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Workforce Availability, Accessibility, and Availability of Healthcare Facilities in Archipelagic Regions: A Literature Review

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ABSTRACT

The utilization of health services in border areas still faces various obstacles that lead to low utilization rates of Community Health Centers (Puskesmas), even though these facilities are physically available. The main challenges stem from limited geographic accessibility, unequal distribution of health workers, and the lack of adequate health facilities. Border communities living in connecting or display areas of a region often have to travel long distances with difficult transportation conditions, which ultimately impacts low visits to formal health facilities. This study aims to examine and synthesize the findings of various previous studies that highlight the relationship between accessibility, quality of health services, workforce availability, and facility availability on the level of health service utilization, particularly in border areas. The method used is a literature review of 23 scientific articles published between 2020 and 2025 and obtained from reliable sources and national journal portals. Data were analyzed descriptively and thematically. The study results indicate that accessibility is the most significant factor influencing people's decisions in using health services, followed by the uneven availability of health workers, and the quality and completeness of facilities that do not meet minimum service standards. These findings are consistent with Andersen's behavioral model, which positions accessibility as an enabling factor in service utilization. Furthermore, the study results also reinforce the urgency of improving health infrastructure and regional-based health worker redistribution policies.

Keywords: Health Workforce Availability; Accesibility; Facility Availability; Health Setvice Utilization; Public Health Center.

INTRODUCTION

Utilization of health services is an important indicator in assessing the success of a health care system in a region. Utilization of health services is defined as the process of using health care facilities by individuals or communities to improve health, prevent disease, and obtaining treatment and health recovery (Widiyastuty et al., 2023). The level of health services reflects the extent to which society has access and willingness to use available services.

Primary health care in Indonesia plays a strategic role in ensuring equal access to health services for all people. However, in rural areas islands/coastal areas, utilization of Community Health Center health services is still low, influenced by limited accessibility, availability of health workers, and facilities Inadequate services. This situation creates a gap in the achievement of health indicators for communities in border areas compared to urban areas (Ministry of Health of the Republic of Indonesia, 2023).

Accessibility is a major challenge in health services in the region Islands/coastal areas. Many community health centers in coastal areas are only accessible by sea or river, which can take hours to travel,

and some do not even have adequate land transportation. A report from the Ministry of Health Health stated that 32% of Community Health Centers in coastal and island areas still difficult to reach due to extreme geographical conditions (Ministry of Health of the Republic of Indonesia, 2023b).This low accessibility causes people to be reluctant to come to Health centers, except in emergency situations.

Furthermore, , the availability of labor is also a crucial issue.Health workers such as doctors, midwives, and nurses are still unevenly distributed in coastal areas. Data from the Directorate General of Health Personnel shows that by 2023, only around 54.3% of community health centers in remote and coastal areas will have complete medical personnel according to minimum standards (Directorate General of Health Workers, 2023). This situation is exacerbated with high levels of absenteeism among medical personnel due to limited incentives and work support facilities.

The shortage of health workers has a direct impact on servicesFor example, many coastal health centers only have one general practitioner, and not even one. have nutritionists or laboratory analysts. This phenomenon results in suboptimal service delivery and risks increasing referral rates to advanced facilities (Katadata.co.id, 2024).

In addition, the availability of service facilities at coastal health centers is also is still far from adequate. Based on BPJS Kesehatan data, although around 97%Although community health centers (Puskesmas) have partnered with the National Health Insurance (JKN), not all have adequate facilities to meet basic service needs, such as laboratories, treatmentrooms, and medication availability (BPJS Kesehatan, 2023). A field study in Southeast Sulawesi showed thatthat there is a lack of facilities such as inpatient beds, basic examination tools, and Referral transportation hinders the service process and causes patients to postpone visits or seek non-medical alternatives (Ministry of Health of the Republic of Indonesia, 2023c).

The implications of low accessibility, lack of health workers, and The limitations of this facility are very clear, namely the low utilization of Community Health Center services. In coastal areas, people tend to rely on traditional medicine or only seek medical help when their illness is severe. This phenomenon directly impacts the low achievement of Minimum Service Standards (SPM).health. Therefore, it is important to conduct an in-depth study on howThree main factors—accessibility, workforce availability, and service facility availability—influence the level of utilization of health services at community health centers in coastal areas. This study is expected to provide a scientific basis forformulation of policies for equal distribution of health services and development of health systems inclusive health, especially for communities in remote and border areas.

METHOD

The method used in writing this research is a literature review study. A literature review is a scientific study that only focuses on one particular topic.This study aims to analyze various selected literature sources to form a conclusion and can become a new idea. This study uses journal literature sources and scientific articles that have been previously published online through Google Scholar and SINTA using several keywords related to the Utilization of health services, "accessibility", "health workers", "health facilities", "Puskesmas", and "coastal areas/DTPK". From the results of selecting articles, 23 articles were obtained that fit the research inclusion criteria.

RESEARCH RESULTS AND DISCUSSION

Research Results

Table 1. Result literature review

Name (Year)	Title	Objective	Method	Result	Conclusion
(Adedokun et al., 2023)	Determinants of partial and adequate maternal health service utilization in	identifying factors associated with partial and adequate utilization of maternal health services in Nigeria.	This study utilizes data from the 2018 Nigeria Demographic and Health Survey (DHS), comprising 21,792 women aged 15–49 who	Approximately 74% of women receive antenatal care, 41% give birth in health facilities, and 21% receive postnatal care. Meanwhile, 68% of women utilize health services partially, and 11% utilize them adequately. The likelihood of utilizing health services—whether	This study has identified factors associated with partial and adequate healthcare service utilization among women in Nigeria. These factors include education, household wealth, marital

	Nigeria : analysis of cross-sectional surveyS		had given birth within the five years preceding the survey. It focuses on antenatal care attendance, place of birth, and postnatal care, employing a combined model. Multinomial logistic regression was applied in the analysis.	partially or adequately—is higher among women who have ever been married, those with secondary education or higher, those from the wealthiest households, those living in urban areas, and those who face no obstacles in obtaining permission to visit or in reaching a health facility.	status, employment status, place of residence, region, media exposure, obtaining permission to use healthcare services, reluctance to visit health facilities alone, and distance to health facilities. Increasing the utilization of maternal health services requires adequate attention to interventions that address the challenges posed by these factors.
Alwi Safriansyah, dkk (2023)	The Impact of Healthcare Service Infrastructur e on JKN Participation in Indonesia	This study aims to determine the impact of healthcare infrastructure on public participation in the National Health Insurance (JKN) program in Indonesia. The primary focus is to evaluate how infrastructure disparities affect the public's interest and ability to enroll in the JKN program.	Research Type: Literature review | Data Source: 30 scientific articles published between 2020 and 2023 | Search Technique: Google Scholar search engine | Inclusion Criteria: Articles relevant to the topic and meeting methodological requirements	Research has identified several factors influencing public participation in the JKN program, including: healthcare infrastructure accessibility (geographical and transportation barriers reduce interest in enrollment); medical workforce availability (uneven distribution of doctors and nurses lowers service quality); availability of supporting facilities (such as medical equipment and laboratories, which affect participant comfort); perceptions of service quality (participants' assessment of JKN facilities and services impacts the continuity of their participation); and regional disparities (remote areas lag behind urban areas in terms of healthcare access and infrastructure). Additional factors—such as knowledge, income, education, and public attitudes—also influence participation in the JKN program.	Healthcare service infrastructure is a crucial factor in supporting participation in the JKN program. Uneven infrastructure distribution leads to limited access, poor service quality, and negative perceptions of the JKN system. Therefore, the following measures are necessary: increasing the number of BPJS-partnered healthcare facilities, particularly in remote areas; optimizing policies and regulations regarding JKN services; leveraging technology—such as the Mobile JKN application—to enhance ease of access and participation; and continuously evaluating JKN implementation to ensure greater adaptability to the public's needs.
M. Habibullah, dkk (2023)	Spatial Analysis of Healthcare Facility Accessibility in Jember Regency	To evaluate the distribution and accessibility of healthcare facilities in Jember Regency, East Java, and to identify areas not yet covered by healthcare services, in order to support equitable access and service quality in accordance with WHO standards.	Research Type: Quantitative, employing a spatial analysis approach within health geography using Geographic Information Systems (GIS).	There is a significant difference between central and regional spatial data (RMSE 2.12 km^2). Distribution: General hospitals (RSU) show a random pattern (Z-score = 0.575), Community Health Centers (Puskesmas) tend to be dispersed (Z-score = 2.405), and Special Hospitals (RSK) are concentrated. Service coverage: RSU coverage area: 2,053 km^2; RSK coverage area: 746 km^2; Puskesmas coverage area: 2,490 km^2; area not covered by any facility: 921.897 km^2 (~28% of the total area).	Jember Regency faces serious challenges regarding the equitable distribution of and access to healthcare facilities. Failure to meet WHO standards (a healthcare facility ratio of 1:10,000) has resulted in many areas lacking service coverage. Improvements in distribution and the use of spatial technology are required to support planning and policymaking aimed at enhancing service quality and ensuring equitable access for the entire population.
Ronal Nteseo, dkk (2023)	The Influence of Facility Availability, Staff Reliability, and Service Guarantees on Parental Satisfaction at the Integrated	To determine the influence of facility availability, staff reliability, and service guarantees on parental satisfaction regarding Integrated Management of Childhood Illness	Research type: Quantitative, analytic observational; Design: Cross-sectional; Population: All parents of children under five visiting the Integrated Management of	The availability of facilities significantly influences parental satisfaction (β = 0.892; p = 0.000) → 89.2% contribution; staff reliability also has a significant effect (β = 0.247; p = 0.039) → 24.7% contribution; and service assurance has a significant effect (β = 0.775; p = 0.000) → 77.5% contribution. Additionally, the availability of facilities influences service	There is a positive and significant influence of facility availability on parental satisfaction with MTBS services (representing the strongest influence). Staff reliability and service assurance also significantly influence satisfaction. The availability of facilities and

	Management of Childhood Illness (IMCI) Clinic of Kota Tengah Community Health Center, Gorontalo City	(IMCI) services at the Kota Tengah Community Health Center in Gorontalo City.	Childhood Illness (IMCI/MTBS) clinic over the past three months (232 individuals); Sample: 70 respondents (selected via purposive sampling); Instrument: Questionnaire with validated and tested reliability; Data analysis: Path analysis to measure causal relationships between variables.	assurance (β = 0.864; p = 0.000), and staff reliability influences service assurance (β = 0.308; p = 0.009).	staff reliability contribute to the quality of service assurance, which ultimately impacts the satisfaction of service recipients.
Putri Oktavianti dkk (2024)	Factors Associated with the Utilization of Health Facilities in Siluluk Village	healthcare facilities by the community of Siluluk Village, specifically examining the influence of accessibility, health insurance coverage, and individual perceptions of illness on healthcare utilization behavior.	Analytic; Design: Cross-sectional (observational); Location and time: Siluluk Village, December 2023 – February 2024; Population: 272 individuals or 75 households; Sample: 75 respondents (saturated sample, 1 person per household); Instrument: Primary questionnaire; Data analysis: Univariate and multivariate using multiple logistic regression.	Accessibility: 89.3% reported easy access, while 10.7% reported difficulty. Individual assessment: 74.7% held a positive assessment regarding the disease. Health facility utilization: 93.3% utilized the facilities. Regression analysis results: Accessibility showed a significant association with health facility utilization (p = 0.036; OR = 15.3), whereas health insurance ownership (p = 1.000) and individual assessment of the disease (p = 0.179) were not significant; the model demonstrated a predictive accuracy of 93.3%.	...significant factors influencing the utilization of health facilities in Siluluk Village. Meanwhile, health insurance coverage and the assessment of the illness did not show a significant relationship. Efforts are needed to improve access to health services, particularly for areas with challenging geographical conditions.
E. Yulianti, dkk (2021)	The Influence of Accessibility on Antenatal Care Practices Among Pregnant Women in the Working Area of Bulu Community Health Center, Temanggung Regency, 2020	To determine the factors influencing antenatal care (ANC) practices among pregnant women in the working area of the Bulu Community Health Center (Puskesmas), Temanggung Regency, and to identify the primary influencing factor, particularly in efforts to reduce the incidence of low birth weight (LBW).	Research type: Quantitative descriptive-analytic; Design: Cross-sectional; Population and sample: 55 third-trimester pregnant women, selected using total sampling; Instrument: Structured questionnaire; Data analysis: Univariate (frequency distribution and percentages), Bivariate (Chi-square test), Multivariate (multiple logistic regression to identify the most influential variable).	Good ANC practices: 54.5% of pregnant women. Seven variables were significantly associated with ANC practices: Age (p = 0.039), Occupation (p = 0.049), Knowledge (p = 0.025), Attitude (p = 0.023), Accessibility of services (p = 0.013), Quality of services (p = 0.013), and Support from health workers (p = 0.001). Most influential variables (multivariate logistic regression results): Accessibility of services (p = 0.011; OR = 10.557) and Support from health workers (p = 0.006; OR = 8.959).	Although the majority of pregnant women engage in ANC practices, many still fail to take blood-supplementing tablets regularly, follow healthcare provider recommendations, or undergo trimester-specific check-ups. Accessibility and support from healthcare workers are the two strongest factors influencing ANC practices. Factors such as education, income, medical history, and family support do not show a significant influence on ANC practices.
Radinal Husein (2024)	Accelerating the Deployment of Medical and Health Personnel in Community	Examining the reasons behind the persistent shortfall in medical and health personnel at Community Health Centers	Type of research: Policy study (policy paper) using a descriptive approach. Data sources: Primary data from the	There are 8,648 staffing vacancies across Community Health Centers (Puskesmas), comprising shortages of 2,995 dentists, 428 physicians, 959 nutritionists, and 1,493 environmental sanitation officers. Key obstacles include the	Addressing the need for medical personnel requires more than just temporary assignments; a long-term approach is essential, focusing on improved welfare, career

	Health Centers (Puskesmas) to Optimize Healthcare Services for the Community	(Puskesmas) and formulating policy recommendations to accelerate the fulfillment of these staffing needs, in order to optimize public health services and achieve national health development targets.	Ministry of Health's Health Human Resources Information System (SI SDMK); secondary data comprising performance documents from the Directorate General of Health Personnel and literature from various sources. Analysis: Descriptive quantitative analysis to illustrate the situation regarding medical personnel shortages and their distribution by region.	maldistribution of personnel and poor retention rates. Local governments have not optimized redistribution efforts, relying instead on central government programs such as *Nusantara Sehat* and PGDS, while Civil Servant (ASN) recruitment quotas remain limited. Recommended strategic policy options include: recruitment via the PPPK (Government Employees with Employment Agreements) scheme; redistribution of health workers from areas with a surplus to those with a shortage; adjustments to Practice Licenses (SIP) to expand the scope of medical practice; establishment of incentive indices based on zoning; career development for non-ASN personnel; cross-sector and cross-program collaboration; and the provision of health facilities bundled with the necessary medical personnel.	development, and national regulations. New regulations are needed to empower the central government to issue Practice Licenses (SIP) and to restructure the management of health workers. Furthermore, coordination across ministries and local governments is crucial to ensure the equitable distribution of medical personnel and to enhance the quality of services at Community Health Centers (Puskesmas) throughout Indonesia.
Fadila Syahrani Purba, dkk (2024)	Analysis of Facility Availability and Service Quality Regarding Patient Satisfaction at Johor Community Health Center (Puskesmas)	To determine the impact of facility availability and service quality on patient satisfaction at the Johor Community Health Center (Puskesmas), specifically by analyzing patient perceptions and the center's management efforts to improve services.	Research type: Descriptive qualitative; data collection techniques: in-depth interviews with four informants (the head of facilities and infrastructure, the head of administration, and two patients using the services) and participant observation at Puskesmas Johor; instrument: interview guide; analysis: thematic and interpretive, based on interview narratives.	Facility availability at the Johor Community Health Center (Puskesmas) improved from 80.71% in 2023, reaching the 85% target for 2024. Areas rated positively included the waiting room, medical equipment, and cleanliness; however, the children's play area was deemed inadequate. Facility assessment and provision are managed through the RUK (Proposed Needs Plan) system and by addressing patient complaints. Annual staff training programs have enhanced service competence, and annual patient satisfaction surveys indicate high satisfaction levels, exceeding the >76% target. Patients described the service as good, friendly, and efficient, assigning a satisfaction rating of 7 out of 9.	The availability of facilities and the quality of service significantly influence patient satisfaction. Factors contributing to satisfaction include the friendliness of medical staff, the completeness of facilities, and responsiveness to complaints. Enhancing facilities—particularly children's play areas—and strengthening service evaluation systems are recommended to maintain and improve patient satisfaction in the future.
ville & Linard (2022)	Spatial accessibility to health facilities in Sub-Saharan Africa: comparing existing models with survey based perceived accessibility	Assessing the extent to which four spatial models of accessibility to health facilities across 12 sub-Saharan African countries reflect perceived accessibility among the population, based on Demographic and Health Surveys (DHS) data.	Design: A quantitative comparative study based on spatial data and surveys. Countries studied: 12 Sub-Saharan African countries (including Angola, Ethiopia, Nigeria, Rwanda, etc.). Models compared: Euclidean Distance (ED) – straight-line distance to the nearest health facility; Cost-Distance Motorized (CD-M) – travel time by motorized vehicle; Cost-Distance Walking (CD-W) – travel	Euclidean Distance (ED) generally shows the strongest correlation with public perceptions of accessibility (r = 0.457). Stronger correlations were observed in rural areas and among respondents lacking access to motorized transport. While Kernel Density performed best in 6 out of the 12 countries when analyzed individually, it performed the weakest in the aggregate analysis across all countries; no single model consistently outperformed the others across all contexts. Complex models (such as cost-distance) do not necessarily outperform simpler methods, particularly when spatial data is of low resolution (~1x1 km) or incomplete.	A simple spatial accessibility model (based on Euclidean distance) is generally better suited for predicting perceived accessibility than more complex models when using medium-resolution global data. Model performance is superior in rural areas and among populations without motor vehicles. This study highlights the importance of considering local contexts and utilizing more detailed or field-based data to improve model accuracy in predicting actual accessibility. Policy implications: healthcare service planning needs to account for the limitations

			time on foot; Kernel Density (KD) – density of health facilities within a 15 km radius. Supporting data: Friction maps (mobility resistance maps), population maps (WorldPop), and perceived access data from DHS respondents (questions regarding whether distance acts as a barrier). Analysis: Spearman correlation between modeled accessibility values and perceived accessibility (PA) values, stratified by: region (urban vs. rural) and access to motorized transport (yes/no).		of spatial models and integrate them with data on public perceptions and socio-economic realities.
Jabrullah Ab Hamid, et al. (2022)	Spatial Accessibility of Primary Care in the Dual Public–Private Health System in Rural Areas, Malaysia	To assess the level and spatial patterns of primary healthcare accessibility in rural areas of Selangor, Malaysia, and to identify the ecological (geographical and demographic) factors influencing such access. This study distinguishes the contributions of the public and private sectors within the dual healthcare system.	Research Type: Spatial ecological study using the Enhanced Two-Step Floating Catchment Area (E2SFCA) method. Location: Rural areas of Selangor, Malaysia. Data: Population data from the 2010 Census, healthcare facility data from the Ministry of Health Malaysia, and road network data from the National Geospatial Centre. Analysis: Hot Spot Analysis (Getis-Ord Gi*) and Global Moran's I; Hierarchical Multiple Linear Regression (MLR) and Geographically Weighted Regression (GWR) to evaluate the influence of ecological factors.	Public E2SFCA accessibility score (Aspub): 0.800; private E2SFCA accessibility score (Aspri): 1.154; total score (Astot): 1.953 — > 59% is derived from the private sector. Areas near urban centers exhibit higher accessibility scores, whereas the north coast and inland regions show low access ("cold spots"). Factors significantly influencing accessibility include road density, population density, distance to the city center, the proportion of vulnerable groups, and the elderly dependency ratio. Rural areas show slightly higher accessibility scores compared to small urban areas. Private E2SFCA scores tend to be unevenly distributed, particularly in the northern region.	This study reveals that spatial access to primary healthcare services in rural Malaysia remains unequal, characterized by a heavy reliance on the private sector. The application of a modified E2SFCA method—integrating health needs with service availability—yields more accurate results in depicting service access. Spatially informed healthcare planning, public-private partnerships, and subsidies such as the "Peduli Sihat" program offer strategic solutions to address access disparities for rural communities.
Aklilu Endalamaw, et al. (2024)	Barriers and strategies for primary health care workforce development : synthesis of evidence	Identifying the barriers and strategies affecting primary health care workforce development worldwide, with an emphasis on recruitment, retention, training, motivation, and system support.	Study type: Scoping review of reviews; Data sources: Google Scholar, PubMed, Web of Science, EMBASE; Inclusion criteria: Review articles related to primary health workforce development, focusing on topics such as training,	Key obstacles: Financial and funding issues, lack of training and professional development, unsupportive work environments, ambiguity regarding roles and responsibilities, unequal distribution of healthcare workers, high workloads, shortages of technology and medical equipment, and sociodemographic factors such as gender, age, and educational background. Effective strategies identified: Strong leadership and	The development of the primary healthcare workforce relies heavily on strong leadership, stable funding systems, technology and information support, and the strengthening of individual and team capacities. A systemic and sustainable approach is required—one capable of preventing burnout, boosting

			motivation, recruitment, retention, etc., published in English up to July 2022; Number of articles analyzed: 69 reviews out of 7,276 initial articles; Data analysis: Qualitative synthesis based on the WHO health system building blocks.	supervision, financial and non-financial incentives, continuous education and training, community involvement in recruitment and retention, solid teamwork and peer support, utilization of information technology and remote services (telehealth), and an inclusive, balanced work environment.	motivation, and enhancing recruitment and retention across all levels of the health system. These findings serve as a crucial foundation for policymakers and health administrators in designing strategies that are effective and responsive to global challenges.
Meyer et al., (2025)	Sociodemohgrahic predictors of mental heath service utilization among young adults with support in daily living in Sweden: a register-based study	to provide a comprehensive overview of the social and health circumstances of young people aged 18 to 29 who have recently received support in their daily lives. We specifically focus on the utilization of mental health services and the potential influence of sociodemographic factors.	Swedish national registry data were used to describe sociodemographic characteristics and mental health service utilization, including outpatient and inpatient care, treatment for suicidal behavior, and pharmacological treatment. Sociodemographic predictors (sex, age, country of birth, education, and parental education) of mental health service utilization were explored using binary logistic regression.	A total of 15,024 young adults (aged 18–29 years) who received support between 2017 and 2021 (49.2% female) were included in the study. Disadvantaged social circumstances were common, including interrupted education, unemployment, and a need for financial assistance. Many had a history of psychiatric hospitalization (40.0%) and treatment for suicidal behavior (15.7%). The majority received psychiatric outpatient care (71.6%) and psychopharmacological treatment (73.9%) during the year they received the grant. Common conditions requiring treatment included attention-deficit/hyperactivity disorder, anxiety and fear disorders, mood disorders, and autism spectrum disorder. Comorbid conditions were also common. Mental health service utilization was more frequent among women, particularly regarding treatment for suicidal behavior (adjusted OR 2.52; 95% CI 2.16–2.93). Higher levels of education and being born in Sweden were associated with a greater likelihood of utilizing outpatient care and psychopharmacological treatment. Conversely, those born in Sweden were less likely to be hospitalized compared to those born abroad (adjusted OR 0.66; 95% CI 0.59–0.74).	Although social services recognize the support needs of this group of young adults, our findings indicate that sociodemographic characteristics—such as gender, education level, and country of birth—can facilitate or hinder their access to mental health services. It is crucial to coordinate efforts so that young adults who require support in their daily lives can seek and access the mental health services they need.
Y. Li et al., (2023)	Factors influencing international non-utilization of heathcare : a Study using the Andersen model	This study aims to investigate the factors influencing residents' healthcare utilization behavior and to provide a scientific basis for improving the overall efficiency of healthcare service utilization.	A comprehensive analysis was conducted using data from the Chinese General Social Survey (CGSS) project. Exploratory Factor Analysis (EFA) and Structural Equation Modeling (SEM) were employed to examine the effects and relationships among three core factors of Andersen's Health Service Utilization Model (predisposing	A total of 2,230 participants were enrolled in this study. The majority were male (55.74%), married (85.38%), and had a junior or senior high school education (45.29%). The mean age was 52.39 years, and 56.32% of participants reported an annual income of <30,000 RMB. Exploratory Factor Analysis (EFA) grouped the influencing factors into four domains: Enabling and Support Factors, Need, Health Behavior, and Medical Service Experience. Revised Structural Equation Modeling (SEM) results indicated that the influence coefficients of Enabling and Support Factors, Need, and Medical Service Experience on the Decision to Use	This study indicates that unmarried individuals with low incomes and job instability exhibit reduced healthcare utilization due to economic barriers and a lack of social support. Furthermore, experiences with medical services constitute another significant factor influencing healthcare utilization. Specifically, our findings highlight the need for targeted interventions—such as expanding insurance coverage, improving the quality of medical services, and

			factors, enabling resources, and need) and two additional factors (health behavior and medical service experience) on residents' decisions regarding health service utilization.	Health Services (DUHS) were 0.095, -0.104, and 0.093, respectively. Mediation effect test results showed that the indirect effects of Predisposing and Enabling Factors, Need, and Health Behavior on DUHS were -0.098, 0.024, and -0.017, respectively, all of which were statistically significant. Finally, the modified model fit indices demonstrated a good fit.	implementing health education campaigns—to reduce disparities in access to healthcare.
Guiyuan et al., (2024)	heathcare services for internal migrant older adults	to assess current outpatient and inpatient healthcare service utilization among the elderly migrant population in Xuzhou and to explore the factors influencing such utilization	A multistage random sampling method was used to select a study population consisting of 568 elderly migrants aged 60 and older residing in Xuzhou city. Multivariate logistic regression analysis, based on the Anderson model, was conducted to explore the factors influencing the utilization of outpatient and inpatient healthcare services among this population.	Among the 568 migrants, 73 (12.9%) had received outpatient services in the past two weeks, while 109 (19.2%) had received inpatient services in the past year. Education level, travel time to health centers, and self-rated health status were negatively associated with outpatient service utilization among elderly migrants. Conversely, pension insurance coverage, ease of access, illness within the past two weeks, and healthcare needs were positively associated with outpatient service utilization. Furthermore, age, pension and health insurance coverage, ease of access, number of chronic conditions, illness within the past two weeks, and healthcare needs were positively associated with inpatient service utilization among elderly migrants, whereas education level, self-rated health status, and travel time to health centers were negatively associated with it.	Overall healthcare service utilization by elderly migrants in Xuzhou remains inadequate. Addressing this issue requires enhanced medical policy support and assistance, stronger health education initiatives, and greater social integration for the elderly. Furthermore, efforts are needed to alleviate their financial burden and improve healthcare accessibility.
Yan et al., (2023)	Maternal heathcare utilization in papua new guinea	to assess the prevalence and determinants of ANC, SBA, and PNC services among women in PNG. Unlike other similar studies [8,9], we conducted a dominance analysis to determine the relative contributions of predisposing, enabling, and need factors within a multivariable logistic regression model. The results can provide new evidence to inform the development of targeted policies and interventions. The study findings reveal that the prevalence of ANC service utilization among women in PNG is 52.3%. A similar indicator	This study utilized data from the 2016–2018 Papua New Guinea Demographic and Health Survey. A total of 5,248 women of reproductive age constituted the analysis sample. The outcome variables were the utilization of ANC, SBA, and PNC services. Chi-square tests, multivariable logistic regression, and dominance analysis were performed. Statistical significance was set at $p < 0.05$.	The prevalence rates for ANC, SBA, and PNC services were 52.3%, 58.7%, and 26.6%, respectively. Women's employment, education, media exposure, distance to health facilities, household wealth, region, place of residence, and parity were determinants of maternal and child health service (MHS) utilization. The utilization of ANC, SBA, and PNC services was primarily influenced by enabling factors, followed by predisposing and need factors.	This study indicates that enabling factors—such as media exposure, distance to health facilities, household wealth, region, and place of residence—have the greatest impact on the utilization of maternal health services (K3), followed by predisposing factors (employment, education) and need-based factors (parity). Therefore, enabling factors should be prioritized when developing maternal health programs and policies. For instance, transportation and health infrastructure must be strengthened, and education and vocational training for women enhanced—particularly in the Highlands, Momase region, and rural areas—to increase the utilization of K3.

		value was reported by the World Health Organization (WHO), showing that 49.0% of women of reproductive age in PNG had attended at least four ANC visits (2011–2018) [17]. The prevalence of SBA services (58.7%) in this study is higher than that found in two previous studies, which reported estimates of 28% (2007–2010) [18] and 39.1% (2009–2012) [19] for PNG. Differences in study findings may be attributed to the different time periods in which the studies were conducted. The increased utilization of SBA services may be due to an increase in health human resources.			
Devkota et al., (2021)	Mental heath service from primary health care (PCH) Facilities of western hilly district of nepal	To explore the factors influencing the utilization of mental health services at primary health care facilities in Arghakhanchi district, a hilly district in western Nepal.	A cross-sectional qualitative study was conducted in Arghakhanchi District, Nepal, during July and August 2019, gathering information through face-to-face in-depth interviews and key informant interviews with three purposively selected categories of participants. Thirty-two participants selected from these three categories were interviewed using a validated interview guide. Thematic analysis was performed using the RQDA package for EZR software. Validation of translated transcripts, member checking, and inter-rater agreement percentages were	Mental health stigma and a lack of awareness have been identified as primary factors hindering the utilization of mental health services at the community level. This issue also impacts various factors across other socio-ecological levels, thereby acting as a barrier. Participants recommended raising community awareness and ensuring the accessibility and availability of comprehensive mental health services to increase service utilization at primary healthcare facilities.	Awareness among individuals, families, and the community can help reduce and/or eliminate mental health stigma. Accessible health facilities and the availability of comprehensive mental health services within primary healthcare settings can help increase the utilization of these services.

			employed to ensure the study's rigor.		
Zhang et all., (2025)	Shool- based Health cenrers and the utilization of primary care in rular communities	This study contributes to the literature by comparing primary care service utilization among school-aged children—including physician visits, recommended preventive care, and visits related to chronic conditions—across rural school districts with varying levels of access to School-Based Health Centers (SBHCs) between 2011 and 2017. Utilizing a unique dataset of patient encounters with primary care providers drawn from a regional healthcare network's electronic health record (EHR) system, the study tracked student locations, healthcare visits, and service types. Students residing in school districts without SBHCs were categorized as having no access to SBHCs, while those in districts with SBHCs were categorized as having access. Access to SBHCs was further categorized based on actual usage: never using an SBHC, using only an SBHC, or using both an SBHC and other primary care facilities.	Electronic medical record data from 2011–2017 for students (aged 5–18 years) utilizing primary care services were analyzed to compare utilization patterns (total clinic visits, well-child visits, immunizations, and visits related to chronic conditions) across rural areas in four New York counties. Students were categorized into a group without SBHC access (residing in school districts without an SBHC) and a group with SBHC access (residing in districts with an SBHC). Students with SBHC access were further categorized into non-SBHC users (having access but not utilizing the SBHC), SBHC-only users (utilizing only the SBHC), and hybrid users (utilizing both the SBHC and other primary care providers). Treatment effects associated with SBHC access and usage categories were estimated, adjusting for age, sex (as defined in medical records), year, community-level socioeconomic factors, and student/school district random effects. Visits by hybrid users were categorized by location (SBHC clinic versus non-SBHC clinic). The analysis was conducted in 2025.	Among students with access to a School-Based Health Center (SBHC), 24% did not use the SBHC, 52% used only the SBHC, and 24% used a combination of both. Having access to an SBHC was associated with higher primary care service utilization compared to having no access. Utilization rates varied across the SBHC access categories: users of both services showed the highest utilization, while non-users showed the lowest. Students who used only the SBHC made more physician visits.	School-Based Health Centers (SBHCs) increase overall clinic visits and immunizations among students utilizing primary care services in this rural area. Promoting enrollment in and use of SBHCs is crucial, as the effects are observed only among students who utilize them.
Nagdev et all., (2023)	Dental health servies aamong school chldren	assessing the need for dental health services and the factors influencing their utilization among school-	A cross-sectional study was conducted among schoolchildren aged 13 to 15 years in Bangalore, India (n =	Approximately 78.1% of children did not utilize dental health services. Regarding reasons for not visiting a dentist, 65.8% stated they had no dental problems, and 22.2% cited an inability to afford the cost.	Utilization of dental health services has been low over the past year. Age, family size, parental education level, travel time to dental facilities, children's oral

		aged children using Andersen's health service utilization model	1,100). A questionnaire was developed based on the concepts of Andersen's healthcare utilization model. The children's parents completed the questionnaire. The factors were examined using bivariate analysis and multivariate logistic regression analysis.	Bivariate analysis revealed that age, gender, education level, head of household's occupation, monthly family income, socioeconomic status, perception of oral health problems, accessibility of dental facilities, and parental attitudes toward their children's oral health were significantly associated with the use of dental health services ($p < 0.05$). Multiple regression analysis showed that dental service utilization was directly associated with age (OR = 2.206), education, family size (OR = 1.33), and the practice of brushing teeth twice daily (OR = 1.575), while no significant associations were found regarding the distance to dental facilities, the number of dental visits, or socioeconomic status.	health behaviors, and positive parental attitudes all play a role in children's utilization of dental health services.
Xin & Ren, (2023)	Province based health service utilization	The Andersen Behavioral Model is used to explore the impact of various factors on healthcare service utilization. The aim of this study is to establish a provincial-level proxy framework for healthcare service utilization from a spatial perspective, based on the factors influencing the Andersen Behavioral Model.	The utilization of provincial-level healthcare services is estimated based on the annual inpatient admission rate of the population and the average number of outpatient visits per year, using data from the *China Statistical Yearbook* (2010–2021). This study explores the factors influencing healthcare service utilization by employing a spatial Durbin panel model. Spatial spillover effects are introduced to interpret the direct and indirect effects, analyzed through a proxy framework comprising predisposing, enabling, and need factors related to healthcare service utilization.	Between 2010 and 2020, the population hospitalization rate in China rose from 6.39% ± 1.23% to 15.57% ± 2.61%, while the average number of annual outpatient visits increased from 1.53 ± 0.86 to 5.30 ± 1.54. Healthcare service utilization varied across provinces. Durbin model results indicate that factors with statistically significant local effects on the population hospitalization rate included the proportion of the population aged 65 and older, GDP per capita, the percentage of health insurance enrollees, and the health resource index; meanwhile, factors statistically associated with the average number of annual outpatient visits included the illiteracy rate and GDP per capita. Decomposition of the direct and indirect effects of factors influencing the population hospitalization rate revealed that the proportion of the population aged 65 and older, GDP per capita, the percentage of health insurance enrollees, and the health resource index not only affected local hospitalization rates but also exerted spatial spillover effects on geographically neighboring regions. The illiteracy rate and GDP per capita had significant local and neighboring-region impacts on the average number of annual outpatient visits.	Healthcare service utilization is a variable that differs by region and must be considered within a geographical context involving spatial attributes. From a spatial perspective, this study identifies the local and neighborhood-level impacts of predisposing, enabling, and need factors that contribute to disparities in local healthcare service utilization.
John et al., (2024)	Sexual reproductive Health Services amoung youths	identifying the factors influencing the utilization of KSR services among young people aged 18–24 in Malaysia.	This web-based cross-sectional study was conducted from March 2022 to June 2022 using a pre-tested, self-administered questionnaire. The Andersen Model of Health Service Utilization Behavior	A total of 617 young people aged 18–24 years participated in this survey. Only 20.4% (n = 126) had ever visited sexual and reproductive health (SRH) services in their lifetime, and only 8.4% (n = 52) had visited SRH services within the past year. Predisposing factors (such as age, marital status, and exposure to SRH information from family and government agencies like the NPFDB), enabling factors (such as	In general, the utilization of and awareness regarding sexual and reproductive health (SRH) services among young people in Malaysia remain low and need to be improved. The findings of this study can be used to influence SRH service providers to offer age-appropriate awareness programs that

			was used to identify variables included in the survey. Bivariate and multivariate logistic regression models were used to determine factors significantly associated with sexual and reproductive health (SRH) service utilization. Adjusted odds ratios (AORs) and 95% confidence intervals (CIs) with p values were calculated.	the availability and convenience of SRH services), and need-based factors (such as a diagnosis of an SRH-related condition) were significantly associated with SRH service utilization. The older age group (20–24 years) was more likely to utilize SRH services compared to the 18–19 age group (AOR = 1.634, 95% CI = 1.041, 2.564, p = 0.033). Married participants were three times more likely to use SRH services than unmarried participants (AOR = 2.910, 95% CI = 1.356, 6.249, p = 0.006). Participants who used e-cigarettes had higher odds of using SRH services (AOR = 1.793, 95% CI = 1.014, 3.174, p = 0.045). Participants who received SRH information from their families had higher odds of using SRH services compared to those who did not (AOR = 1.964, 95% CI = 1.229, 3.138, p = 0.005). Similarly, participants who received sexual and reproductive health (SRH) information from government agencies were more likely to utilize SRH services (AOR = 1.929, 95% CI = 1.202, 3.095, p = 0.006). Enabling factors associated with SRH service utilization included service availability—characterized by the self-purchase of medication at pharmacies (AOR = 1.830, 95% CI = 1.184, 2.855, p = 0.007)—and service convenience (AOR = 1.928, 95% CI = 1.250, 2.974, p = 0.003). Adolescents diagnosed with an SRH-related condition (a need factor) were four times more likely to utilize SRH services (AOR = 4.490, 95% CI = 1.935, 10.410, p < 0.001).	meet the diverse SRH needs of young people.
Salam et al., (2022)	Utilization of Outpatient Health Services at Tanete Community Health Center During the COVID-19 Pandemic	to determine the pattern of healthcare service utilization among outpatients during the COVID-19 pandemic at the Tanete Community Health Center, Bulukumba Regency.	This study employs a quantitative research design with a descriptive approach. The study population consists of the community within the working area of the Tanete Community Health Center (Puskesmas), with a sample size of 146 respondents, and data collection was conducted using an accidental sampling technique.	The results indicate that 42.5% of respondents were employed, while 57.5% were unemployed. Regarding income, 79% of respondents were in the low-income category, and 21% were in the high-income category. Positive respondent attitudes accounted for 66.4%, while 33.6% showed less favorable attitudes. Access to healthcare services at Puskesmas Tanete was rated as good by 76% of respondents and poor by 24%. Healthcare workers' attitudes were perceived as good by 80.1% of respondents and poor by 19.9%. Positive respondent attitudes accounted for 66.4%, while 33.6% showed less favorable attitudes. Family support was rated as good by 79.5% of respondents and poor by 20.5%.	Among outpatients at the Tanete Community Health Center (Puskesmas) in Bulukumba Regency, 42.5% were employed and 57.5% were unemployed. Regarding income, 79% had low income and 21% had high income. In terms of attitude, 66.4% demonstrated a positive attitude, while 33.6% showed a less positive attitude. Regarding healthcare service access, 76% rated it as good and 24% as poor. Regarding the attitude of healthcare workers, 80.1% rated it as good and 19.9% as poor. Finally, regarding family support, 79.5% received good support, while 20.5% received less support.
Sukiyem, (2024)	Analysis of determinants	analyzing the determinants of	This study employs a non-experimental	The Chi-Square test results for research variables at the Negeri	A 2024 study at the Negeri Lama Community Health

	of healthcare service utilization at the Negeri Lama Community Health Center, Labuhan Batu.	healthcare service utilization at the Negeri Lama Community Health Center (Puskesmas) in Labuhanbatu in 2024, using descriptive quantitative methods and associative analysis.	quantitative method using a descriptive approach (cross-sectional survey) and associative analysis to understand the determinants of healthcare service utilization at the Negeri Lama Community Health Center (Puskesmas) in Labuhanbatu. The research is being conducted at the center from June through the end of 2024. The study population consists of patients who visited the facility over the past three months, averaging 178 patients per month. A sample size of 125 individuals was determined using Slovin's formula (0.5%), utilizing an incidental sampling technique based on chance encounters with the researcher.	Lama Labuhanbatu Community Health Center (Puskesmas) in 2024 identified associations between demographic categories and healthcare service utilization. Among the 125 respondents, 32% of those aged ≤ 35 years and 48% of those aged > 35 years utilized the services (p-value 0.012), indicating a significant relationship. Regarding gender, 36% of males and 44% of females utilized the services (p-value 0.025). In terms of education, 24% of respondents with low education levels and 56% with high education levels utilized the services (p-value 0.007). Regarding employment, 40% of unemployed respondents and 40% of employed respondents utilized the services (p-value 0.015). Concerning the perception of staff attitude, 56% of respondents who perceived the attitude as positive utilized the services (p-value 0.003). In the accessibility category, 68% of respondents who considered the facility to be nearby utilized the services (p-value 0.000). These results demonstrate a significant relationship between all demographic variables and healthcare service utilization, warranting further examination through multivariate analysis.	Center (Puskesmas) in Labuhanbatu revealed a significant association between demographics and healthcare service utilization. Respondents aged over 35 (48%) and women (44%) were more active users compared to those aged 35 or younger (32%) and men (36%), with p-values of 0.012 and 0.025, respectively. Higher education levels (56%) were also positively associated with service utilization (p-value 0.007). Although employment status was not statistically significant, the p-value of 0.015 highlights the need to focus on the unemployed group. Facility accessibility was the most influential factor (p-value 0.000; Odds Ratio 12.300), indicating that good accessibility encourages healthcare service utilization.
Salsabila & Setianingsih, (2023)	Utilization of health services by National Health Insurance participants at the Cikarang Community Health Center.	to identify factors associated with the utilization of health services by JKN participants.	This study employs a quantitative research design with a cross-sectional approach. The study population consists of all 67,290 JKN participants at the Cikarang Community Health Center (Puskesmas), with a sample of 100 respondents selected using the Slovin formula. Sampling was conducted via purposive sampling. A questionnaire served as the research instrument. Data analysis involved univariate and bivariate methods, utilizing the chi-square statistical test.	Almost all respondents (82.0%) exhibited a high level of utilization, while a small proportion (18.0%) showed a low level. More than half were adults (67.0%), and nearly half were adolescents (33.0%). The majority were female (69.0%), while the remainder were male (31.0%). Regarding education, almost all (83.0%) fell into the high education category, with a small minority (17.0%) in the low category. More than half (57.0%) were PBI (Contribution Assistance Recipient) participants, and nearly half (43.0%) were non-PBI participants. The knowledge variable showed that out of 100 respondents, more than half (61.0%) possessed adequate knowledge, while nearly half (39.0%) had inadequate knowledge. Regarding perceptions of JKN, more than half (59.0%) held a positive view, while 41.0% held a negative view. The service access variable indicated that almost all (82.0%) lived within a short travel distance, while a small minority (18.0%) faced a long travel distance. Furthermore, regarding health facilities, more than half (56.0%) rated them as adequate, while nearly half (44.0%) rated them as inadequate. The family support variable revealed that more than	The results and discussion indicate that, over the past three months, nearly all visiting respondents demonstrated a high level of service utilization. Associations were found between healthcare service utilization and the following factors: education level, JKN membership type, knowledge, perceptions regarding JKN, access to services, health facilities, and family support. No association was found between healthcare service utilization and either age or gender.

		half (51.0%) received family support, whereas nearly half (49.0%) did not. Regarding JKN membership type, more than half (52.0%) of those with high utilization levels were PBI participants, while nearly half (30.0%) of those with high utilization were non-PBI participants. The Chi-square test yielded a p-value of 0.012 (< 0.05), indicating a significant relationship between JKN membership type and healthcare service utilization.

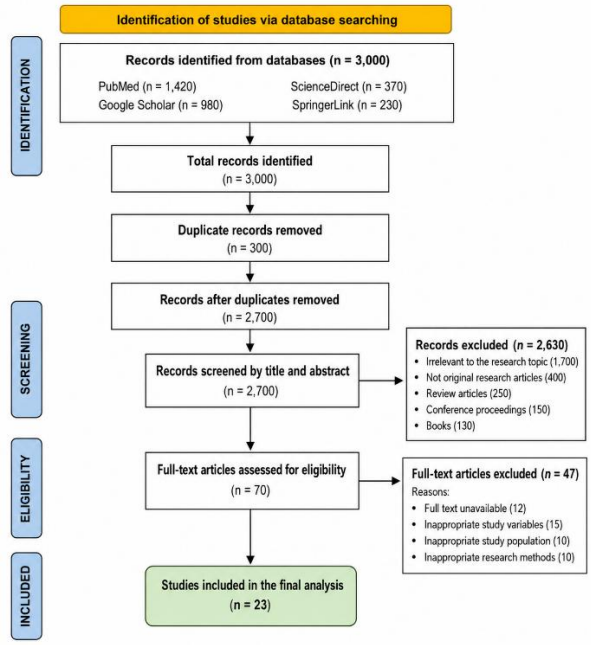

Figure 1. Diagram Prisma

Based on the PRISMA diagram, a literature search was conducted across four databases PubMed (1,420 articles), Google Scholar (980 articles), ScienceDirect (370 articles), and SpringerLink (230 articles) yielding a total of 3,000 articles. After removing 300 duplicates, 2,700 articles remained and were screened based on their titles and abstracts. A total of 2,630 articles were excluded for failing to meet the inclusion criteria. Subsequently, 70 articles underwent full-text review, resulting in the exclusion of 47 articles that did not meet the requirements. Ultimately, 23 articles met all inclusion criteria and were used for analysis in this literature review regarding workforce availability, as well as the accessibility and availability of healthcare facilities and service utilization in archipelagic and coastal regions.

Discussion

Aksesibilitas

Most articles identify accessibility as a dominant factor influencing the utilization of health services. Accessibility encompasses the distance to health facilities, the availability of transportation, and geographical conditions such as rugged terrain, archipelagic settings, and extreme weather that pose major challenges in coastal areas. Limited accessibility leads communities to be reluctant to seek medical care or to delay doing so, particularly in remote and coastal regions. Without adequate road infrastructure and transportation support, people often opt for self-treatment or forgo accessing services entirely. Therefore, improving transportation access, establishing sea or river-based referral systems, and providing mobile health services must be prioritized in coastal areas.

Accessibility is defined as the degree of ease with which the public can reach a specific area. It encompasses the distance between a given area and locations providing public services essential to meeting community needs.

Several aspects serve as benchmarks for measuring an area's accessibility, including the availability of roads leading to service centers, the volume of transportation options, and the condition and quality of the road infrastructure. Meanwhile, according to Bashshur et al. (1971), accessibility represents a functional relationship among the public, medical facilities, and available resources; this relationship reflects differential conditions whether constraints, barriers, and difficulties, or factors that facilitate access for healthcare service recipients. Furthermore, the dimensions of the perspective proposed by Bashshur et al. (1971) encompass the factors that determine whether the public utilizes healthcare services. Accessibility entails a alignment between available resources and the population. Benchmarks for healthcare accessibility can be observed through the utilization of services, which depends on affordability, physical accessibility, and the nature of the services received; it is not merely a matter of the adequacy of service supply (Ahsan et al., 2023).

Factors influencing the utilization of health services include predisposing characteristics such as demographics (gender, age), social factors (education level, occupation, ethnicity/race), and health beliefs (attitudes, perceptions) and enabling characteristics, which encompass family resources (income, knowledge, health insurance) and community resources (availability of facilities and health personnel, service waiting times, accessibility). Need characteristics involve an individual's assessment of illness and clinical evaluations. Another factor influencing health service utilization is the provider, specifically regarding the services of health personnel (doctors) and the ease of obtaining information (Winda & Susilawati, 2023). The World Health Organization (WHO) also advocates for the utilization of medical services as a fundamental concept of health, particularly for vulnerable populations. Healthcare must be universally accessible, free from barriers related to affordability, physical access, or service acceptance. Consequently, increasing health service utilization is a crucial objective in many countries, especially developing ones. For coastal communities, the ability or inability to access health services significantly impacts their actual use of these services, particularly Community Health Centers (Puskesmas). Geographically and economically, health facilities located far from residents' homes are difficult to reach. Therefore, factors such as the distance between homes and health centers, as well as the availability of necessary transportation, significantly influence the demand for health services; conversely, difficult access and transportation challenges increase the likelihood that individuals will forgo using these services (Aina Cici Ramadhani, 2022).

This model explains that healthcare service utilization is influenced by three primary factors: predisposing factors, enabling factors, and need factors (Andersen, R. M., 1995). Accessibility falls under the category of enabling factors, which directly facilitate or hinder individuals in obtaining healthcare services. When access is difficult (e.g., due to distance, transportation, or travel time), service utilization tends to be low, even if health needs are high. Based on this overview of accessibility, it can be concluded that three key elements influence healthcare accessibility: availability, barriers, and utilization. A region's level of healthcare accessibility can be measured by examining both need-related and supply-related factors. Need factors include the volume of health facility visits, population size, and utilization rates for inpatient care and emergency services. Meanwhile, supply factors encompass the availability of general practitioners and specialists, as well as the number of healthcare facilities (Ahsan et al., 2023).

Availability of Health Workers

The availability and distribution of health workers is the second most frequently cited factor determining service utilization. Several coastal areas face shortages of medical personnel, particularly general practitioners, dentists, nutritionists, and environmental health workers. Uneven distribution of health personnel hinders the optimal functioning of Community Health Centers (Puskesmas). Patients often fail to receive care that meets standards due to limited numbers or insufficient competence among medical staff. Coastal regions require long-term strategies, such as location-based incentives, workforce redistribution, the recruitment of contract-based government employees (PPPK), and the utilization of local health workers who receive continuous training.

As well as the utilization of local health workers who receive continuous training. Research published in the *Window of Public Health Journal* addresses the unequal distribution of health workers in Community Health Centers (Puskesmas), particularly in Eastern Indonesia, a region comprising many coastal areas. Utilizing IFLS East data, the study reveals disparities in health worker distribution based on household economic status and geographic location (urban, rural, or remote); specifically, coastal and remote health centers frequently face shortages of doctors and midwives, as well as low numbers of public health personnel. Optimizing the

government's role is crucial especially in provinces like East Nusa Tenggara, Maluku, and West Papua, which suffer from health workforce shortages and even vacancies for doctors and midwives (Hikmah et al., 2020). Data on 2021 Health Minimum Service Standard (SPM) achievements show that regions with the lowest performance also recorded the lowest rates of health worker recruitment for these centers. For instance, Papua had the lowest health worker recruitment rate (8.6%) and an SPM achievement of 4.5%. This serves as an early indicator that health worker recruitment at Community Health Centers directly impacts the quality and quantity of healthcare services provided to the public. Meanwhile, other researchers have identified financial factors as a cause of health workforce shortages; a study analyzing health workforce availability and its link to universal health coverage across 204 countries and territories (1990–2019) argued that low income levels in certain regions hinder performance. Additionally, research on health financing reforms in Kenya demonstrated improved access to care by addressing four barriers related to the health workforce: geographic accessibility, availability, affordability, and acceptability. Zakumumpa et al. (2021) noted that health workforce shortages were driven by delays in government payroll registration and a lack of private accommodation. These findings suggest that government financial performance plays a significant role in health workforce shortages (Ismoyo, 2023).

The distribution and placement of health workers, based on principles of equity and the equitable provision of services, fall under government authority as mandated by Article 26 of Health Law No. 36 of 2009. Ideally, health workers are distributed effectively to meet established staffing ratios; however, a common issue currently faced is uneven or unbalanced distribution, a phenomenon known as maldistribution. Many countries face a "human resources for health crisis" involving three dimensions: availability, concerning the provision of qualified health workers; distribution, concerning the recruitment and retention of health workers in areas where they are most needed; and performance, concerning health worker productivity and the quality of care provided.4 Various forces specifically push and pull factors influence workforce distribution. These driving forces illustrate and explain the extent and underlying causes of the health workforce crisis in certain regions.5 The ability to attract and retain health workers depends on two interrelated aspects: the factors influencing a health worker's decision to accept a position and remain in it, and the strategies employed by the government to address those factors (Hikmah et al., 2020).

The theory regarding healthcare workforce availability is the Donabedian Theory (Structure-Process-Outcome Model); this theory assesses the quality of healthcare services through three components: Structure (encompassing physical and human resources, such as medical personnel, infrastructure, and facilities), Process (the interaction between healthcare workers and patients), and Outcome (service results such as satisfaction, recovery, or health improvement). Healthcare workforce availability falls under the "Structure" component, serving as a crucial prerequisite for establishing effective service processes. If the structure is weak (e.g., insufficient healthcare personnel), the service process will be compromised, and the final outcome specifically service utilization will decline (Donabedian, A. (1988)).

Availability of facilities

As a type of primary healthcare facility, the Community Health Center plays a vital role in the national health system, particularly regarding vulnerable populations. Healthcare must be universally accessible, free from barriers related to affordability, physical access, or service acceptance. Consequently, in many countries especially developing ones attention is focused on health service systems (Indonesian Ministry of Health, 2014). Achieving optimal public health requires addressing various factors, one of which is the provision of health services defined as any effort undertaken, whether independently or collaboratively within an organization, to maintain and improve the health of individuals, families, groups, or the community at large.

The desired level of public health can be achieved through primary health care services provided by Community Health Centers (*Puskesmas*). According to Minister of Health Regulation Number 75 of 2014, a *Puskesmas* is a health service facility that delivers primary-level individual health services prioritizing promotive and preventive measures to achieve the highest possible level of public health within its service area (Winda & Susilawati, 2023).

Inadequate healthcare facilities whether regarding the building itself, medical equipment, or the availability of medicines also hinder service utilization. Substandard facilities diminish public comfort and trust in Community Health Center (Puskesmas) services. Consequently, people opt for private clinics despite the higher costs. Providing comprehensive facilities and infrastructure including treatment rooms, basic laboratory equipment, children's play areas, and parking spaces can boost service utilization.

The theory regarding facility availability is Andersen's Behavioral Model of Health Services Use. This model explains that health service utilization is influenced by three primary factors: predisposing factors, enabling factors, and need factors (Andersen, R. M., 1995). Facility availability falls under enabling factors, serving as a prerequisite for individuals to access and utilize health services; without adequate facilities, individuals will not utilize services optimally, even if they require them. The utilization of Community Health Centers (Puskesmas) can be explained through Andersen's (1974) theory of health service utilization as cited by Rinie Hidaya et al. (2020) which categorizes the determinants of utilization into three groups: predisposing factors (demographics, social structure, and health beliefs); enabling characteristics, comprising family resources (family income, travel time/accessibility) and community resources (knowledge, health worker attitudes, service quality, affordability, and necessary medical information); and need characteristics (health status).

This indicates that the healthcare services available at community health centers (*puskesmas*) are not yet fully utilized by the public a situation that certainly acts as a barrier to health development in Indonesia. Health planning processes regarding both the healthcare workforce and facilities are heavily influenced by policies governing the production and consumption of services; these processes tend to prioritize procurement over actual utilization, even though both are crucial aspects of healthcare service usage. Evidence of this lies in the prevalence of healthcare facilities that lack efficiency and effectiveness in service delivery. Consequently, the utilization of healthcare services remains low (Winda & Susilawati, 2023).

CONCLUSION

The literature review indicates that accessibility, the availability of health workers, and the availability of facilities are key determinants of the utilization of Community Health Center (Puskesmas) services in coastal areas. Accessibility is the most dominant factor influencing the community's decision to access services, primarily due to geographical conditions, distance, and transportation limitations. The uneven distribution and insufficient competence of health workers also serve as major obstacles to the provision of optimal services. Meanwhile, limited facilities regarding equipment, infrastructure, and service quality contribute to low utilization rates of these health centers. These three factors are interconnected and mutually reinforcing in shaping an ideal primary healthcare system. Therefore, efforts to increase health service utilization in coastal areas must adopt a systemic, evidence-based approach that takes into account the unique geographical, social, and structural factors of these regions.

RECOMMENDATIONS

To improve service accessibility, the government needs to provide alternative medical transport options such as sea ambulances and upgrade road infrastructure leading to healthcare facilities in coastal areas. Ensuring the equitable distribution and quality of the health workforce requires policies for recruitment and redistribution based on zoning, alongside continuous training and professional development to enhance service quality. To strengthen healthcare facilities and resources, the government and community health center (Puskesmas) administrators must improve the availability of medical equipment, service areas, and support systems through data-driven needs planning (e.g., the *RUK* or Annual Work Plan). Finally, to foster cross-sector synergy, policy interventions must involve multiple sectors (health, transportation, and infrastructure), and service utilization outcomes in coastal areas should be subject to regular evaluation.

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