ORIGINAL ARTICLE

Factors Affecting Health Care Services Utilisation among Rural Population in Sabah, Malaysia

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ABSTRACT

Malaysia has made significant strides in achieving universal health coverage since gaining independence. However, rural areas in Sabah still confront challenges in accessing adequate healthcare compared to Peninsula Malaysia. This study explores healthcare utilisation patterns among Sabah's rural populace, with a focus on identifying access determinants. Over four months, a household cross-sectional study interviewed 438 respondents, employing geographical units for random sample selection. The questionnaire used was adopted and pre-tested from the National Health and Morbidity Survey 2011 (Healthcare Demand Module). Descriptive statistics and logistic regression were utilised to analyse demographic characteristics and determinants of health utilisation among those reporting one or more diseases (n = 99). The findings underscored age and health limitations as significant predictors of healthcare usage. Despite commendable national health outcomes, resource allocation tends to favour secondary care over primary care in rural regions. Prioritising preventive care at the primary level could enhance overall health outcomes. Understanding healthcare utilisation in rural areas, especially those with heightened poverty rates, is crucial for refining tailored healthcare policies. This study fills a crucial gap in the literature, offering insights to shape effective healthcare interventions for underserved rural populations.

INTRODUCTION

Malaysia's healthcare system has undergone significant evolution since gaining independence, establishing universal health coverage as a cornerstone to ensure unimpeded access to essential services (Mohamad Noh, 2011). Remarkably, it has achieved greater success compared to many other countries in this regard (Rannan-Eliya et al., 2016). Despite overall health improvements nationwide, Sabah, a region with historical ties to British colonisation and now part of Malaysia, continues to face substantial health disparities. In 2018, Sabah reported the highest rates of infant mortality (10.1 per 1,000 live births), toddler mortality (0.6 per 1,000 population), and maternal mortality (18.9 per 100,000 live births) (Ministry of Health, 2021). Challenges also persist in controlling diseases such as tuberculosis and malaria (Goroh et al., 2020; Ministry of Health, 2021; Naserrudin et al., 2023), with a concerning rise in chronic diseases, including diabetes prevalence, hypercholesterolemia, and hypertension (Bakar et al., 2011, 2015).

Effectively delivering healthcare, especially in rural areas, is crucial for addressing both communicable and non-communicable diseases. Public health facilities in rural areas, heavily subsidised, offer accessible care to Malaysians at nominal fees or no cost. However, health access in East Malaysia, particularly in Sabah's rural areas, remains significantly lower than in Peninsula Malaysia (Atun et al., 2016).

The challenge of accessing healthcare due to lower socioeconomic status has significant implications for health outcomes (Nasirin & Lionardo, 2021), often compounded by the higher prevalence of risky behaviours like smoking and drinking (Pampel et al., 2010). In Sabah, where nearly one in five individuals (19.5%) lived below the poverty line in 2019 (Ministry of Economy, 2023), the prevalence of smoking is notably high, reaching 25.3% among individuals aged 15 years and above. Sabah also reports the highest proportion of binge drinkers among adults aged 18 years and older, with a rate of 74.8% (Institute for Public Health, 2019).

These statistics emphasise the importance of scrutinising healthcare utilisation patterns to assess disparities across diverse population characteristics. Madyaningrum et al. identified disparities in outpatient service utilisation in Indonesia, focusing on the correlation between health insurance and visits for economically vulnerable elderly individuals (Madyaningrum et al., 2018). However, there is still an unexplored focus on rural areas with high poverty rates. In South Korea, Ham and Lee found a positive association between lifestyle factors (alcohol consumption, tobacco use) and healthcare provider visits among newly diagnosed hypertensive individuals (Ham & Lee, 2007). Shifting to Malaysia, Anis-Syakira et al. (2022) explored the relationship between socioeconomic position and health service utilisation, specifically in the private health sector across diverse locations (Anis-Syakira et al., 2022).

Despite extensive research exploring healthcare utilisation and its predictors, there remains a notable gap in the literature, specifically in studying variables influencing healthcare usage among rural populations marked by elevated poverty rates. This study delves into the determinants shaping healthcare utilisation patterns among Sabah's rural populace, providing valuable insights for refining policy formulation and healthcare delivery to cater to the distinct needs of these regions. The originality of this research lies in its focused inquiry, which generates insights that transcend conventional national health evaluations.

MATERIALS AND METHODS

The household cross-sectional study, conducted over a period of four months, aimed to address economic challenges and a significant incidence of poverty in a rural area

of Sabah. By division, Nabawan has the highest incidence of poverty, which ranged from 50.8% to 70.8% in 2004 (Institute for Development Studies, 2007b). It is one of the seven interior divisions of Sabah, with a population estimated to be around 32,309 in 2020. Exclusive face-to-face interviews were administered to non-institutionalised residents who had resided in the area for a minimum of two weeks before data collection. Exclusions were applied to individuals in institutional settings, including hotels, hostels, and hospitals, to maintain consistency in the study population.

The determination of the sample size, with a precision of 5%, a confidence level of 95%, and a population variance of 33.2% (representing the population seeking healthcare advice or treatment in Sabah within the last 2 weeks based on Ministry of Health, (2015b), was achieved through a single percentage formula. Considering the finite population in Nabawan, totalling 32,309 (Department of Statistics Malaysia, 2022a), and factoring in a 20% non-response rate, the target sample size was set at 414 respondents. To identify respondents, the research areas were subdivided into Enumeration Blocks (EBs) based on geographical units designated by the National Statistics Department. Each EB comprised approximately 500 to 600 residents, with an average of 80 to 120 Living Quarters (LQs). Six EBs were randomly selected to acquire the necessary respondents from the LQs based on the estimated average of four household members (Aris et al., 2015).

The study employed a questionnaire adopted from the Health Care Demand Module of the 2011 version of the National Health and Morbidity Survey (NHMS), notable for its comprehensive nature compared to other NHMS surveys (Aris et al., 2011). This questionnaire is comprised of two sections. The first section investigated household characteristics, such as telecommunications connectivity, access to electricity, availability of treated water, and socioeconomic quintile,

followed by an examination of each household member's sociodemographic profiles. Details regarding the development and validation of the questionnaire are provided in the NHMS technical report (Aris et al., 2011). Prior to conducting interviews, consent was obtained from all respondents as required by the Medical Research Ethics Committee, Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah (JKEtika 4/17(2)). Written informed consent was obtained from all the study participants.

Interviews were conducted between February 23 and June 25, 2019, in the Malay language by the main author, with assistance from a locally hired translator when communication in other local languages was necessary. Data entry was facilitated using Epi Info version 7.2.2.6 as the database.

A total of 438 respondents were interviewed for the study, of whom 25.8% (99) reported being diagnosed with one or a combination of the ten health problems, including hypertension, asthma, malaria, diabetes, arthritis, heart disease, TB, stroke, dengue, and renal disease. These conditions were identified based on the NHMS 2011 questionnaire, with no new additions following a pre-test in Nabawan aimed at identifying other common health problems or diseases. Descriptive statistics were employed to illustrate overall healthcare service utilisation, presented as percentages with a 95% confidence interval, across the independent variables studied as indicated in Table 1.

The study analysed the factors associated with healthcare utilisation among the 99 individuals who reported being diagnosed with one or a combination of the ten health problems. Single and multiple logistic regression techniques were utilised. Variables with a significance level of $p<0.25$ in the single logistic regression were included in the preliminary final model, following the methodology outlined by Bursac et al., (2008).

Likelihood ratio tests were then conducted to identify the final variables, retaining those that demonstrated statistical significance in the final regression model. The results of the logistic regression were presented as crude and adjusted odds ratios, along with corresponding 95% confidence intervals.

Multicollinearity was assessed using the Variance Inflation Factor (VIF), and interactions between independent variables were scrutinized. Subsequently, the fitness of the model was evaluated using receiver operating characteristics (ROC) curve analysis, the Hosmer-Lemeshow test, and a classification table.

All analyses were performed using STATA (Stata Corp, College Station, Texas, USA) and a significant level of $p<0.05$ was considered statistically significant throughout the analysis process.

Table 1: Definition of variables.

Variable	Definition	Responses / classification
Sex	Reported gender of the household member	Male; Female
Age	Age group of the household member	18-54; 55-64; 65 and older
Married	Marital status	Yes; No (Single, Divorced, Separated)
Highest education	Highest level of education attained	No schooling; Primary; Secondary; Tertiary
Working	Currently employed or working	Yes (Employed, Self-employed); No (Not working)
Telecommunications connection	Connected to telecommunication lines that enable data, voice, or multimedia connectivity.	Yes; No
Supply of electricity	Connected to the main electricity supply system, including portable generators for home use.	Yes; No
Supply of treated water	Supply of treated water that has undergone a treatment process to make it safe and suitable for consumption and various other purposes. Untreated water sources include rivers, lakes, ponds, or wells that have not been subjected to filtration, disinfection, or other water treatment methods.	Yes; No
Socioeconomic quintile	Household living standards are adjusted using the adult equivalent.	Quintile 1 (Poorest); Quintile 2; Quintile 3; Quintile 4; Quintile 5 (Richest)

Table 1: Definition of variables (continue).

Variable	Definition	Responses / classification
Experienced barrier to health service	Factors that prevent people from acquiring access to health services.	Ill & sought treatment; Ill & did not seek treatment; Did not need health treatment
Self-determination	Ability and right to make their own choices and decisions regarding their healthcare, treatment, and overall well-being.	Yes; No
Reported health status as "good"	Measures present general health and gives answer choices on a Likert Scale.	Yes (Very good, Good) ; No (Moderate, Not good, Very Bad)
Reported to experienced activity limitation	Measures perceived activity limitations of their health condition and gives answer choices on a Likert Scale.	Yes (Severe/unable to perform; Moderate/mild); No (None)
Health services	Utilisation of outpatient care in the last 2 weeks or inpatient care in the last 12 months.	Yes; No

The study analysed the factors associated with healthcare utilisation among the 99 individuals who reported being diagnosed with one or a combination of the ten health problems. Single and multiple logistic regression techniques were utilised. Variables with a significance level of p<0.25 in the single logistic regression were included in the preliminary final model, following the methodology outlined by Bursac et al., (2008). Likelihood ratio tests were then conducted to identify the final variables, retaining those that demonstrated statistical significance in the final regression model. The results of the logistic regression were presented as crude and adjusted odds ratios, along with corresponding 95% confidence intervals.

Multicollinearity was assessed using the Variance Inflation Factor (VIF), and interactions between independent variables were scrutinized. Subsequently, the fitness of the model was evaluated using receiver operating characteristics (ROC) curve analysis, the Hosmer-Lemeshow test, and a classification table.

All analyses were performed using STATA (Stata Corp, College Station, Texas, USA) and a significant level of p<0.05 was considered statistically significant throughout the analysis process.

RESULTS

A total of 99 respondents (22.6%) who reported ever having been diagnosed with one or more diseases were included in the analysis, and Table 2 presents a detailed overview of the households and members sociodemographic characteristics. The characteristics that were derived from households' questionnaires, reveal a higher proportion of them with telecommunication connectivity, with 86.9% (86) reporting access. The demographic profile shows a nearly equal gender distribution, with 55.6% (55) identifying as female and 44.4% (44) as male. Age distribution is uniform, with the "18–54" age group representing the largest proportion at 50.5% (55) and 87.9% (87) reported being married. A substantial portion of participants (70, 70.7%) were employed. Moreover, a noteworthy 94.9% (94) indicate access to electricity. However,

45.5% (45) of respondents mention a lack of access to treated water. The distribution across socioeconomic categories demonstrates a relatively balanced representation, with approximately 26.3% (26) categorised as belonging to the "poorest" group. The study underscores a prevailing sense of personal autonomy in health decision-making, with 67.7% (67) expressing their independence in health-related choices. Interestingly, a significant majority (85, 85.9%) report no obstacles to accessing healthcare services. Despite 75.8% (75) indicating a positive self-perceived health state, a significant minority (64, 64.6%) reports encountering restrictions in daily activities.

Table 2: Characteristics of respondents.

Characteristics	Frequency	%
Sex		
Female	55	55.6
Male	44	44.4
Age		
18-54	50	50.5
55-64	26	26.3
65+	23	23.2
Married		
No	12	12.1
Yes	87	87.9
Highest education		
No Schooling	23	23.2
Primary	43	43.4
Secondary	25	25.3
Tertiary	8	8.1
Working		
No	29	29.3
Yes	70	70.7
Telecommunication connection		
No	13	13.1
Yes	86	86.9
Supply of electricity including generators		
No	5	5.1
Yes	94	94.9
Supply of treated water		
No	54	54.5
Yes	45	45.5
Socioeconomic level		
Poorest	26	26.3
2	19	19.2
3	14	14.1
4	19	19.2
Richest	21	21.2
Self-decision		
No	67	67.7
Yes	32	32.3
Experienced barrier to health service		
No	85	85.9
Yes	14	14.1
Reported health status as "good"		
No	24	24.2
Yes	75	75.8
Reported to experienced activity limitation		
No	35	35.4
Yes	64	64.6

In the subset of individuals with a medical condition, 39.4% (39) had recently utilised healthcare services. As indicated in Table 3, a notable 89.7% (35) of this subgroup report telecommunication connectivity, and an overwhelming 92.3% (36) have access to electricity. However, 53.8% (21) face challenges in obtaining treated water. Socioeconomic disparities persist, with 33.3% (13) classified as the "poorest." A substantial 69.2% (27) of individuals make autonomous health decisions, and all respondents report no hindrances to accessing healthcare services, ensuring unimpeded healthcare access. Gender distribution remains balanced, and age distribution encompasses individuals aged 18 to 54 (13, 33.3%), 55 to 64 (16, 41.0%), and 65 and older (10, 25.6%). A significant majority (36, 92.3%) of those utilising healthcare services are married. Educational levels vary, with 56.4% (22) completing primary school, 28.2% (11) having no formal education, 12.8% (5) completing secondary school, and

2.6% (1) completing higher education. For employment, 64.1% (25) are working. While 64.1% (25) perceive their health as "good," a notable 79.5% (31) acknowledge activity limitations.

Table 3 shows the results of the logistic regression analysis for healthcare utilisation. Only age, reported health status as good, and reported activity limitation were statistically significant in the bivariate analysis. In the final model, age and health limitations were retained as key predictors. Individuals aged between 55 and 64 exhibited a fourfold increase in the likelihood (AOR =4.328, 95% CI = 1.527–12.269) of utilising health services compared to those in the 18–54 age bracket. For health limitations, individuals reporting such limitations were three times more likely (AOR = 2.982, 95% CI = 1.121–7.937) to utilise healthcare services compared to those without reported health limitations. These findings underscore the significance of age and health limitations as influential factors in predicting healthcare service utilisation within the examined population.

DISCUSSION

Despite Malaysia's relatively modest health spending at four percent of GDP, the health system demonstrates commendable outcomes compared to countries of similar economic standing, such as Brazil, Chile, Estonia, Mexico, and Turkey (Atun et al., 2016; OECD Stat, 2023). However, a concerning issue arises with allocative efficiency, reflecting the optimal allocation of resources within the health system for the best possible outcomes (Atun et al., 2016). A noticeable trend reveals an imbalanced distribution of resources favouring secondary and tertiary healthcare facilities over primary care, resulting in higher costs and suboptimal health outcomes, particularly in rural areas like Nabawan. The prioritisation of curative treatments at the hospital level neglecting preventive and promotive care at the primary level signifies a significant

allocative inefficiency, especially in managing Non-Communicable Diseases (NCDs).

In Nabawan, a predominantly rural area, public health facilities play a crucial role in meeting the healthcare needs of the population (Department of Statistics Malaysia, 2022b). However, geographical remoteness and transportation difficulties pose hindrances for those seeking medical assistance. Despite heavy subsidisation of public health services in Malaysia, accessing healthcare remains challenging for rural populations, with notable disparities in resource allocation between primary and secondary healthcare facilities.

The demographic profile of Nabawan suggests a propensity among the elderly and individuals with substantial activity limitations to seek healthcare services. However, the provision of care often lacks emphasis on preventive and promotional strategies. This oversight has significant ramifications, potentially undermining timely interventions among younger demographics with fewer activity limitations. Neglecting preventive measures risks exacerbating complications later in life, increasing the burden on both individuals and the healthcare system.

According to the study, socioeconomic factors did not affect the use of health services. Only those aged 18–64 who reported experiencing activity limitations have higher odds of using health services. Older adults have a greater propensity to seek medical attention for chronic ailments or consultations before and after surgical procedures. However, compared to younger individuals, they display a lower likelihood of pursuing preventative healthcare measures (Hing et al., 2006). Most research reported significant correlations between age and the use of healthcare services (Ani et al., 2008; Blackwell et al., 2009; Nabalamba & Millar, 2007; Stockdale et al., 2007). Nevertheless, the direction of this association varied significantly depending on individuals' traits. For instance, it was discovered that older individuals were

less likely than younger individuals to utilise alcohol, drug, and mental health services (Stockdale et al., 2007). According to other research, older individuals had lower odds of seeing a specialist (Nabalamba & Millar, 2007). A study in the US between ethnic groups showed African-Americans and Latinos older respondents were more likely than their younger counterparts to report having received a doctor's diagnosis for their medical concerns (Ani et al., 2008). The findings among the rural population, with those aged 55 to 64 having a greater likelihood of using healthcare services, could imply that these populations only seek care when experiencing symptoms and rarely for screening or preventive services.

Comparison with other countries, such as Jordan, highlights potential opportunities for a more focused distribution of resources based on health concerns and socioeconomic factors (Rawabdeh & Rawabdeh, 2021). The reallocation of resources towards preventive and promotive care at the primary level holds promise for improving overall health outcomes, particularly in rural regions like Sabah.

Public health services are heavily subsidised in Malaysia, and it is not surprising to observe a need factor such as "activity limitation" determining the use of healthcare services rather than socioeconomic factors. The need-related factor has been closely associated with the use of health services (Newbold et al., 1995). For example, the study by Bennett et al. in the United States showed that activity limitation affects the association between the use of health care services among older adults (Bennett et al., 2009). Similarly, in the study by Heyden et al., in Belgium, a higher utilisation rate among lower socioeconomic groups is due to differences in need (Heyden et al., 2003). Several studies have concluded that self-rated activity limitation acts in tandem with health literacy (Bennett et al., 2009; Reisi et al., 2014; Sørensen et al., 2012).

The Institute for Public Health highlights Sabah's notably high incidence of low health literacy among individuals aged 18 years and older, particularly prevalent in areas with limited educational opportunities or lower income levels (Institute for Public Health, 2019). This lack of health literacy may lead to a diminished understanding of the importance of health services and their potential benefits. Sørensen et al. define health literacy as proficiency in obtaining, comprehending, evaluating, and using health-related information for healthcare, illness prevention, and health promotion (Sørensen et al., 2012). Education and health education are primary contributors to health literacy development.

Advancements in technology have paved the way for enhancing health literacy, notably through eHealth literacy. However, persistent disparities exist in the correlation between self-rated activity limitations and eHealth literacy, potentially attributed to reliance on the health system. Bundorf et al. suggest that internet searches for health information are influenced by factors such as out-of-pocket expenses and opportunity costs, which vary across health systems and could clarify conflicting findings (Bundorf et al., 2006). Moreover, while eHealth literacy significantly contributes to improving health literacy, addressing this among individuals with limited education, unemployment, the elderly, and low-income populations present challenges. A recent study by Qing Liang Goh et al. observed a significant impact on the health literacy of adults with chronic illnesses seeking medical care in Sabah's public health facilities due to the possession of smartphones or laptops (Qing Liang Goh et al., 2022). Moreover, the study found connections between low health literacy and several demographic factors, including older age, lower educational attainment, reduced household income, and lack of insurance coverage. Notably, access to smartphones or computers was shown to notably improve patient health literacy.

Fostering gains in health literacy and promoting informed use of health services pose challenges, particularly among individuals with no formal education, the unemployed, the elderly, and those with low income. In Nabawan, individuals aged 55 to 64 exhibit a notably higher likelihood of utilising healthcare services compared to those aged 65 and older. A study by Liang et al. among adult patients with chronic diseases in Sabah's public health facilities revealed that low health literacy correlated with older age, lower educational levels, reduced household income, and lack of insurance ownership (Liang et al., 2021).

Karim's study in a similar community, aiming to explore their access to health information, found a preference for interactive health talks with healthcare personnel (Karim, 2020). However, inadequate, or uneven distribution of resources allocated to preventive and promotive care at the primary level could impede timely access to appropriate healthcare. Discrepancies, particularly in service quality, often lead to a growing trend where patients seek alternative sources to fulfil their healthcare needs, even at a higher financial cost. This bypassing behaviour, wherein patients directly seek higher-level healthcare facilities without consulting primary care providers for non-critical diseases, results in increased medical costs, compromised care quality, and potential treatment delays (Gotsadze et al., 2005; Pollack et al., 2015). Globally, various factors contribute to this phenomenon, including demographic and socioeconomic factors, provider characteristics, geographic accessibility, service quality, cost considerations, insurance coverage, and drug availability (Xie et al., 2023).

CONCLUSION

Investing in the healthcare system should go beyond infrastructure improvements. It's crucial to promote effective health behaviours and appropriate utilisation patterns, especially among demographics like older individuals and those with activity limitations, as seen in Nabawan. A comprehensive approach, addressing both supply and demand aspects, is essential to meet the needs of rural populations, particularly those facing pre-existing health conditions. This comprehensive strategy involves providing accessible information, enhancing health literacy, and implementing tailored educational initiatives to foster effective demand.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

AVAILABILITY OF DATA AND MATERIALS

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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Table 3: Logistic regression analysis for healthcare utilisation.

Variables	Health services utilisation		Crude			Adjusted		
	Frequency	%	OR	(95% CI)	P-value	OR	(95% CI)	P-value
Sex					0.491			
Female	20	51.3	0.752	(0.335-1.692)				
Male (ref)	19	48.7						
Age					0.010			
18-54 (ref)	13	33.3						
55-64	16	41.0	4.554	(1.656-12.525)		4.328	(1.527-12.269)	0.006
65+	10	25.6	2.19	(0.775-6.187)		1.804	(0.619-5.266)	0.28
Married					0.264			
No	3	7.7	0.473	(0.12-1.867)				
Yes (ref)	36	92.3						
Highest education					0.489			
No Schooling	11	28.2	0.875	(0.318-2.411)				
Primary (ref)	22	56.4						
Secondary	5	12.8	0.239	(0.076-0.753)				
Tertiary	1	2.6	0.137	(0.016-1.206)				
Working					0.247			
No	14	35.9	1.68	(0.699-4.04)				
Yes (ref)	25	64.1						
Telecommunication connection					0.489			
No	4	10.3	0.648	(0.185-2.27)				
Yes (ref)	35	89.7						
Supply of electricity including generators					0.340			
No	3	7.7	2.417	(0.386-15.17)				
Yes (ref)	36	92.3						
Supply of treated water					0.176			
No	18	46.2						
Yes	21	53.8	1.75	(0.776-3.951)				
Socioeconomic level					0.472			
Poorest (ref)	13	33.3						
2	9	23.1	0.9	(0.276-2.941)				
3	4	10.3	0.4	(0.1-1.608)				
4	7	17.9	0.584	(0.175-1.953)				
Richest	6	15.4	0.4	(0.119-1.355)				
Self-decision					0.790			
No	27	69.2	1.125	(0.474-2.676)				
Yes (ref)	12	30.8						
Experienced barrier to health service								
No	39	100.0						
Yes	0	0.0						
Reported health status as "good"					0.031			
No	14	35.9	2.8	(1.091-7.189)				
Yes (ref)	25	64.1						

Table 3: Logistic regression analysis for healthcare utilisation (Continue).

Variables	Health services utilisation			Crude		Adjusted		
	Frequency	%	OR	(95% CI)	P-value	OR	(95% CI)	P-value
Reported activity limitation					0.011			
No (ref)	8	20.5						
Yes	31	79.5	3.171	(1.253-8.027)		2.982	(1.121-7.937)	0.029

Notes: 1. R-square = 10.8%; Area under ROC curve = 70.1%; Hosmer-Lemeshow test, p-value = 0.916; classification table = 68.69%.

2. ref: reference group; OR: odds ratio; CI: confidence interval.

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