Unmet Healthcare Needs and Their Determining Factors: Addressing Inequalities in Access to Healthcare in Myanmar

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Submitted: 11 July 2023. Accepted: 1 February 2024. Published: 18 February 2024
Volume 32, 2024. pp. 591–608. http://doi.org/10.25133/JPSSv322024.035

Abstract

Myanmar aims to achieve universal health coverage by 2030 through the 2017–2021 National Health Plan while providing nearly cost-free healthcare services at public facilities. Nonetheless, concerns regarding healthcare access persist. This study examined healthcare access in Myanmar by identifying the prevalence, determinants, and reasons behind unmet healthcare needs (UHN), which occur when an individual needs healthcare but cannot access it. Descriptive statistical analysis and binary logistic regression were employed using data obtained from 318 residents of Tat Kon Township, Nay Pyi Taw. Among the participants, 23.6% experienced UHN. Specifically, individuals with low income, daily-waged workers, rural residents, younger individuals, and females reported high UHN. The primary reason was the unavailability of healthcare facilities (46.7%), followed by competing personal priorities (19%) and treatment or transportation costs (14%). The government could consider expanding public healthcare infrastructure and implementing a nationwide health insurance system. Continuing the geographic expansion of health services to address the needs of rural residents and extending service hours to accommodate individuals engaged in daily-waged or full-time employment are recommended. These efforts could be complemented by improving public transportation infrastructure, promoting income security, and supporting gender equity to facilitate access to healthcare services.

Keywords

Access to healthcare; Myanmar; unmet healthcare needs

Introduction

Access to healthcare is fundamental to achieving universal health coverage (UHC), which aims to grant every individual access to essential healthcare services without financial hardships (World Health Organization, 2023). Myanmar has significantly improved nationwide access to healthcare services (Ministry of Health [Myanmar], 2016). In 2016, the government implemented the 2017–2021 National Health Plan, which emphasized delivering essential healthcare services at and below the township level (Ministry of Health [Myanmar], 2016). A cost-sharing scheme has been in place in public healthcare facilities since 1993, providing nearly cost-free access to healthcare services (World Health Organization, 2014).

Despite the health system reform and the provision of nearly cost-free healthcare services at public facilities, access to healthcare in Myanmar remains unsubstantiated. Previous studies have highlighted that several challenges remain in Myanmar's health sector, such as the inadequate and uneven distribution of health resources (Latt et al., 2016; Ministry of Health [Myanmar], 2016; Saw et al., 2019). These challenges and socioeconomic disparities undoubtedly impede access to healthcare in Myanmar (Han et al., 2018; Ministry of Health [Myanmar], 2016; Nikoloski et al., 2021; World Health Organization, 2014, 2015).

Unmet healthcare needs (UHN) have been used to understand barriers that impede access to healthcare in several studies (Chen & Hou, 2002; Jung & Ha, 2021; Meemon & Paek, 2019; Mitrašević et al., 2020). While previous studies in Myanmar have examined access to healthcare, there is a notable absence of research focusing on UHN. Hence, this study aims to (i) identify the prevalence of UHN, (ii) investigate whether socioeconomic and demographic factors are associated with UHN, and (iii) determine the reasons for UHN. The findings will assist stakeholders in improving the health system, identifying vulnerable populations, and addressing the factors that facilitate or hinder access to healthcare in the country. Consequently, this study is expected to provide valuable insights for revising health policies to achieve UHC, the ultimate goal of Myanmar's health sector.

Unmet healthcare needs

Unmet healthcare needs (UHN) are when people do not receive healthcare services even though they require them (Carr & Wolfe, 1976). The concept of UHN holds a significant position in the literature for measuring access to healthcare. This is because UHN can identify barriers to healthcare access that might not be determined by other measures from the healthcare services supply side, such as the presence of healthcare facilities, outpatient visits, and hospital admission rates (Chen & Hou, 2002; Jung & Ha, 2021; Meemon & Paek, 2019; Mitrašević et al., 2020; Sanmartin et al., 2002). Past research has shown that UHN can arise from factors related to the healthcare system, including the availability and quality of services provided by healthcare facilities (Chung, 2022; Hwang, 2018; Marrone, 2007), as well as from population characteristics, such as socioeconomic and demographic status (Åhs et al., 2012; Allin et al., 2010; Bryant et al., 2009; Lee et al., 2015; Stevens & Gillam, 1998).

Previous studies have indicated that UHN is particularly pronounced among individuals with low incomes, females, and rural residents, suggesting inequitable access to healthcare based on socioeconomic and demographic factors (Kasman & Badley, 2004; Meemon & Paek, 2019; Sibley & Glazier, 2009). Moreover, studies have shown that despite the provision of nearly cost-free healthcare, UHN arises due to factors beyond financial constraints (Kim et al., 2020;

Meemon & Paek, 2018, 2019; National Population and Family Planning Board [BKKBN] et al., 2018; Paek et al., 2016). For instance, the cost of transportation and limited operating hours of healthcare facilities are frequently cited as reasons behind UHN in Thailand despite its nearly cost-free healthcare services (Meemon & Paek, 2018, 2019). Similar findings were also found in studies conducted in Vietnam and Indonesia, indicating that UHN results from factors beyond the cost of healthcare services (Kim et al., 2020; National Population and Family Planning Board [BKKBN] et al., 2018; Nisak, 2021).

This study will, therefore, add to the existing literature by emphasizing their significance in a broader context. This, in turn, will facilitate the formulation of future policies and guidelines aimed at improving access to healthcare in Myanmar and other countries with similar contexts.

The context of Myanmar

According to the United Nations (2021), Myanmar is one of the least developed countries. It is the fourth most populous country in Southeast Asia (World Bank, 2023), and the population was predicted to be 51.1 million in 2019, with 69% residing in rural areas (Ministry of Labour, Immigration and Population [Myanmar], 2017). Myanmar has gone through significant political issues, including economic isolation and ongoing armed conflicts (Bhattacherjee, 2014; Grundy et al., 2014). Table 1 provides an overview of Myanmar's basic demographic and health indicators.

Table 1: Basic Demographic and Health Indicators in Myanmar

Indicator	Result	Source (Year)
Total population	51.1 million	Ministry of Labour, Immigration and Population [Myanmar] (2020)
Geographic area	676,578 km^2	Government of the Republic of the Union of Myanmar (2018)
Population density	82 per km^2	World Bank (2020)
Female population (% of total population)	50.2	World Bank (2020)
Rural population (% of total population)	69	World Bank (2020)
GDP per capita (US dollars)	1209.9	World Bank (2020)
Human development index	0.59	United Nations (2022)
Poverty headcount ratio at the national poverty line (% of population)	24.8	World Bank (2020)
At least primary education (% of the total population)	63.5	World Bank (2020)
Access to electricity (% of total population)	70.4	World Bank (2020)
Access to safe drinking water (% of total population)	59	World Bank (2020)
Life expectancy at birth (years)	66	World Bank (2020)
Infant mortality rate (per 1,000 live births)	34	World Bank (2020)
Maternal mortality ratio (per 100,000 live births)	179	World Bank (2020)
Hospital beds (per 1,000 people)	1.0	World Health Organization (2017)
Total health expenditure (% of GDP)	4.6	World Bank (2020)
Out-of-pocket expenditure on health (% of total health expenditure)	78.2	World Bank (2020)

Along with the economic isolation and under-development of social sectors, health in Myanmar faces several challenges (Ministry of Health [Myanmar], 2016; Saw et al., 2013;

World Health Organization, 2014). With the relatively low national averages of health indicators compared to other countries in the region (World Bank, 2020), Myanmar exhibits substantial disparities in health outcomes across socioeconomic and demographic groups (World Health Organization, 2014, 2017; Zaw et al., 2015). Studies have shown that shortages in the health system, such as imbalances in human resources for health, insufficient infrastructure, and the absence of a comprehensive health financing strategy, exacerbate existing health disparities (Ministry of Health [Myanmar], 2016; Saw et al., 2019; World Health Organization, 2014). Moreover, challenges in the health system are heightened by weak public transportation and inadequate electricity infrastructure, further hindering access to healthcare (Asian Development Bank, 2012). Given the mentioned situation of Myanmar, which is likely to have a higher UHN, research on this topic remains remarkably limited in Myanmar.

Methods

Study design

A cross-sectional study was conducted with 318 participants from Tat Kon Township, Nay Pyi Taw Union Territory. The sample size was determined using the formula $n = Z^2[p(1-p)/e^2]$ (Lachin, 2005), where Z represents the level of confidence, p represents the prevalence of UHN, and e represents the margin of error. With Z = 1.96 and p = 0.24, from an estimate obtained from a previous study on UHN in a suburban area of Myanmar (Myint et al., 2019) —and e = 0.05, the initial calculation of the sample size was 280.

The study received approval from the Committee of Research Ethics, Faculty of Social Sciences and Humanities, Mahidol University (2022/173 [B1]).

Study area

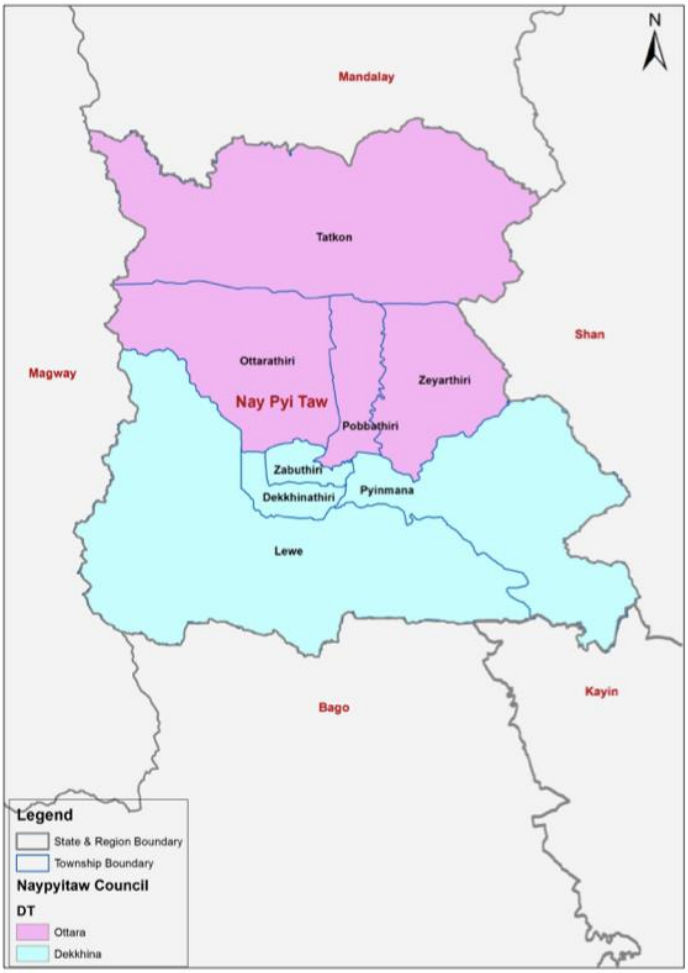
Nay Pyi Taw Union Territory was purposely selected because it is one of the country's three regions with the lowest population seeking care from primary healthcare facilities (Ministry of Health [Myanmar], 2021). Nay Pyi Taw consists of two central districts: Oattara and Dekkhina. These two districts contain eight townships, including urban wards and rural villages (Ministry of Labour, Immigration and Population [Myanmar], 2017). Six of the eight townships have similar socio-demographic characteristics, such as their ratio of urban and rural residences and social contexts. The two exceptions are Zayarthiri and Dekinathiri, where most residents are government employees (Ministry of Labour, Immigration and Population [Myanmar], 2017). Excluding these two townships, Tat Kon was selected randomly among the six townships in the second stage. In the third stage, wards (for urban populations) and village tracts (for rural populations) were selected randomly. In the fourth stage, eligible respondents residing in these randomly selected wards and villages were recruited using simple random sampling. The overview of Nay Pyi Taw Union Territory demographics and its map indicating Tat Kon township are described in Table 2 and Figure 1, respectively.

Table 2: Demographic Summary of Nay Pyi Taw Union Territory

Number of Districts			2
Number of Townships			8
Total number of population			1,160,242
Male population			565,155 (48.71%)
Female population			595,087 (51.29%)
Urban population			32%
Area (km^2)			70,571
Population density (per km^2)			164.4
Number of private households			262,253
Percentage of urban households			30.3%
Mean household size			4.1
Percentage of population by age group			
0–14 years			28.2%
15–64 years			67.2%
> 64 years			4.6%
People with disability		**Number**	**Percent**
Any form of disability		36,583	3.2%
Walking		14,761	1.3%
Seeing		18,189	1.6%
Hearing		9,468	0.8%
Intellectual/Mental		11,691	1.0%
Employment to population ratio	**Both sexes**	**Male**	**Female**
Age 10 and over	58.3%	72.8%	44.7%
Age 15 and over	65.0%	82.0%	49.4%
Age 15 to 64	67.85%	84.5%	52.1%
Ownership of housing unit			
Owner			75.9%
Renter			5.2%
Provided free (individually)			2.5%
Government quarters			14.4%
Private company quarters			1.5%
Others			0.5%
Availability of communication amenities			
Radio			38.3%
Television			50.5%
Landline phone			3.8%
Mobile phone			45.1%
Computer			5.3%
Internet at home			8.8%
% with none of the items			24.7%
% with all the items			0.5%
Availability of transportation equipment			
Car/Truck/Van			3.2%
Motorcycle/Moped			41.9%
Bicycle			34.2%
4-wheel tractor			0.7%
Canoe/boat			0.3%
Motorboat			0.1%
Cart (bullock)			21.1%

Note: Ministry of Labour, Immigration and Population [Myanmar] (2017)

Figure 1: Map of Nay Pyi Taw Union Territory by Districts and Townships



Note: Adopted from the Ministry of Labour, Immigration and Population [Myanmar] (2017)

Participants recruitment

Step 1: Individuals met the inclusion criteria if they were 18 years and above and had resided in Tat Kon Township, Myanmar, for at least 12 months. Based on the exclusion criteria, potential participants were excluded if they had a physical disability that could limit their mobility to access healthcare or a severe physical illness or mental issue that could limit their ability to respond to the research questionnaires.

Step 2: Individuals who met the inclusion and exclusion criteria were asked if they were experiencing a health problem that required medical attention during the past six months. Those who had answered "Yes" (i.e., individuals who had experienced a health problem that required medical attention during the past six months) were included in the study (i.e., 318 participants).

Data collection

Pilot procedure: Before the data collection, this study performed a pilot test to check the validity and reliability of the questionnaire. Specifically, the pilot test was conducted using 30 randomly selected people (approximately 10% of the sample size) from the study area. After

the pilot test, questions with unclear words were revised for more clarity and easier understanding for the respondents.

Data collection procedure and questionnaire structure: Data collection occurred between October and December 2022. Face-to-face interviews were conducted after obtaining informed consent. The researcher filled out the questionnaire once the participant had provided an answer. The first section of the questionnaire encompassed the socioeconomic and demographic characteristics of the participants. The subsequent section focuses on UHN, presenting a question and response options regarding the reasons for UHN. Specifically, the question for UHN was, "During the past six months, was there ever a time that you felt the need for healthcare but did not receive it?". Participants were prompted to select reasons for UHN from the provided options following the statement, "If you did not receive any of healthcare services, choose one or more of the following reasons." The average interview session lasted approximately 20 to 30 minutes.

Variable selection and measurement

The dependent variable (unmet healthcare needs [UHN]) was defined as the situation where people did not receive healthcare when they needed it during the past six months (Organization for Economic Cooperation and Development [OECD], 2020). Accordingly, it was a dichotomous variable (yes versus no). Specifically, two questions were used to measure the UHN of participants: (1) "During the past six months, was there ever a time that you felt the need for healthcare? Yes or No" and (2) "If yes, did you receive it?: Received or Not received." Among the participants who answered "Yes" to Question 1 (i.e., the study sample: 318 participants), those who answered "Not received" to Question 2 were categorized into the "Yes" group, and those who answered "Received" to the question were categorized into the "No" group.

Additionally, among participants in the "Yes" group, reasons for UHN were explored based on availability, accessibility, and acceptability. According to Meemon and Paek (2020), availability-related UHN occurs due to issues of the healthcare system (e.g., long waiting times in healthcare facilities), while accessibility- and acceptability-related UHN arise from the socioeconomic and sociocultural issues of individuals seeking healthcare services (e.g., cost of treatment or transportation). In this study, if the reasons for UHN were related to healthcare service availability issues (e.g., "no healthcare facility in the area" or "waiting time too long"), they were included in the "availability" category. If the reasons were related to cost or transportation (e.g., "could not afford to travel" or "could not afford treatment"), they were included in the "accessibility" category. All other reasons (e.g., "not sure of diagnosis accuracy" or "too busy due to employment or housework (e.g., caring for a child)" were included in the "acceptability" category.

This study included nine independent variables, following Aday and Andersen's Access to Medical Care model. According to this model, factors affecting access to healthcare are categorized into three groups: predisposing, enabling, and need-for-care factors. Predisposing factors indicate socio-demographic characteristics that cannot be easily altered. Enabling factors indicate individual- and community-level resources that facilitate healthcare access. Need-for-care factors indicate subjective and objective health issues that demand healthcare services (Aday & Andersen, 1974; Andersen & Newman, 1973).

The analysis included four variables (age, sex, religion, and ethnicity) as predisposing factors and five (marital status, education, occupation, income, and location of residence) as enabling factors. Regarding need-for-care factors, the initial plan was to collect information about participants' chronic disease statuses, such as diabetes and hypertension. However, in the pilot procedure, most individuals were unaware of their chronic health conditions and unable to provide valid information for need-for-care factors, leading to an underestimation of the need for care. To avoid inaccuracy in the assessment of UHN, need-for-care factors were excluded from the study.

All independent variables, except occupation status, were measured as dichotomous variables: age (18–44 years versus 45 years and above), sex (male versus female), religion (Buddhist versus others), ethnicity (Bamar versus others), marital status (single versus married), education (low versus high), income (low versus high), and residence (urban versus rural). Regarding education, participants who had completed middle school or below were included in the "low" group, while those with a high school education or higher were included in the "high" group. In terms of income, following the Average Salary in Myanmar 2021 Survey (Salary Explorer, 2021), participants with a monthly income lower and higher than 300,000 Myanmar kyats (≈ 100 US dollars) were categorized into the "low" and "high" groups, respectively. Lastly, occupation status was measured as a nominal variable with three categories: daily-waged, self-employed, and dependent.

Statistical analysis

A descriptive analysis was performed to explore the prevalence and reasons for UHN. The bivariate association between the dependent variable (UHN) and each independent variable was examined using chi-squared tests. In addition, a binary logistic regression analysis was conducted since it is an appropriate statistical method to investigate the association between multiple independent variables and a dichotomous dependent variable (UHN). The Hosmer–Lemeshow goodness-of-fit test was employed to assess the performance of the binary logistic regression model (Hosmer & Lemeshow, 2000). Statistical significance was fixed at a p value of .05. The binary logistic regression model employed an odds ratio and a 95% confidence interval to assess the directional relationship and statistical significance. Statistical analyses were conducted using IBM SPSS software (Version 29). Specifically, a binary logistic regression model was performed by setting UHN as a dependent variable and all independent variables (i.e., demographic and socioeconomic characteristics of participants) as covariates in the Binary Logistic menu in SPSS.

Results

Descriptive statistical analysis

Table 3 reveals the descriptive statistical analysis results. The findings showed that among all 318 participants, approximately 23.6% (n = 75) experienced unmet healthcare needs (UHN). The prevalence of UHN was relatively high among participants with a low socioeconomic status compared to those with a high socioeconomic status. Participants who experienced UHN included a more significant proportion of those who were younger, female, daily-waged or dependent, had a low income, and lived in rural areas compared to participants who did not experience UHN. Specifically, regarding age, the prevalence of UHN among the younger

group (aged 18–44 years) was 33.8%, approximately 2.5 times higher than the older group (aged 45 years and above) at 13.7%. Regarding sex, the prevalence of UHN among females (29.1%) was almost twice as high as among males (16.8%). For occupation status, the highest prevalence of UHN was observed among daily-waged workers (35%), followed by dependents (26.7%) and self-employed individuals (14.6%). Low-income individuals (28.2%) and rural residents (30.6%) had a higher prevalence of UHN compared to high-income individuals (18.7%) and urban residents (16.8%), respectively. Furthermore, the results indicate that the prevalence of UHN was higher among those with low education and those belonging to religious minority and ethnic minority groups. However, these variables did not reach statistical significance.

Table 3: Descriptive Analysis of Unmet Healthcare Needs

Characteristic	Overall *N* = 318	Healthcare Needs		*p* value
		Met *n* = 243 (76.4%)	Unmet *n* = 75 (23.6%)	
Age				
18–44 years	157 (49.4)	104 (66.2)	53 (33.8)	< .001***
45 years and above	161 (50.6)	139 (86.3)	22 (13.7)	
Sex				
Male	143 (45.0)	119 (83.2)	24 (16.8)	.010*
Female	175 (55.0)	124 (70.9)	51 (29.1)	
Religion				
Buddhist	309 (97.2)	237 (76.7)	72 (23.3)	.485
Others	9 (2.8)	6 (66.7)	3 (33.3)	
Ethnicity				
Bamar	306 (96.2)	235 (76.8)	71 (23.2)	.417
Others	12 (3.8)	8 (66.7)	4 (33.3)	
Marital status				
Single	126 (39.6)	97 (77.0)	29 (23.0)	.846
Married	192 (60.4)	146 (76.0)	46 (24.0)	
Education				
Low	180 (56.6)	134 (74.4)	46 (25.6)	.344
High	138 (43.4)	109 (79.0)	29 (21.0)	
Occupation				
Dependent	101 (31.8)	74 (73.3)	27 (26.7)	.002**
Self-employed	137 (43.1)	117 (85.4)	20 (14.6)	
Daily-waged	80 (25.2)	52 (65.0)	28 (35.0)	
Income				
Low	163 (51.3)	117 (71.8)	46 (28.2)	.046*
High	155 (48.7)	126 (81.3)	29 (18.7)	
Residence				
Urban	161 (50.6)	134 (83.2)	27 (16.8)	.004**
Rural	157 (49.4)	109 (69.4)	48 (30.6)	

*Note: * $p < .05$, ** $p < .01$, *** $p < .001$.*

Binary logistic regression analysis

The results of the binary logistic regression model are presented in Table 4. The *p* value of Hosmer–Lemeshow goodness-of-fit exceeded .05, suggesting that the regression model did not show a lack of fit with the data. The model found a statistically significant relationship for five variables: age, sex, occupation status, income, and residence. Consistent with the descriptive statistical analysis results, the logistic regression analysis showed that participants with low socioeconomic status were likelier to have a high UHN than those with high socioeconomic status.

A younger age, female sex, a daily-waged or dependent occupation, a low income, and rural residence were associated with higher UHN. Specifically, age was significantly related to UHN with an adjusted odds ratio (AOR) of 2.83 and a confidence interval (CI) of 1.54–5.22. This AOR indicates that participants aged 18–44 years were 2.83 times more likely to experience UHN than those aged 45 years or older. The AOR of 0.37 (95% CI [0.20, 0.70]) for the sex variable indicates that female participants were approximately 2.70 times more likely to encounter UHN than male participants. Regarding occupation status, participants who were dependents or daily-wage workers had 3.03 (95% CI [1.45, 6.25]) times higher UHN than those who were self-employed. There was no significant difference in UHN between dependents and daily-wage workers. Regarding income and residence, low-income and rural participants were 1.90 (95% CI [1.03, 3.49]) and 2.78 (95% CI [1.52, 5.26]) times more likely to experience UHN than high-income and urban participants, respectively.

Table 4: Binary Logistic Regression Analysis of Unmet Healthcare Needs

Characteristic	COR (95% CI)	AOR (95% CI)
Age		
18–44 years	3.22 (1.84, 5.63)*	2.83 (1.54, 5.22)*
45 years and above	1.00 (ref.)	1.00 (ref.)
Sex		
Male	0.49 (0.28, 0.85)*	0.37 (0.20, 0.70)*
Female	1.00 (ref.)	1.00 (ref.)
Marital status		
Single	0.95 (0.56, 1.61)	0.79 (0.43, 1.44)
Married	1.00 (ref.)	1.00 (ref.)
Education		
Low	1.29 (0.76, 2.19)	1.74 (0.95, 3.19)
High	1.00 (ref.)	1.00 (ref.)
Occupation		
Dependent	0.68 (0.36, 1.28)	0.98 (0.47, 2.05)
Self-employed	0.32 (0.16, 0.61)*	0.33 (0.16, 0.69)*
Employed	1.00 (ref.)	1.00 (ref.)
Income		
Low	1.71 (1.01, 2.90)*	1.90 (1.03, 3.49)*
High	1.00 (ref.)	1.00 (ref.)
Residence		
Urban	0.46 (0.27, 0.78)*	0.36 (0.19, 0.66)*
Rural	1.00 (ref.)	1.00 (ref.)

*Note: Hosmer-Lemeshow goodness-of-fit: Chi-square = 11.10; degrees of freedom = 8; p value = .20; COR = crude odds ratio; AOR = adjusted odds ratio; 95% CI = 95% confidence interval; ref. = reference; * p < .05.*

Reasons for unmet healthcare needs

Table 5 represents the prevalence of reasons for UHN. Among the 75 participants who experienced UHN, nearly half (46.7%) attributed their UHN to availability issues. Specifically, the most frequent reason was "no healthcare facilities in the area" (37.3%), followed by "healthcare service is not available when required" (20%) and "long wait time" (8%). The prevalence of UHN due to accessibility (29.3%) and acceptability (30.1%) issues were similar. Among the accessibility-related reasons, the "cost of treatment or transportation for healthcare access" (18.7%) and "no caretakers" (12%) were the most frequent. Finally, "too busy due to employment or housework" (25.3%) was the most frequent acceptability-related reason.

Table 5: Reasons for Unmet Healthcare Needs

Reason for Unmet Healthcare Needs	Number of respondents (%)
Availability	35 (46.7)
No healthcare facility in the area	28 (37.3)
Healthcare service is not available when required	15 (20.0)
Waiting time is too long	6 (8.0)
Accessibility	22 (29.3)
Couldn't afford the treatment/transportation	14 (18.7)
Couldn't find anybody to accompany	9 (12.0)
Didn't know where to go	1 (1.3)
Acceptability	23 (30.1)
Felt that health services would be inadequate to cure health issues	2 (2.7)
Bad impression of or low confidence in the hospital/healthcare center	3 (4.0)
Dislike or afraid of doctors/healthcare providers	2 (2.7)
Too busy due to employment or housework	19 (25.3)

Note: The sum exceeds 100% because a respondent could provide more than one reason.

Discussion

This study examines the prevalence, underlying reasons for, and factors associated with unmet healthcare needs (UHN) in Myanmar in 2022. The findings reveal that 23.6% of the participants experienced UHN, which was higher than 22% of the general population and 18% of the insured population in Vietnam (Giang & Allebeck, 2003) and much higher than 10.6% in Indonesia (National Population and Family Planning Board [BKKBN] et al., 2018), 6.6% of the elderly population in Malaysia (Krishnaswamy et al., 2009), and 1.6% in Thailand (Vongmongkol et al., 2021). Vietnam, Indonesia, and Thailand have implemented national-level health insurance programs (Kirdruang, 2011; Lu & Chiang, 2018), while Myanmar lacks such a scheme.

This study further identifies several significant factors, including age, sex, income level, occupation, and residential location, that differentiate individuals with met healthcare needs from those with UHN. Specifically, females, younger individuals, individuals with lower income levels, daily-waged workers, and those residing in rural areas experienced higher UHN than their counterparts.

Consistent with previous studies, individuals with lower incomes had a higher prevalence of UHN. This could be because most patients in Myanmar are responsible for covering the costs of medications, inpatient care, outpatient care, and inpatient food (World Health Organization, 2014). Despite a cost-sharing scheme, the significant demand cannot be accommodated (World Health Organization, 2014), resulting in limited access to healthcare and financial burdens on low-income individuals. Moreover, the existing social security scheme provides coverage only for individuals employed in the formal employment sector, which accounts for less than 2% of the total population (World Health Organization, 2014). In this sense, the government could consider implementing a nationwide public health insurance system to provide financial coverage for a broader range of services, reducing UHN and facilitating equitable access to healthcare. However, the successful implementation of a nationwide public health insurance system may encounter challenges such as the need for pooling funds, effective regulatory frameworks, and public awareness to ensure widespread participation.

It is crucial to consider expenses that extend beyond healthcare services, specifically transportation and accommodation costs. In Myanmar, the availability of public transportation is limited (Asian Development Bank, 2016), compelling individuals to rely on private transportation, which can be considerably expensive. Similar findings have been reported in previous studies, including a study in Korea, where nearly half of the respondents experienced UHN due to transportation difficulties (Choi et al., 2019). Similarly, inadequate access to public and affordable transportation has been indicated as a primary barrier to healthcare access (Iimi, 2021; Kullanit & Taneepanichskul, 2017; Moturi et al., 2022; Syed et al., 2013; Varela et al., 2019).

The higher prevalence of UHN among the rural population can be explained by the fact that, although the government is expanding public healthcare services in rural and remote areas (Ministry of Health [Myanmar], 2016), there is a severe shortage of human resources for health in these regions. While healthcare facilities are available, the lack of healthcare professionals hinders their effectiveness. This issue, particularly the challenges associated with introducing and retaining human resources for health in rural and remote areas, has also been acknowledged in the National Health Plan 2017–2021 (Ministry of Health [Myanmar], 2016). Furthermore, establishing rural and sub-rural health centers in rural areas also depends on villages' economic and social development (World Health Organization, 2014).

Additionally, the limited availability of specific outpatient services, which are typically provided for a limited time (e.g., diabetic outpatient services are offered only on Wednesdays from 9:00 am to 11:00 am) in public healthcare facilities (Yangon General Hospital, 2022), poses a barrier for the population seeking healthcare. Meanwhile, private healthcare facilities, although usually situated within communities, are predominantly concentrated in urban and suburban areas (World Health Organization, 2014), further impeding rural populations' access to healthcare. Similar findings have been documented in previous studies that have identified the ineffective allocation of resources as the primary cause of disparities in UHN between urban and rural areas (Dorjdagva et al., 2017; Lu & Chiang, 2018; Quashie & Pothisiri, 2019; Sibley & Weiner, 2011).

Daily-waged workers experienced more UHN than self-employed or dependent workers due to their limited time to visit health facilities. A similar pattern has been observed in Thailand, where time constraints during daytime and restricted service hours of healthcare facilities were identified as significant factors associated with UHN for full-time employed individuals (Meemon & Paek, 2019; Paek et al., 2016).

This study reveals that younger individuals had a higher UHN than older individuals. It is consistent with previous studies showing that UHN was most prevalent among young individuals (Chen & Hou, 2002; Kasman & Badley, 2004; Krishnaswamy et al., 2009; Sibley & Glazier, 2009). However, other studies indicated that older individuals were more likely to have UHN (Knodel & Teerawichitchainan, 2017; Meemon & Paek, 2018). The higher prevalence of UHN among younger individuals could be attributed to their demanding schedules and attitudes toward healthcare (Papanikolaou & Zygiaris, 2014; Pappa et al., 2013).

Furthermore, this study indicates that females were more likely than males to encounter UHN. This could be due to acceptability concerns, particularly those arising from competing priorities. Among the reasons for UHN identified in this study, "too busy due to employment or housework" was the second most common. For instance, females often assume child-rearing and family care responsibilities. This is supported by the existing literature indicating that females significantly predict UHN due to the unique responsibilities they bear within a household (Pappa et al., 2013; Read & Smith, 2017). Another possible explanation is related to Myanmar culture, according to which females are typically dependents within a household and face limitations in independent travel, especially those residing in remote areas. A report by the Asian Development Bank (2016) highlighted that households in Myanmar usually possess only one means of transportation, such as a bike or motorcycle. This implies that females or dependent individuals often have to wait for a family member with access to transportation to return before seeking healthcare.

Although this study recommended expanding public healthcare infrastructure and implementing a nationwide health insurance system, this recommendation may not guarantee equitable access to healthcare. For instance, Thailand continued expanding its public healthcare infrastructure after achieving universal health coverage in 2002. Nevertheless, poor access to healthcare has been cited among people with low socioeconomic status in remote areas. To alleviate this issue, Thailand has implemented a community health volunteer program. This program, a formal part of the primary healthcare system, promotes community-level healthcare by bridging the gap between community members and healthcare facilities (Meemon & Paek, 2019). The Myanmar government should consider strengthening community and village health volunteer programs, particularly for the rural population. This approach aligns with the needs of the rural population and the long-term sustainability of addressing healthcare disparities across the country.

One of the strengths of this study is that it identified the prevalence of UHN and its underlying reasons while considering the diverse socioeconomic statuses and demographic factors of residents of both urban and rural areas. However, this study has some limitations. First, this study relied on a structured interview to gather self-reported data, which could have introduced subjectivity and variation in individual perspectives. For instance, respondents may have had different interpretations of what constitutes a waiting time that is "too long." In addition, it is essential to note that this study does not explore the different perspectives and layers of needs (i.e., wants [felt needs], demands [expressed needs], and needs [normative needs]) (Wright & Williams, 1998). Qualitative research approaches, such as an in-depth interview or case study, are necessary in future studies to fill this methodological gap.

Second, this study used a relatively limited number of samples in a particular region, which was purposively selected. In addition, individual demographic and socioeconomic characteristics have been found to vary across states and regions in Myanmar (Ministry of Labour, Immigration and Population [Myanmar], 2020). This limits the generalizability of the

study findings to the entire Myanmar. Thus, a study using larger samples from different geographical locations is required to verify the validity and reliability of the study findings.

Third, the study did not incorporate environmental and system-level factors such as transportation situation, distribution of health resources across different regions, and availability of healthcare professionals and facilities in each ward or village. Future studies should consider these system-level factors which might impact the UHN. Fourth, the observed differences between COR and AOR indicated potential confounding effects among the independent variables. Thus, future studies should consider various interactions across demographic and socioeconomic characteristics to evaluate more precise patterns of UHN.

Fifth, the cross-sectional design employed in this study could not provide information about the causality between socio-demographic factors and UHN. Thus, when referring to the relation throughout the paper, the causality is not pointed out but the association between the variables. Last, excluding need-for-care factors from the analysis limits the study's evaluation of chronic health conditions. Future studies should consider need-for-care factors, addressing chronic health conditions and potential under-reported health conditions for a more comprehensive assessment of UHN.

Conclusions

To our knowledge, this study is the first to explore unmet healthcare needs (UHN) while considering diverse socioeconomic strata in Myanmar. This study revealed that the prevalence of UHN in Myanmar is relatively high compared to those in the region. Despite recent efforts to expand services, significant socioeconomic and demographic inequalities in access to healthcare persist in Myanmar. This study also emphasized that providing healthcare with no or minimal cost does not guarantee universal access to healthcare, highlighting the need for adequate and equitable infrastructure. Specifically, the government should consider further expanding the geographical coverage of public healthcare infrastructure and extending operating hours to enhance the availability and accessibility of healthcare services.

The findings also underscore the importance of adopting a comprehensive approach to health policy programs and interventions. A critical policy area involves establishing a national health insurance system with the existing social security scheme and pension programs. It is crucial to complement these efforts with initiatives in social sectors, focusing on improving public transportation and promoting gender equity. This is particularly important in rural areas where UHN is most prevalent.

References

Aday, L. A., & Anderson, R. M. (1974). A framework for the study of access to medical care. *Health Services Research, 9*(3), 208–220. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1071804/

Åhs, A., Burell, G., & Westerling, R. (2010). Care or not care—that is the question: Predictors of healthcare utilisation in relation to employment status. *International Journal of Behavioral Medicine*, *19*(1), 29–38. https://doi.org/10.1007/s12529-010-9129-2

Allin, S., Grignon, M., & Le Grand, J. (2010). Subjective unmet need and utilization of health care services in Canada: What are the equity implications? *Social Science & Medicine*, *70*(3), 465–472. https://doi.org/10.1016/j.socscimed.2009.10.027

Andersen, R., & Newman, J. F. (1973). Societal and individual determinants of medical care utilization in the United States. *The Milbank Memorial Fund Quarterly. Health and Society*, *51*(1), 95–124. https://doi.org/10.2307/3349613

Asian Development Bank. (2012, August). *Myanmar in Transition: Opportunities and Challenges*. https://www.adb.org/sites/default/files/publication/29942/myanmar-transition.pdf

Asian Development Bank. (2016). *Myanmar Transport Sector Policy Note: Rural Roads And Access*. https://www.adb.org/sites/default/files/publication/189079/mya-rural-roads.pdf

Bhattacherjee, A. (Ed.). (2014). *Myanmar in Transition: Ethnic Conflicts, External Interests and Political Changes*. Institute of Peace and Conflict Studies. http://www.jstor.org/stable/resrep09401

Bryant, T., Leaver, C., & Dunn, J. R. (2009). Unmet healthcare need, gender, and health inequalities in Canada. *Health Policy, 91*(1), 24–32. https://doi.org/10.1016/j.healthpol.2008.11.002

Carr, W., & Wolfe, S. (1976). Unmet needs as sociomedical indicators. *International Journal of Health Services, 6*(3), 417–430. https://doi.org/10.2190/MCG0-UH8D-0AG8-VFNU

Chen, J., & Hou, F. (2002). Unmet needs for health care. *Health Reports, 13*(2), 23–24. https://pubmed.ncbi.nlm.nih.gov/12743954/

Choi, Y., Nam, K., & Kim, C.-Y. (2019). Association between convenience of transportation and unmet healthcare needs of rural elderly in Korea. *Journal of Preventive Medicine and Public Health*, *52*(6), 355–365. https://doi.org/10.3961/jpmph.19.172

Chung, W. (2022). Changes in barriers that cause unmet healthcare needs in the life cycle of adulthood and their policy implications: A Need-Selection Model analysis of the Korea Health Panel Survey data. *Healthcare*, *10*(11), Article 2243. https://doi.org/10.3390/healthcare10112243

Dorjdagva, J., Batbaatar, E., Svensson, M., Bayarsaikhan, D., Batmunkh, B., & Kauhanen, J. (2017). Free and universal, but unequal utilization of primary health care in the rural and urban areas of Mongolia. *International Journal for Equity in Health*, *16*(1), Article 73. https://doi.org/10.1186/s12939-017-0572-4

Giang, K. B., & Allebeck, P. (2003). Self-reported illness and use of health services in a rural district of Vietnam: Findings from an epidemiological field laboratory. *Scandinavian Journal of Public Health*, *31*(62_suppl), 52–58. https://doi.org/10.1080/14034950310015112

Government of Republic of the Union of Myanmar. (2018). *Geography*. Myanmar National Portal. https://myanmar.gov.mm/geography#:~:text=The%20total%20area%20of%20the,dominant%20topographical%20features%20of%20Myanmar

Grundy, J., Annear, P. L., Ahmed, S., & Biggs, B. (2014). Adapting to social and political transitions: The influence of history on health policy formation in the Republic of the Union of Myanmar (Burma). *Social Science & Medicine*, *107*, 179–188. https://doi.org/10.1016/j.socscimed.2014.01.015

Han, S. M., Rahman, M., Rahman, S., Swe, K. T., Palmer, M., Sakamoto, H., Nomura, S., & Shibuya, K. (2018). Progress towards universal health coverage in Myanmar: A national and subnational assessment. *The Lancet Global Health*, *6*(9), e989–e997. https://doi.org/10.1016/s2214-109x(18)30318-8

Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression* (2nd ed.). John Wiley & Sons, Inc.

Hwang, J. (2018). Understanding reasons for unmet health care needs in Korea: What are health policy implications? *BMC Health Services Research*, *18*(1), Article 557. https://doi.org/10.1186/s12913-018-3369-2

Iimi, A. (2021, July). Estimating the impact of improved roads on access to health care: Evidence from Mozambique. *Policy Research Working Papers*. The World Bank Group. https://doi.org/10.1596/1813-9450-9726

Jung, B., & Ha, I.-H. (2021). Determining the reasons for unmet healthcare needs in South Korea: A secondary data analysis. *Health and Quality of Life Outcomes*, *19*(1), Article 99. https://doi.org/10.1186/s12955-021-01737-5

Kasman, N. M., & Badley, E. M. (2004). Beyond access: Who reports that health care is not being received when needed in a publicly-funded health care system? *Canadian Journal of Public Health*, *95*(4), 304–308. https://doi.org/10.1007/bf03405137

Kim, J. Y., Kim, D. I., Park, H. Y., Pak, Y., Tran, P. N. H., Thai, T. T., Thuy, M. T. T., & Van Dung, D. (2020). Unmet healthcare needs and associated factors in rural and suburban Vietnam: A cross-sectional study. *International Journal of Environmental Research and Public Health*, *17*(17), Article 6320. https://doi.org/10.3390/ijerph17176320

Kirdruang, P. (2011). *Essays in Economics of public health insurance in developing countries: Evidence from Thailand and Vietnam* [Doctoral dissertation, University of Minnesota]. University Digital Conservancy. https://hdl.handle.net/11299/119863

Knodel, J., & Teerawichitchainan, B. (2017). Aging in Myanmar. *The Gerontologist*, *57*(4), 599–605. https://doi.org/10.1093/geront/gnw211

Krishnaswamy, S., Subramaniam, K., Low, W. Y., Aziz, J. A., Indran, T., Ramachandran, P. V., Hamid, A. R. A., & Patel, V. (2009). Factors contributing to utilization of health care services in Malaysia: A population-based study. *Asia Pacific Journal of Public Health*, *21*(4), 442–450. https://doi.org/10.1177/1010539509345862

Kullanit, A., & Taneepanichskul, N. (2017). Transportation barriers on healthcare utilization among elderly population living in Mahasarakham province, Thailand. *Journal of Health Research*, *31*(Suppl. 2), S233–S238. https://doi.org/10.14456/jhr.2017.89

Lachin, J. M. (2005). Sample size determination. In P. Armitage & T. Colton (Eds.), *Encyclopedia of Biostatistics*. John Wiley & Sons, Ltd. https://doi.org/10.1002/0470011815.b2a15138

Latt, N. N., Myat, C. S., Htun, N. M. M., Saw, Y. M., Myint, M. N. H. A., Aoki, F., Reyer, J. A., Yamamoto, E., Yoshida, Y., & Hamajima, N. (2016). Healthcare in Myanmar. *Nagoya Journal of Medical Science, 78(2),* 123–134. https://www.med.nagoya-u.ac.jp/medlib/nagoya_j_med_sci/782/01_NyiNyiLatt.pdf

Lee, S.-Y., Kim, C.-W., Kang, J.-H., & Seo, N.-K. (2015). Unmet healthcare needs depending on employment status. *Health Policy*, *119*(7), 899–906. https://doi.org/10.1016/j.healthpol.2014.09.007

Lu, J. R., & Chiang, T. (2018). Developing an adequate supply of health services: Taiwan's path to universal health coverage. *Social Science & Medicine*, *198*, 7–13. https://doi.org/10.1016/j.socscimed.2017.12.017

Marrone, S. (2007). Understanding barriers to health care: A review of disparities in health care services among indigenous populations. *International Journal of Circumpolar Health*, *66*(3), 188–198. https://doi.org/10.3402/ijch.v66i3.18254

Meemon, N., & Paek, S. C. (2018). Health-seeking behavior of the uninsured before and after the Universal Coverage Scheme in Thailand. *Asia-Pacific Social Science Review, 18*(1), 1–14. https://repository.li.mahidol.ac.th/handle/123456789/44946

Meemon, N., & Paek, S. C. (2019). Factors associated with unmet need for healthcare among older adults in Thailand. *Asia-Pacific Social Science Review, 19*(2), 180–191. https://www.dlsu.edu.ph/wp-content/uploads/pdf/research/journals/apssr/2019-June-vol19-2/14-factors-associated-with-unmet-need-for-healthcare-among-older-adults-in-thailand.pdf

Meemon, N., & Paek, S. C. (2020). Universal coverage scheme in Thailand: Analysis of factors associated with and reasons for underutilization. *Asia-Pacific Social Science Review, 20*(2), 1–13. https://www.dlsu.edu.ph/wp-content/uploads/pdf/research/journals/apssr/2020-June-vol20-2/2-universal-coverage-scheme-in-thailand-analysis-of-factors-associated-with-and-reasons-for-underutilization.pdf

Ministry of Health [Myanmar]. (2016). *National Health Plan (2017–2021)*. https://mohs.gov.mm/Main/content/publication/national-health-plan-2017-2021-eng

Ministry of Health [Myanmar]. (2021, September). *Public Health Statistics 2017–2019*. Health Information Division Department of Public Health Ministry of Health. https://mohs.gov.mm/ckfinder/connector?command=Proxy&lang=en&type=Main&currentFolder=%2FNews%2FNews_2021%2FOct_2021(B)%2F&hash=a6a1c319429b7abc0a8e21dc137ab33930842cf5&fileName=Public%20Health%20Statistics%20Report%202017-2019%20(22%20Sep%202021).pdf

Ministry of Labour, Immigration and Population [Myanmar]. (2017, March). *The 2014 Myanmar Population and Housing Census: Thematic Report on Population Projections for the Union of Myanmar, States/Regions, Rural and Urban Areas, 2014 – 2050: Census Report Volume 4-F.* https://myanmar.unfpa.org/sites/default/files/pub-pdf/4F_Population%20Projections.pdf

Ministry of Labour, Immigration and Population [Myanmar]. (2020, December). *The 2019 Inter-censal Survey: The Union Report*. https://dop.gov.mm/sites/dop.gov.mm/files/publication_docs/ics_report_eng_7012021.pdf

Mitrašević, M., Radovanović, S., Radević, S., Maričić, M., Mačužić, I. Ž., & Kanjevac, T. (2020). The unmet healthcare needs: Evidence from Serbia. *Iranian Journal of Public Health*, *49*(9), 1650–1658. https://doi.org/10.18502/ijph.v49i9.4081

Moturi, A. K., Alegana, V. A., Mumo, E., Snow, R. W., Okiro, E. A., & Macharia, P. M. (2022). Geographic accessibility to public and private health facilities in Kenya in 2021: An updated geocoded inventory and spatial analysis. *Frontiers in Public Health*, *10*, Article 1002975. https://doi.org/10.3389/fpubh.2022.1002975

Myint, C. Y., Pavlova, M., & Groot, W. (2019). Patterns of health care use and out-of-pocket payments among general population and social security beneficiaries in Myanmar. *BMC Health Services Research*, *19*(1), Article 258. https://doi.org/10.1186/s12913-019-4071-8

National Population and Family Planning Board (BKKBN), Statistics Indonesia (BPS), Ministry of Health (Kemenkes), & ICF. (2018, September). *Indonesia Demographic and Health Survey 2017*. https://dhsprogram.com/pubs/pdf/FR342/FR342.pdf

Nikoloski, Z., McGuire, A., & Mossialos, E. (2021). Evaluation of progress toward universal health coverage in Myanmar: A national and subnational analysis. *PLOS Medicine*, *18*(10), Article e1003811. https://doi.org/10.1371/journal.pmed.1003811

Nisak, B. A. (2021). Determinants of unmet needs in married women in Indonesia (Indonesian DHS Analysis 2017). *Jurnal Biometrika Dan Kependudukan (Journal of Biometrics and Population)*, *10*(1), 1–10. https://doi.org/10.20473/jbk.v10i1.2021.1-10

Organization for Economic Cooperation and Development (OECD). (2020). *Unmet needs for health care.* https://www.oecd-ilibrary.org/sites/13aff239-en/index.html?itemId=/content/component/13aff239-en

Paek, S. C., Meemon, N., & Wan, T. T. H. (2016). Thailand's universal coverage scheme and its impact on health-seeking behavior. *SpringerPlus*, *5*(1), Article 1952. https://doi.org/10.1186/s40064-016-3665-4

Papanikolaou, V., & Zygiaris, S. (2012). Service quality perceptions in primary health care centres in Greece. *Health Expectations*, *17*(2), 197–207. https://doi.org/10.1111/j.1369-7625.2011.00747.x

Pappa, E., Kontodimopoulos, N., Papadopoulos, A., Tountas, Y., & Niakas, D. (2013). Investigating unmet health needs in primary health care services in a representative sample of the Greek population. *International Journal of Environmental Research and Public Health*, *10*(5), 2017–2027. https://doi.org/10.3390/ijerph10052017

Quashie, N. T., & Pothisiri, W. (2019). Rural-urban gaps in health care utilization among older Thais: The role of family support. *Archives of Gerontology and Geriatrics*, *81*, 201–208. https://doi.org/10.1016/j.archger.2018.12.011

Read, J. G., & Smith, P. B. (2017). Gender and national origin differences in healthcare utilization among U.S. Immigrants from Mexico, China, and India. *Ethnicity and Health*, *23*(8), 867–883. https://doi.org/10.1080/13557858.2017.1297776

Salary Explorer. (2021). *Average salary in Myanmar 2021*. http://www.salaryexplorer.com/salary-survey.php?loc=148&loctype=1

Sanmartin, C., Houle, C., Tremblay, S., & Berthelot, J.-M. (2002). Changes in unmet healthcare needs. *Health Reports, 13*(3), 15–21. https://www150.statcan.gc.ca/n1/en/pub/82-003-x/2001003/article/6101-eng.pdf?st=7Y1VdzId

Saw, Y. M., Than, T. M., Thaung, Y., Aung, S., Shiao, L. W.-S., Win, E. M., Khaing, M., Tun, N. A., Iriyama, S., Win, H. H., Sakisaka, K., Jimba, M., Hamajima, N., & Saw, T. N. (2019). Myanmar's human resources for health: Current situation and its challenges. *Heliyon*, *5*(3), Article e01390. https://doi.org/10.1016/j.heliyon.2019.e01390

Saw, Y. M., Win, K. L., Shiao, L. W.-S., Thandar, M. M., Amiya, R. M., Shibanuma, A., Tun, S., & Jimba, M. (2013). Taking stock of Myanmar's progress toward the health-related Millennium Development Goals: Current roadblocks, paths ahead. *International Journal for Equity in Health*, *12*(1), Article 78. https://doi.org/10.1186/1475-9276-12-78

Sibley, L. M., & Glazier, R. H. (2009). Reasons for Self-reported unmet healthcare needs in Canada: A population-based provincial comparison. *Healthcare Policy*, *5*(1), 87–101. https://doi.org/10.12927/hcpol.2009.20934

Sibley, L. M., & Weiner, J. P. (2011). An evaluation of access to health care services along the rural-urban continuum in Canada. *BMC Health Services Research*, *11*(1), Article 20. https://doi.org/10.1186/1472-6963-11-20

Stevens, A., & Gillam, S. (1998). Health needs assessment: Needs assessment: From theory to practice. *The BMJ*, *316*(7142), 1448–1452. https://doi.org/10.1136/bmj.316.7142.1448

Syed, S. T., Gerber, B. S., & Sharp, L. K. (2013). Traveling towards disease: Transportation barriers to health care access. *Journal of Community Health*, *38*(5), 976–993. https://doi.org/10.1007/s10900-013-9681-1

United Nations. (2021). *Least developed country category: Myanmar profile*. https://www.un.org/development/desa/dpad/least-developed-country-category-myanmar.html

United Nations. (2022). *Human Development Index (HDI)*. https://hdr.undp.org/data-center/human-development-index#/indicies/HDI

Varela, C., Young, S., Mkandawire, N., Groen, R. S., Banza, L., & Viste, A. (2019). Transportation barriers to access health care for surgical conditions in Malawi: A cross sectional nationwide household survey. *BMC Public Health*, *19*(1), Article 264. https://doi.org/10.1186/s12889-019-6577-8

Vongmongkol, V., Viriyathorn, S., Wanwong, Y., Wangbanjongkun, W., & Tangcharoensathien, V. (2021). Annual prevalence of unmet healthcare need in Thailand: Evidence from national household surveys between 2011 and 2019. *International Journal for Equity in Health*, *20*(1), Article 244. https://doi.org/10.1186/s12939-021-01578-0

World Bank. (2020). *Indicators* [Dataset]. https://data.worldbank.org/indicator

World Bank. (2023). *Data for Myanmar* [Dataset]. https://data.worldbank.org/?locations=MM-XN

World Health Organization. (2014). The Republic of the Union of Myanmar Health System Review. *Health Systems in Transition, 4*(3). WHO Regional Office for the Western Pacific. https://iris.who.int/handle/10665/208211

World Health Organization. (2015). *What are the challenges facing Myanmar in progressing towards universal health coverage?* WHO Regional Office for the Western Pacific. https://iris.who.int/handle/10665/208247

World Health Organization. (2017). *Hospital beds (per 10,000 population)*. Indicators. https://www.who.int/data/gho/data/indicators/indicator-details/GHO/hospital-beds-(per-10-000-population)

World Health Organization. (2023, October 5). *Universal Health Coverage*. https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-(uhc)

Wright, J., Williams, R., & Wilkinson, J. (1998). Health needs assessment: Development and importance of health needs assessment. *The BMJ*, *316*(7140), 1310–1313. https://doi.org/10.1136/bmj.316.7140.1310

Yangon General Hospital. (2022, January 18). *Outpatient services: Online booking*. https://m.facebook.com/story.php?story_fbid=pfbid02WRxHKzUmCQXaprCScP6ErgQDnBBp9j4FQi9p1puHosZiNKamL2uWggqKCcw3ZrbWl&id=1205203356213171

Zaw, P. P. T., Htoo, T. S., Pham, N. M., & Eggleston, K. (2015). Disparities in health and health care in Myanmar. *The Lancet*, *386*(10008), Article 2053. https://doi.org/10.1016/s0140-6736(15)00987-3