectly through improvements in quality and availability.

Table 7. Effect Sizes (f^2)

	Accessi- bility	Avail- ability	Qual- ity	Accep- tance
Accessi- bility		0.151	0.450	0.004
Avail- ability				0.118
Quality Accep- tance		0.517		0.261

Source: Primary Data, 2024

DISCUSSION

This study provides empirical and theoretical insights into community acceptance of integrated non-communicable disease (INCD) postal services provided through INCD Post. Field findings show that the quality and availability of services have a direct effect on the acceptance of community-based non-communicable disease services. Accessibility, on the other hand, has an indirect effect. This condition refines existing theories on the use of health services by emphasizing that physical access alone is insufficient to ensure acceptance unless the service is considered reliable, sustainable, and beneficial to the community. Thus, this study expands the Andersen Behavior Model by positioning acces-

sibility as a supporting factor but not the main determinant, while service quality and availability function as the main determinants of sustainable service acceptance in community-based NCD programs.¹⁴

The results of the study show that participants in INCDS Post are predominantly middle-aged female (≥ 40 years). This condition shows that female, especially those in the adult and elderly age groups, have higher participation in early detection and monitoring of Non-Communicable Disease (NCD) risk factors. The predominance of female in INCDS Post activities can be attributed to several factors. In general, female have higher health awareness and are more actively involved in community-based health initiatives than male. In addition, middle-aged female tend to have more flexible schedules, allowing them to participate regularly in health screening activities. This aligns with the research by Ashari and Ernawati (2023), which states that the use of INCDS Post is more common among older females than among males.¹⁵

The dominance of older women's participation in INCDS Post activities shows that strategies are still needed to increase the participation of men and younger age groups. These efforts can include community-based approaches, more intensive promotion of the benefits of INCDS Post, and more flexible scheduling of activities to reach less engaged population groups. In family life, women often play the role of family health managers and will encourage family members to undergo health checkups and seek health-related information. Low male participation may be influenced by time constraints, lack of awareness of the risks of Non-Communicable Diseases (NCDs), and the perception that activities such as INCDS Post are not a priority.

Education plays a crucial role in shaping individuals' health behaviors, particularly in their ability to access, understand, and apply health information. Individuals with lower educational backgrounds often face barriers in interpreting health messages. The results showed that respondents with lower educational levels were more dominant. This can affect their understanding of the functions and objectives of INCDS Post, as well as their perceptions of service quality, leading to passive participation in preventive health services such as INCDS Post. According to

a study conducted by Zulkhairani et al. (2020), it was found that education level significantly affects the utilization of INCDs Post. People with lower education levels tend to use this service less optimally.¹⁶

In addition, educational attainment also influences individuals' perceptions of service quality. Respondents with lower educational backgrounds tend to view INCDs Post activities as mere routine health checks, without fully understanding the importance of early detection of non-communicable disease risk factors. Conversely, individuals with higher educational attainment tend to show greater awareness of the long-term benefits of participating in INCDs Post and are more actively involved. This shows that communication and health education strategies tailored to the educational characteristics of the community are needed. The application of a simpler, more interactive, and community-based approach can increase the understanding of groups with lower levels of education regarding the function and benefits of INCDs Post. Therefore, strengthening public health literacy is very important to expand the reach and effectiveness of the INCDs Post program at the local level.

Individuals who are not employed, such as housewives or the elderly, generally have greater flexibility to participate in INCDs Post activities, which are usually held during working hours or in the morning. Conversely, employed individuals often face time constraints due to busy work schedules, so their attendance rates at INCDs Post activities tends to be lower.¹⁷ Field findings show that unemployed respondents tend to have a higher level of acceptance of INCDs Post among their peer groups compared to employed respondents. This is due to differences in time availability and daily activity priorities that affect the level of acceptance of INCDs Post.

In line with the study by Sari et al. (2025), employment status was significantly associated with the level of community participation in Non-Communicable Disease Early Detection activities ($p = 0.014$). These results confirm that employment factors can be important determinants of community participation in non-communicable disease early detection activities. Employment status not only affects the amount of time available, but also influences priority patterns, work-related stress, and awareness of the

importance of routine health checkups.¹⁸ In addition, these results reinforce the view that community participation in INCDs Post is not only influenced by knowledge and attitude factors. Socioeconomic conditions and available leisure time also play a role. Therefore, to increase community involvement, innovation is needed through adjustments to activity schedules, collaboration with the work environment, or integration of INCDs Post services into flexible community activities. This strategy can expand the reach of INCDs Post services and promote equitable access among various community groups.

Respondent characteristics and sociodemographic backgrounds such as education, gender, and occupation play a critical role in determining the 'readiness' or 'potential' to utilize services. Although these individual attributes help identify which segments of the population are more likely to have the awareness and opportunity to participate, they do not fully explain why communities ultimately adopt, continue to use, or remain loyal to the program. This suggests that while sociodemographic characteristics and enabling factors (such as accessibility) establish the necessary preconditions, the actualization of sustained community acceptance is primarily influenced by structural and service-related determinants, particularly perceptions of the reliability and quality of the services provided. To analyze these dynamics beyond individual profiles, this study uses an SEM-PLS approach to identify systemic determinants that transform latent participation potential into realized and sustained community acceptance.

Field findings show that the availability and quality of services are the dominant factors influencing the level of public acceptance of INCDs Post. This indicates that the success of the program is not solely determined by ease of access, but also by the quality of services as perceived by the community. These findings explain why the aspects of service quality and availability have a greater influence than accessibility in shaping acceptance. Accessibility does determine an individual's ability to reach services, but acceptance depends heavily on the extent to which the time and effort expended provide meaningful benefits. In the context of community-based NCD programs, service discontinuity, absence of health workers, and equipment limitations can increase the opportu-

nity cost of participation, thereby reducing acceptance even though the services are geographically accessible. Although accessibility remains important in reaching program targets, positive perceptions of service quality and availability encourage the community to be more accepting and actively participate in INCDs Post activities. Service availability relates to the continuity of activities, regularity of schedules, and adequacy of human resources and equipment, while service quality reflects the competence of the implementing staff, adequacy of facilities and infrastructure, and the comfort and efficiency of services. When both of these aspects are optimally fulfilled, the community tends to view INCDs Post as a source of tangible health benefits, thereby strengthening trust and increasing participation.

In line with the results of a study conducted by Yonika, Palu, and Muchlis (2023), it was found that the quality of services and facilities significantly affects patient satisfaction. This finding reinforces the view that public perception of service quality is a key factor in the success of community-based health programs. In the context of INCDs Post, public satisfaction and acceptance depend heavily on the extent to which the services provided are able to meet the needs and expectations of the community.⁽¹⁹⁾ Thus, improving the quality and availability of services should be a top priority in the development of INCDs Post. Local governments can collaborate with community cadres and health workers in conducting routine evaluations of INCDs Post facilities, the human resources involved, and implementation mechanisms to ensure service quality. These efforts are expected to increase community acceptance and promote the sustainability of early detection programs for non-communicable diseases at the community level.

Other studies on the accessibility of health services for people with hearing disabilities in Indonesia state that although physical and geographical access is still limited (around 64.7%), lack of access can have a negative impact on perceptions of service quality and reduce service utilization.⁽²⁰⁾ The combined findings of previous studies show that accessibility does play a role in public acceptance, but its influence is stronger when service availability and quality are adequate. In addition, a spatial analysis of the

accessibility of health facilities in Jember Regency (2023) shows that the uneven spatial distribution of health facilities results in remote areas having very limited access. These findings are in line with this study, which shows that low accessibility weakens the direct influence on service utilization.⁽²¹⁾ Thus, efforts to improve accessibility need to be followed by improvements in service quality to ensure that better access provides meaningful benefits to the community.

The finding that service quality mediates the relationship between accessibility and public acceptance reinforces the theoretical concept that service attributes such as responsiveness, reliability, and empathy influence public perceptions of their overall experience in using health services. This is consistent with the service quality analysis conducted by Posyandu Jiwa Panji Asmoro (2024), which found that the dimensions of tangibles, assurance, and empathy significantly contribute to public satisfaction and acceptance, whereas the dimensions of reliability and responsiveness remain limiting factors.⁽²²⁾ Thus, although physical facilities and infrastructure (as part of tangibles) and quality assurance factors have improved, aspects such as responsiveness and service reliability still require enhancement to ensure that service quality is not merely superficial but consistently evident in everyday experiences.

A key contribution of this study is the finding that service quality and availability exert stronger influences on community acceptance than accessibility. This result extends existing health service acceptance theories by demonstrating that, in community-based NCD programs, acceptance is driven more by experiential factors than by physical proximity. When services are consistently available, staffed by competent personnel, and supported by adequate equipment and infrastructure, communities are more likely to perceive them as valuable and trustworthy. This finding is consistent with Saxena et al. (2024), who reported that acceptability of care in primary and community health settings in India is strongly influenced by perceived feasibility, service readiness, and provider competence rather than access alone.⁽²³⁾ Similarly, Esswaran et al. (2025) highlighted that healthcare worker capacity and service quality play central roles in shaping community engagement in NCD prevention among vulnerable and

underserved populations. These international findings from low- and middle-income country (LMIC) contexts support the present study's conclusion that quality and availability are critical determinants of service acceptance.²⁴

Overall, this study emphasizes that in the context of INCDs Post which is deeply influenced by local geography and community culture focusing solely on accessibility is insufficient. Equal emphasis must be placed on service availability and the quality of delivery, as these are the primary determinants that transform mere access into genuine community acceptance.

CONCLUSION AND RECOMMENDATION

This study concludes that the acceptance of community-based health services is influenced by perceived values regarding service quality and availability, rather than simply geographical proximity. Although accessibility does not have a significant direct effect on acceptance, it plays a crucial preliminary role by indirectly shaping acceptance through its influence on service quality and availability. These findings indicate that simply increasing the physical presence of services or reducing geographical barriers is insufficient to ensure meaningful utilization. Conversely, acceptance arises when easily accessible services are perceived as reliable, adequately resourced, and consistently provided, highlighting the importance of how services are perceived rather than where they are located.

This study provides a significant theoretical contribution by refining health service utilization models in community-based settings. It demonstrates that, in the context of NCD screening, the transition from physical access to actual service acceptance is not automatic. By shifting the analytical focus from a purely geographical perspective to a service-attribute perspective, the findings establish that service quality and resource reliability function as critical "sustainment factors" that cultivate long-term community trust and continued engagement. Scientifically, this underscores the role of service quality as a key mediating mechanism that transforms mere physical availability into meaningful participation, institutional credibility, and program sustainability, thereby extending existing utilization frameworks that have

traditionally emphasized access as the dominant determinant.

The insights generated offer a strategic framework for NCD program management, not only in Banjarmasin City but also for national health systems in other low- and middle-income countries with similar urban characteristics. Policies should shift toward a "quality-first" approach by prioritizing professional cadre training, regular supervision by health professionals, and the guaranteed availability of early detection tools at every post, rather than focusing solely on expanding service locations. To address identified gender and age imbalances, targeted innovations such as workplace NCDs screening and flexible-hour services are needed to reach productive-age and formal-sector populations. Strengthening health literacy through tailored, simple, and community-led communication is also essential to bridge the gap between service provision and perceived personal benefit. In addition, integrating NCD Post data into digital primary healthcare systems will support real-time monitoring, evaluation, and evidence-based scaling. The SEM-PLS model developed in this study provides a validated predictive tool for health authorities in LMICs to assess the potential success of community-based interventions before large-scale resource allocation. Future research should further examine socio-cultural motivations and psychological barriers influencing service acceptance across diverse contexts and employ longitudinal designs to establish causal relationships beyond the limitations of cross-sectional analysis.

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AUTHOR CONTRIBUTIONS

Conceived and designed the study by ARSA and AN; ARSA coordinated the field data collection and performed the statistical analysis; AN contributed substantially to data interpretation and methodological refinement; RA, AHI, and MAS provided critical academic input, conceptual advice, and methodological validation during the research process; H, MSN, and MR contributed to contextual analysis, policy interpre-

tation, and critical review of the manuscript. ARSA drafted the original manuscript, with substantive revisions and intellectual input from AN. All authors reviewed, provided critical feedback, and approved the final manuscript. ARSA = Ayu Riana Sari Azwari, AN = Adi Nugroho, RA = Rosihan Adhani, AHI = Acim Heri Iswanto, MAS = Muhammad Abdan Shadiqi, H = Herawati, MSN = Meitria Syahadatina Noor, MR = M. Ramadhan.

CONFLICTS OF INTEREST

The authors declare no conflict of interest in this study.

REFERENCES

1. Kurniasih H, Purnanti KD, Atmajaya R. Pengembangan Sistem Informasi Penyakit Tidak Menular (PTM) Berbasis Teknologi Informasi. *Jurnal Teknoinfo*. 2022;16(1):60–65.
<https://doi.org/10.33365/jti.v16i1.1520>
2. Kemenkes RI. Profil Kesehatan Indonesia 2021. Jakarta: Kementerian Kesehatan Republik Indonesia; 2022.
<https://kemkes.go.id/id/profil-kesehatan-indonesia-2021>
3. Kemenkes RI. Profil Kesehatan Indonesia 2024. Jakarta: Kementerian Kesehatan Republik Indonesia; 2025.
<https://kemkes.go.id/id/profil-kesehatan-indonesia-2024>
4. Kemenkes RI. Hasil Utama Riskesdas 2018. Jakarta: Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan Republik Indonesia; 2018.
https://dinkes.babelprov.go.id/sites/default/files/dokumen/bank_data/20181228%20-%20Laporan%20Riskesdas%202018%20Nasional-1.pdf
5. SKI. Survei Kesehatan Indonesia (SKI). Jakarta: Badan Kebijakan Pembangunan Kesehatan; 2023.
https://kemkes.go.id/app_asset/file_content_download/17169067256655eae5553985.98376730.pdf
6. Dinkes Kalimantan Selatan. Profil Kesehatan Provinsi Kalimantan Selatan 2022. Banjarmasin: Dinas Kesehatan Kalimantan Selatan; 2023.
<https://dinkeskalsel.id/?content=list&type=download>
7. Dinkes Kalimantan Selatan. Profil Kesehatan Provinsi Kalimantan Selatan 2023. Banjarmasin: Dinas Kesehatan Kalimantan Selatan; 2024.
<https://dinkeskalsel.id/?content=list&type=download>
8. Dinkes Kalimantan Selatan. Profil Kesehatan Provinsi Kalimantan Selatan 2024. Banjarmasin: Dinas Kesehatan Kalimantan Selatan; 2025.
<https://dinkeskalsel.id/?content=list&type=download>
9. Dinkes Kota Banjarmasin. Profil Kesehatan Kota Banjarmasin 2023. Banjarmasin: Dinas Kesehatan Kota Banjarmasin; 2024.
<https://dinkes.banjarmasinkota.go.id/p/profil-kesehatan-dinas-kesehatan-kota.html>
10. Fitriyani D, Dewi SU, Wirawan S, Kartadarma S, Purnomo H. Implementasi Program Posbindu Penyakit Tidak Menular. *Ensiklopedia of Journal*. 2024;6(3):57–63.
<https://jurnal.ensiklopediaku.org/ojs-2.4.8-3/index.php/ensiklopedia/article/view/2312>
11. Kemenkes RI. Keputusan Menteri Kesehatan Republik Indonesia Nomor HK.01/Menkes/2015 Tentang Petunjuk Teknis Integrasi Pelayanan Kesehatan Primer. Jakarta: Kementerian Kesehatan Republik Indonesia; 2023.
<https://ppid.kemendagri.go.id/front/dokumen/detail/300288241>
12. Kemenkes RI. Undang-undang Republik Indonesia Nomor 17 Tahun 2023 Tentang Kesehatan. Jakarta: Kementerian Kesehatan Republik Indonesia; 2023.
<https://peraturan.bpk.go.id/details/258028/uu-no-17-tahun-2023>
13. Darukaradhya TB, Krishnamurthy. Modifying Non-communicable Disease Behaviours Through Effective Health Communication and Behaviour Change: A Systematic Review. *Preventive Medicine Research & Reviews*. 2025;2(1):24–39.
https://journals.lww.com/pmrr/fulltext/2025/01000/modifying_non_communicable

[_disease_behaviours.5.aspx](#)

14. Andersen RM. Revisiting The Behavioral Model and Access to Medical Care: Does it Matter?. *Journal of Health and Social Behavior*. 1995;36(1):1-10.
<https://pubmed.ncbi.nlm.nih.gov/7738325/>
15. Ashari SF, Ernawati. Hubungan Kelompok Usia dengan Pemanfaatan Posbindu X di Desa Pontian Mekar, Kecamatan Lubuk Batu Jaya Kabupaten Indragiri Hulu, Riau 2021. *Health Information: Jurnal Penelitian*. 2023;15(2):1-7.
<https://myjurnal.poltekkes-kdi.ac.id/index.php/hijp/article/view/1053>
16. Zulkhairani S, Gurning FP. Faktor-faktor yang Mempengaruhi Pemanfaatan Posbindu PTM pada Masa Pandemi Covid-19 di Puskesmas Dalu Sepuluh Kecamatan Tanjung Morawa. *Sehat Rakyat: Jurnal Kesehatan Masyarakat*. 2022;1(4):409-422.
<https://doi.org/10.54259/sehatrakyat.v1i4.1205>
17. Duha S, Utami TN, Rifai A. Analisis Faktor yang Memengaruhi Minat Berkunjung Masyarakat ke Pos Pembinaan Terpadu Penyakit Tidak Menular di UPTD Puskesmas Lahusa Kecamatan Lahusa Kabupaten Nias Selatan. *Jurnal Kesmas Prima Indonesia*. 2021;3(2):52-61.
<https://doi.org/10.34012/jkpi.v3i2.2056>
18. Sari NPSW, Akbar IZ, Panghiyangan R, Musafaah M, Shadiqi MA. Analisis Faktor-Faktor yang Berhubungan dengan Pemanfaatan Pelayanan Pos Bina Terpadu Penyakit Tidak Menular. *HJK: Holistik Jurnal Kesehatan*. 2025;18(12):1495-505.
<https://ejournal.ipphorr.com/index.php/hjk/article/view/628>
19. Yoniko VA, Palu B, Muchlis N. Pengaruh Kualitas Pelayanan dan Fasilitas Terhadap Kepuasan Pasien Rawat Jalan di Mayapada Hospital Tangerang Tahun 2023. *Journal of Aafiyah Health Research (JAHR)*. 2024;5(1):108-114.
<https://pasca-umi.ac.id/index.php/jahr/article/view/1600>
20. Varry R, Zachreini I, Ghaita F. Survei Aksesibilitas Layanan Kesehatan Penyandang Disabilitas Rungu di Indonesia. *GALENICAL: Jurnal Kedokteran dan Kesehatan Mahasiswa Malikussaleh*. 2025;4(3):29-37.
<https://doi.org/10.29103/jkkmm.v4i3.22396>
21. Arief MH, Afandi K, Kustin K, Arifin IF, Laily NF. Analisis Spasial Aksesibilitas Fasilitas Kesehatan di Kabupaten Jember. *Jurnal Minfo Polgan*. 2023;12(2):1764-1771.
<https://doi.org/10.33395/jmp.v12i2.12984>
22. Wardani LCK, Subekti T. Analisis Kualitas Layanan Posyandu Jiwa Panji Asmoro oleh Puskesmas Srengat Tahun 2024. *Journal of Governance and Policy*. 2024;5(1):21-32.
<https://jgp-fisip.ub.ac.id/index.php/jgp/article/view/54>
23. Saxena S, Bhan A, Fleming W, Singh A, Tugnawat D. Acceptability, Feasibility and Appropriateness of Care of Patients with Depression at Health and Wellness Centre in a District of India. *Preventive Medicine Research & Reviews*. 2024;1(1):41-46.
https://journals.lww.com/pmrr/fulltext/2024/01010/acceptability,_feasibility_and_appropriateness_of.12.aspx
24. Esswaran C, Vijayalakshmi, Banu MJH. Non-communicable Disease Risk Factors and Healthcare Worker's Perspective on Tackling Them Amongst Tribal Population: A Mixed Method Study. *Preventive Medicine Research & Reviews*. 2025;2(3):119-123.
https://journals.lww.com/pmrr/fulltext/2025/05000/non_communicable_disease_risk_factors_and.6.aspx