



Factors influencing antenatal care completion among married reproductive-age women in peri-urban Yangon, Myanmar

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Abstract

Background: Antenatal care (ANC) is essential for reducing maternal and perinatal mortality, however, completion of the recommended contact schedule remains inadequate in many peri-urban settings. **Objective:** This cross-sectional study aimed to assess ANC completion and identify influencing factors among married reproductive-age women in peri-urban Yangon, Myanmar. **Methods:** Data were collected from January to April 2025 through face-to-face interviews with 408 married women aged 15–49 years who had delivered within the preceding six months. Participants were recruited using multistage cluster sampling from three peri-urban townships with the highest maternal mortality rates. ANC completion was defined as attending eight or more antenatal care contacts with a skilled birth attendant, in accordance with the 2016 WHO recommendations. Multivariable binary logistic regression identified independent predictors. **Results:** Only 36.8% of women completed the WHO recommended eight ANC contacts. In multivariable logistic regression analysis, adequate family support (AOR = 2.79, 95% CI: 1.37–5.67), higher transportation expenditure per ANC visit (AOR = 2.20, 95% CI: 1.32–3.64), husband's informal sector employment (AOR = 1.85, 95% CI: 1.14–2.98), and access to multiple information sources (AOR = 1.78, 95% CI: 1.01–3.16) were independently associated with ANC completion. Limited availability of healthcare personnel significantly reduced the odds of completion (AOR = 0.48, 95% CI: 0.26–0.90). **Conclusion:** ANC underutilization in peri-urban Yangon reflects interconnected structural and social barriers. Policy responses should prioritize family engagement programs, financial support for

transportation costs, healthcare workforce strengthening, and multi-channel health communication to improve sustained ANC utilization in peri-urban populations.

Keywords: Antenatal care, Family support, Peri-urban areas, Reproductive-age, Myanmar

What was Known

- Antenatal care completion is essential for maternal survival yet remains suboptimal in peri-urban settings.
- Transportation access and healthcare staffing are key determinants of maternal health service utilization.

What's New and Next

- In peri-urban Yangon, only one in three women completed the full recommended antenatal care schedule.
- Informal employment flexibility and multi-source health information independently support antenatal care completion.
- Future programs should combine family engagement, transport subsidies, and expanded community health outreach.

Introduction

Antenatal care (ANC) constitutes an essential component of maternal healthcare, encompassing systematic medical consultations designed to support healthy pregnancies, detect, and address potential complications, and prepare expectant mothers for delivery and postnatal care. Global maternal mortality declined by 40% between 2000 and 2023, but it remains a critical public health challenge worldwide ⁽¹⁾. Myanmar illustrates this persistent burden, having maintained the second-highest maternal mortality ratio among the eleven countries in the WHO South-East Asia Region between 2015 and 2020, with 179 deaths per 100,000 live births recorded in 2020 ⁽²⁾. Myanmar's healthcare system faces inadequate infrastructure, limited human resources, geographic constraints, and socioeconomic disparities ⁽³⁾.

In 2016, WHO revised its ANC guidelines to increase the recommended minimum number of contacts from four to eight, with the first visit within 12 weeks of gestation and subsequent visits at 20, 26, 30, 34, 36, 38, and 40 weeks ⁽⁴⁾. Completing eight or more contacts can reduce perinatal mortality by up to 8 deaths per 1,000 births compared with the four-visit model ⁽⁴⁾. Myanmar adopted this eight-contact model in May 2018 ⁽⁵⁾. Women who completed the recommended contacts demonstrated higher rates of facility-based delivery and early postnatal care, both critical for improved

maternal and newborn outcomes^(6,7). ANC completion has therefore become an important indicator of maternal healthcare quality and continuity of care.

National ANC utilization data also reveal uneven coverage across regions. Before this policy shift, a retrospective analysis of the 2015–2016 demographic survey estimated that only 18.0% of pregnant women received eight or more contacts⁽⁸⁾. Nationwide, completion of four or more visits was recorded at 59% in 2015⁽⁹⁾. In Yangon, coverage fluctuated from 76% in 2019 to 48% in 2021 before recovering to 71% in 2022⁽¹⁰⁾. Since Myanmar's adoption of the eight-contact model in 2018, up-to-date data on regional ANC completion under current guidelines remain sparse, particularly in rapidly expanding urban centers. Peri-urban areas pose distinct challenges for maternal healthcare delivery, including compromised infrastructure, highly mobile populations, and resource-constrained health systems⁽¹¹⁾. Most of Yangon's 46 townships are designated peri-urban for planning purposes, forming a transitional zone around the central urban core. Internal migration to the city has intensified since 2021, as conflict in several regions displaced households toward urban and peri-urban centers, creating dense communities with urgent maternal healthcare needs⁽¹²⁾.

Despite Myanmar's adoption of the WHO ANC model in 2018 and Yangon's role as the country's primary urban center, no study has examined factors influencing ANC completion in peri-urban Yangon under current guidelines. Existing national estimates rely on secondary survey data with long recall periods, and primary face-to-face evidence in peri-urban populations remains lacking. Addressing this knowledge gap is important given the unique challenges of peri-urban settings, population influx, and regional health disparities. Therefore, this study aimed to assess ANC completion and identify associated factors among married women of reproductive age in peri-urban Yangon Region, Myanmar.

Materials and Methods

Study design and setting

This cross-sectional study was conducted from January to April 2025 in three peri-urban townships of Yangon Region, Myanmar. Yangon encompasses 46 townships across four districts under the Yangon Regional Health Department⁽¹²⁾. As no national definition of peri-urban areas exists, this study followed regional practice classifying 31 metropolitan-fringe townships as peri-urban. The West District, which forms the central urban core, was excluded. Data were collected through face-to-face interviews with eligible women in wards and villages across the East, South, and North Districts.

Study population and sampling

A multistage cluster sampling approach was used. First, the three peri-urban districts (East, South, and North) were selected. Second, maternal death records from 2020 to 2022 were reviewed in each district to identify the township with the highest maternal mortality rate. This process selected Hlinethaya (North District), Kyauktan (South District), and Dagon Myothit Seikkan (East District), which together reported 93,685 live births in 2022 according to the Yangon Regional Public Health Department ⁽¹⁰⁾. Because eligibility required a birth within the preceding six months, this figure formed the sampling frame. Inclusion criteria were married women aged 15 to 49 years who had given birth within the preceding six months, had lived in the study sites for at least two consecutive years before data collection, and could give informed consent and complete the interviewer-administered questionnaire. Lists of eligible women were prepared with township health staff, and participants were selected from these lists by simple random sampling within each township until the required sample size was reached. The minimum sample size was calculated using Daniel's formula ⁽¹³⁾:

$$n = \frac{Z^2 P (1 - P)}{d^2}$$

where n is the required sample size, Z is the z-score for a 95% confidence level (1.96), P is the estimated proportion of four-visit ANC completion from the 2015–2016 Myanmar Demographic and Health Survey (0.59) ⁽⁹⁾, and d is the margin of error (0.05). This yielded a minimum of 371 women, increased by 10% to 408 to account for non-response.

Study variables

The outcome variable was ANC completion, defined as attending eight or more ANC contacts with a skilled birth attendant during the most recent pregnancy, based on the 2016 WHO ANC model. The WHO model recommends a schedule consisting of one ANC contact within the first 12 weeks of gestation, followed by subsequent contacts at 20, 26, 30, 34, 36, 38, and 40 weeks ⁽⁴⁾. ANC completion was coded as binary: complete (1) for eight or more contacts, and incomplete (0) for fewer than eight contacts or absence of a skilled birth attendant. A skilled birth attendant was defined per the Myanmar Ministry of Health and Sports data dictionary as a trained healthcare provider, including a doctor, nurse, midwife, health assistant, or lady health visitor ⁽¹⁴⁾.

Explanatory variables were grouped using the Andersen Phase 4 Health Care Utilization Model ⁽¹⁵⁾ into predisposing, enabling, and need factors. Predisposing factors included women's age, women's education, husband's education, maternal knowledge of ANC danger signs, and women's

and husband's occupations. Education was classified as no formal or primary education (Kindergarten–Grade 5), secondary education (Grades 6–12), or higher education (university level, graduates, and postgraduate qualifications including diplomas, master's, and doctoral degrees) ⁽¹²⁾. Maternal knowledge was categorized as low or sufficient based on understanding of risk factors from the 2016 Myanmar Maternal and Child Healthcare Handbook ⁽¹⁶⁾. Women's and husband's occupations were classified as government employee, private employee, employer, own-account worker, unpaid family worker, dependent, or other ⁽¹²⁾. Enabling factors included travel time to the nearest health center, transportation costs per visit, waiting time, availability of healthcare personnel, sources of ANC information (antenatal care providers, family or relatives, friend or neighbors, mass media, and others), family income (total monthly earnings in Myanmar Kyats), place of residence (urban or rural according to Myanmar's Ministry of Home Affairs designation), and family support. Family support was measured using a 16-item adapted Family Support Scale based on the original scale from Bangladesh ⁽¹⁷⁾ and House's theory of social support ⁽¹⁸⁾. Total scores ranged from 16 to 80 and were categorized as low support (≤ 60), moderate support (61–70), or high support (≥ 71) based on the sample distribution. Need factors included parity and intention of pregnancy, classified as wanted, unclear, and unwanted.

Data collection

Nine interviewers were recruited from community health volunteers outside the study townships to conduct face-to-face interviews. The principal researcher conducted a two-day training workshop in each township covering questionnaire orientation, application use, and mock interviews to standardize data entry and interviewing. Completed questionnaires were reviewed daily by the principal researcher to ensure accuracy and completeness. Data were collected using the KoboCollect application on the KoboToolbox server. The questionnaire was validated by three maternal and child health experts and pretested in a township with similar sociodemographic characteristics to ensure clarity and reliability.

Statistical analysis

Statistical analyses were conducted using IBM SPSS Statistics for Windows, version 31, licensed by Mahidol University. Descriptive statistics summarized participant characteristics and ANC utilization patterns. For multivariable analysis, several explanatory variables were recoded into binary groups to meet model assumptions and ensure adequate statistical power. Age was dichotomized at 35 years, the threshold for advanced maternal age. Women's and husband's education were recoded

as higher education versus lower education, with no formal, primary, and secondary education combined as the reference group to maintain model stability. Husband's occupation was recategorized as formal sector employment (government and private employees with fixed monthly salaries, used as the reference group) versus informal sector employment (daily wage earners, dependents, and self-employed workers). Source of ANC information was recoded as single source versus multiple sources, and family support as low versus adequate (moderate and high combined). All independent variables were entered simultaneously into multivariable binary logistic regression to identify factors independently associated with ANC completion. Model fit was assessed using the Hosmer-Lemeshow goodness-of-fit test, and multicollinearity was assessed using variance inflation factors. Results are presented as adjusted odds ratios (AOR) with 95% confidence intervals (CI). Statistical significance was set at $p < 0.05$.

Results

Participant characteristics

A total of 408 married reproductive-age women from three peri-urban townships of Yangon Region participated in the study. Nearly half (46.6%) were aged 26–34 years, with roughly equal proportions in the younger (32.8%, ≤ 25 years) and older (20.6%, ≥ 35 years) age groups. Most women (52.9%) and husbands (59.6%) had completed secondary education through Grade 12, but only a small minority reached higher education (7.6% of women and 8.1% of husbands). More than three-quarters of women (76.7%) were housewives without formal employment, and 71.1% showed sufficient knowledge of ANC danger signs. Among husbands, private employment was most common (45.8%), but a substantial proportion (41.7%) were daily wage earners in occasional or irregular work without fixed employment or stable income.

Geographic accessibility appeared relatively favorable, with 61.5% of women living within 30 minutes of the nearest health center, and 70.3% incurring transportation costs of 4,823 Myanmar Kyats (MMK) or less (approximately USD 1.33) per visit. The majority resided in areas designated as urban (55.6%), and 69.4% reported adequate availability of healthcare personnel. However, 60.0% experienced waiting times exceeding 30 minutes. Economic vulnerability was pronounced despite the study area's location in Myanmar's primary economic hub. About 70% of households reported monthly incomes below 548,407 MMK (approximately USD 151.58), placing them in low-income categories. This constraint was mirrored in limited information access, with two-thirds (67.6%) obtaining ANC information from only a single source. For family support, half of participants (50.0%)

reported moderate support, with roughly equal proportions reporting low (26.2%) and high (23.8%) support. Nearly half of participants (45.6%) were nulliparous, and the vast majority (89.5%) reported their pregnancy as wanted. Table 1 presents detailed participant characteristics.

Table 1 Background characteristics of the participants (N = 408)

Variable	n (%)
Predisposing factors	
Age of woman	
≤ 25 years	134 (32.8)
26–34 years	190 (46.6)
≥ 35 years	84 (20.6)
Woman's education	
No formal education & primary education	161 (39.5)
Secondary education	216 (52.9)
Higher education	31 (7.6)
Husband's education	
No formal education & primary education	132 (32.4)
Secondary education	243 (59.6)
Higher education	33 (8.1)
Maternal knowledge of ANC	
Low knowledge	118 (28.9)
Sufficient knowledge	290 (71.1)
Woman's occupation	
Housewife	313 (76.7)
Public or Private employment	55 (13.5)
Daily wage earners	40 (9.8)
Husband's occupation	
Private employment	187 (45.8)
Daily wage earners	170 (41.7)
Public or dependent or self-employed workers	51 (12.5)

Table 1 Background characteristics of the participants (Cont.)

Variable	n (%)
Enabling factors	
Travel time to the nearest health center	
$\leq$ 30 minutes	251 (61.5)
$\geq$ 31 minutes to 2 hours	157 (38.5)
Costs for transportation (MMK)	
$\leq$ 4,823.28	287 (70.3)
$>$ 4,823.29	121 (29.7)
Waiting time	
$\leq$ 30 minutes	163 (40.0)
$\geq$ 31 minutes to 2 hours	245 (60.0)
Sources of ANC information	
One source	276 (67.6)
Two to three sources	102 (25.0)
Four or more sources	30 (7.3)
Availability of health care personnel	
Available	283 (69.4)
Limited availability	125 (30.6)
Family income (MMK)	
$\leq$ 548,406.86	287 (70.3)
$>$ 548,406.86	121 (29.7)
Place of residence	
Urban	227 (55.6)
Rural	181 (44.4)
Family support	
Low family support	107 (26.2)
Moderate family support	204 (50.0)
High family support	97 (23.8)

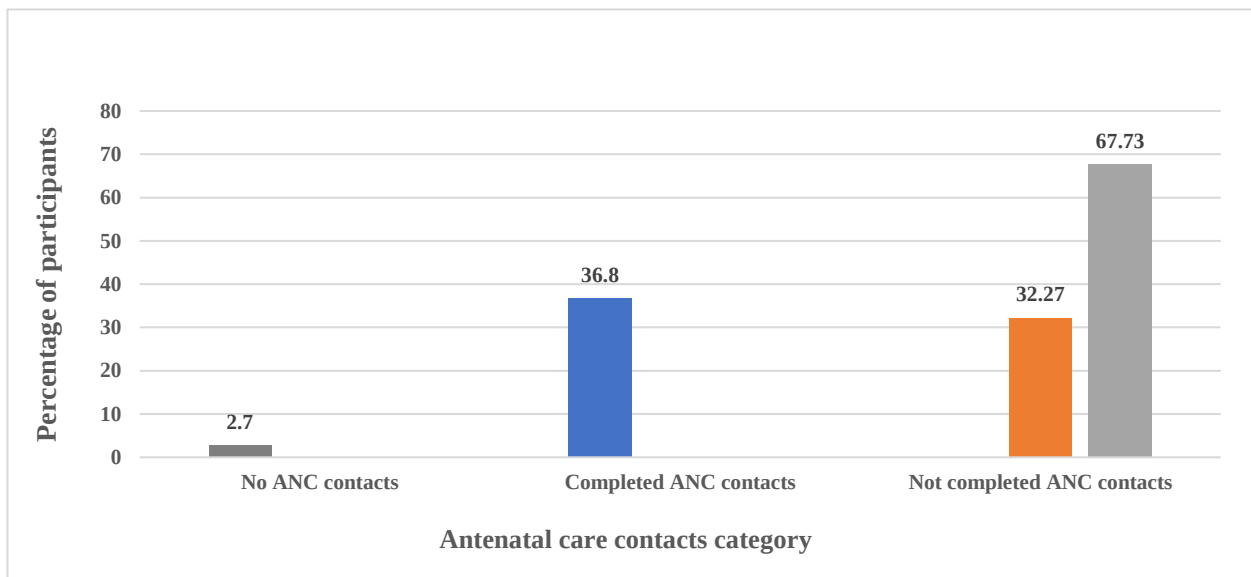
Table 1 Background characteristics of the participants (Cont.)

Variable	n (%)
Need factors	
Parity	
Nulliparous	186 (45.6)
More than one parity	222 (54.4)
Intention of pregnancy	
Wanted pregnancy	365 (89.5)
Less wanted pregnancy	43 (10.5)

Note. ANC = antenatal care; MMK = Myanmar Kyats; USD = United States Dollar. 1 USD = 3,618 Myanmar Kyats (exchange rate at time of data collection).

Antenatal care utilization patterns

Overall, 146 of 408 women (36.8%) completed the WHO-recommended ANC contacts. Among the 262 women who did not complete the recommended contacts, about one-third (32.3%) discontinued after the first visit. The remainder (67.7%) achieved partial completion with two to seven contacts. A small proportion of women (2.7%, n=11) had no ANC visits during pregnancy (Figure 1).

**Figure 1.** Patterns of antenatal care utilization among participants

Factors associated with antenatal care completion: Bivariate analysis

Table 2 presents bivariate results for factors associated with ANC completion. Among predisposing factors, women's education, husband's education, maternal knowledge of ANC, and husband's occupation were significantly associated with ANC completion ($p < 0.05$). Women's age and women's occupation showed no significant association. Among enabling factors, travel time, transportation costs, waiting time, sources of ANC information, availability of healthcare personnel, and family support were all significantly associated with ANC completion ($p < 0.05$). Family income and place of residence showed no significant association. Among need factors, neither parity nor pregnancy intention was significantly associated with ANC completion. All variables were subsequently entered into the multivariable logistic regression model.

Table 2 Factors associated with antenatal care completion: Bivariate analysis

Variables	n	Adequate ANC, n (%)	Crude OR (95% CI)	p-value
Predisposing factors				
Age of woman				0.409
≤ 25 years	134	44 (32.8)	1 (ref)	
26–34 years	190	67 (35.3)	1.11 (0.70–1.78)	
≥ 35 years	84	35 (41.7)	1.46 (0.83–2.57)	
Women's education				0.019
No formal education & primary education	161	50 (31.1)	1 (ref)	
Secondary education	216	78 (36.1)	1.26 (0.81–1.94)	
Higher education	31	18 (58.1)	3.07 (1.40–6.76)	
Husband's education				0.047
No formal education & primary education	132	41 (31.1)	1 (ref)	
Secondary education	243	87 (35.8)	1.24 (0.78–1.95)	
Higher education	33	18 (54.5)	2.67 (1.22–5.80)	
Maternal knowledge of ANC				<0.001
Low knowledge	118	27 (22.9)	1 (ref)	
Sufficient knowledge	290	119 (41.0)	2.35 (1.43–3.83)	

Table 2 Factors associated with antenatal care completion: Bivariate analysis (Cont.)

Variables	n	Adequate ANC, n (%)	Crude OR (95% CI)	p-value
Woman's occupation				0.450
Housewife	313	109 (34.8)	1 (ref)	
Public or Private employment	55	19 (34.5)	0.99 (0.54–1.80)	
Daily wage earners	40	18 (45.0)	1.53 (0.78–2.98)	
Husband's occupation				<0.001
Private employment	187	46 (24.6)	1 (ref)	
Daily wage earners	170	81 (47.6)	2.79 (1.78–4.37)	
Public or dependent or self-employed workers	51	19 (37.3)	1.82 (0.94–3.51)	
Enabling factors				
Travel time to the nearest health center				0.001
≤ 30 minutes	251	106 (42.2)	1 (ref)	
≥ 31 minutes to 2 hours	157	40 (25.5)	0.47 (0.30–0.72)	
Costs for transportation (MMK)				0.002
≤ 4,823.28	287	89 (31.0)	1 (ref)	
> 4,823.29	121	57 (47.1)	1.98 (1.28–3.06)	
Waiting time				0.042
≤ 30 minutes	163	68 (41.7)	1 (ref)	
≥ 31 minutes to 2 hours	245	78 (31.8)	0.65 (0.43–0.99)	
Sources of ANC information				0.013
One source	276	97 (35.1)	1 (ref)	
Two to three sources	102	31 (30.4)	0.81 (0.49–1.31)	
Four or more sources	30	18 (60.0)	2.77 (1.28–5.99)	

Table 2 Factors associated with antenatal care completion: Bivariate analysis (Cont.)

Variables	n	Adequate ANC, n (%)	Crude OR (95% CI)	p-value
Availability of health care personnel				<0.001
Available	283	123 (43.5)	1 (ref)	
Limited availability	125	23 (18.4)	0.29 (0.18–0.49)	
Family income (MMK)				0.404
≤ 548,406.86	287	99 (34.5)	1 (ref)	
> 548,406.86	121	47 (38.8)	1.21 (0.78–1.87)	
Place of residence				0.380
Urban	227	77 (33.9)	1 (ref)	
Rural	181	69 (38.1)	1.20 (0.80–1.80)	
Family support				<0.001
Low family support	107	15 (14.0)	1 (ref)	
Moderate family support	204	69 (33.8)	3.13 (1.69–5.82)	
High family support	97	62 (63.9)	10.87 (5.48–21.56)	
Need factors				
Parity				0.344
Nulliparous	186	62 (33.3)	1 (ref)	
More than one parity	222	84 (37.8)	1.22 (0.81–1.83)	
Intention of pregnancy				0.896
Wanted pregnancy	365	131 (35.9)	1 (ref)	
Less wanted pregnancy	43	15 (34.9)	0.96 (0.49–1.86)	

Note. ANC = antenatal care; OR = odds ratio; CI = confidence interval; ref = reference category; MMK = Myanmar Kyats. 1 USD = 3,618 Myanmar Kyats (exchange rate at time of data collection).

Factors associated with antenatal care completion: Multivariable analysis

After adjusting for all covariates, five factors were independently associated with ANC completion among women in peri-urban Yangon (Table 3). Family support showed the strongest association. Women with adequate family support had nearly three times higher odds of completing the recommended ANC contacts than those with low support (AOR = 2.79, 95% CI: 1.37–5.67). Transportation costs were the second strongest predictor, with women incurring higher costs per visit ($\geq$ 4,823 MMK, approximately USD 1.33) showing 2.20 times higher odds of completion than those with lower expenditure (AOR = 2.20, 95% CI: 1.32–3.64).

Husband's informal sector employment was associated with higher odds of completion than formal sector employment (AOR = 1.85, 95% CI: 1.14–2.98). Women obtaining ANC information from multiple sources were 1.78 times more likely to complete the recommended contacts than those relying on a single source (AOR = 1.78, 95% CI: 1.01–3.16). Conversely, limited availability of healthcare personnel reduced the odds of completion by about 52% (AOR = 0.48, 95% CI: 0.26–0.90). The Hosmer-Lemeshow goodness-of-fit test indicated adequate model fit, and no other variable showed an independent association with ANC completion after adjustment.

Discussion

This study examined factors influencing ANC completion among married reproductive-age women in peri-urban Yangon, Myanmar. Only 36.8% of women completed the recommended ANC contacts, a substantial decline from the 84% of urban women who completed four visits in the 2015–2016 Myanmar Demographic and Health Survey. This decline is striking because the study area is peri-urban with urban-like health facilities, where higher completion would be expected. Early ANC initiation has improved, with 61.5% of women attending within the first 12 weeks compared to approximately 41% in urban areas in 2015–2016. Nevertheless, completion of the full recommended schedule remains low, indicating that Myanmar's ANC challenge has shifted from initiating care to sustaining engagement across the full course of pregnancy. Internationally, the completion rate in peri-urban Yangon falls between rates observed in other regions. Among South-East Asian countries, completion rates remain notably low in Bangladesh (6.5%) and Nepal (5.1%) ^(19,20). In other regions, Jordan achieved the highest coverage (74.0%), followed by Ghana (43.0%) and Albania (30.0%) ⁽²¹⁾. These comparisons suggest that peri-urban Yangon outperforms other South-East Asian settings, but broader regional implementation challenges remain as countries adopt the 2016 WHO model.

Table 3 Factors associated with antenatal care completion: Multivariable analysis

Variable	AOR	95% CI	p-value
Predisposing factors			
Age of woman			
< 35 years	Reference		
≥ 35 years	1.22	0.69–2.15	0.504
Woman's education			
Lower education	Reference		
Higher education	1.78	0.71–4.49	0.224
Husband's education			
Lower education	Reference		
Higher education	1.81	0.74–4.42	0.193
Maternal knowledge of ANC			
Low knowledge	Reference		
Sufficient knowledge	1.27	0.65–2.47	0.490
Woman's occupation			
Housewife	Reference		
Employed	0.98	0.57–1.70	0.949
Husband's occupation			
Formal sector employment	Reference		
Informal sector employment	1.85	1.14–2.98	0.012*
Enabling factors			
Travel time to the nearest health center			
≤ 30 minutes	Reference		
≥ 31 minutes to 2 hours	0.60	0.33–1.10	0.099
Costs for transportation (MMK)			
≤ 4,823.28	Reference		
> 4,823.28	2.20	1.32–3.64	0.002*

Table 3 Factors associated with antenatal care completion: Multivariable analysis (Cont.)

Variable	AOR	95% CI	p-value
Waiting time			
≤ 30 minutes	Reference		
≥ 31 minutes to 2 hours	0.96	0.57–1.62	0.884
Sources of ANC information			
Single information source	Reference		
Multiple information sources	1.78	1.01–3.16	0.047*
Availability of health care personnel			
Available	Reference		
Limited availability	0.48	0.26–0.90	0.022*
Family income (MMK)			
≤548,406.86)	Reference		
> 548,406.86	1.11	0.64–1.93	0.712
Place of residence			
Urban	Reference		
Rural	1.30	0.81–2.10	0.278
Family support			
Low family support	Reference		
Adequate family support	2.79	1.37–5.67	0.005*
Need factors			
Parity			
Nulliparous	Reference		
More than one parity	1.10	0.68–1.79	0.684
Intention of pregnancy			
Wanted pregnancy	Reference		
Less wanted pregnancy	0.78	0.37–1.66	0.523

Note. ANC = antenatal care; AOR = adjusted odds ratio; CI = confidence interval; MMK = Myanmar Kyats; 1 USD = 3,618 Myanmar Kyats (exchange rate at time of data collection).

*Statistically significant at $p < 0.05$

Family support emerged as the strongest facilitator of ANC completion. Adequate family support was associated with nearly three times higher odds of completing the recommended contacts. In peri-urban Yangon, where healthcare infrastructure remains underdeveloped and referral systems face structural constraints, family support compensates for these system level gaps through several interrelated mechanisms. Instrumental support offers practical assistance with daily domestic tasks, nutrition, and financial needs, and covers transport arrangements and direct medical costs when facilities and referral pathways fall short.

Emotional support protects women against prenatal stress and encourages consistent care engagement. Accompaniment strengthens this support system. When husbands or family members accompany women to antenatal visits, their presence enables timely decision-making and allows pregnancy-related health information to be shared and understood together during the visit. This pattern also reflects a demographic feature of the population, in which husbands predominantly work in private employment or daily wage labor, making flexible family coordination essential to prevent lost household income. Similar patterns appear in other low- and middle-income settings. Evidence from rural Tanzania and Somaliland similarly shows that family-oriented education and practical assistance strengthen maternal service engagement ^(22,23).

Transportation costs were also independently associated with ANC completion. Women spending at or above 4,823 MMK per visit showed 2.20 times higher odds of completion than those spending less. This finding requires contextual interpretation. Most participants (n = 287) spent at or below this threshold and achieved a 31.0% completion rate, and the smaller group spending more (n = 121) achieved a substantially higher rate of 47.1%. Rather than assuming greater financial capacity, higher transport costs may reflect the necessity of paying for direct motorized transport, such as motorbikes or motorized trishaws, or of traveling longer distances to reach preferred facilities. In peri-urban settings with limited public transit options, paying higher travel costs may be an operational necessity for timely and safe access to care. Travel time was not significant in the adjusted model, but cost remained significant, indicating that higher transport spending, whether reflecting necessity or capacity, plays a distinct role in sustaining ANC attendance.

The cumulative cost across multiple visits represents a substantial share of monthly income, particularly for the 70% of households earning below 548,407 MMK (approximately USD 151.58). Evidence from sub-Saharan Africa shows that low socioeconomic status limits ANC utilization beyond geographic barriers alone ^(24,25), and research from South Carolina confirms that ability to pay affects

sustained healthcare access⁽²⁶⁾. These findings suggest that financial support mechanisms such as transport vouchers or conditional cash transfers targeting the full ANC schedule could improve completion rates in peri-urban settings.

Husband's informal sector employment was independently associated with higher odds of ANC completion compared to formal sector employment. In peri-urban Yangon, informal sector workers including construction workers, street vendors, and transport drivers maintain flexible schedules and work closer to home than formal sector employees who face fixed industrial schedules and long commutes. This flexibility enables informal sector husbands to accompany their wives to ANC facilities, supporting sustained utilization. A study from urban Yangon supports this finding, showing that husband accompaniment enhanced ANC service utilization⁽²⁷⁾. Evidence from Indonesia similarly shows that non-professional husbands were more involved in ANC utilization than formal sector workers^(28,29), and research from eastern Kenya found that male partner involvement in ANC was associated with financial, physical, and psychosocial support⁽³⁰⁾.

Limited availability of healthcare personnel was independently associated with significantly lower odds of ANC completion. Even with urban-like health infrastructure, 60% of women reported waiting times exceeding 30 minutes, suggesting staffing constraints. Evidence from Bangladesh shows that the presence of skilled healthcare personnel at community clinics significantly increases the likelihood of women completing all recommended contacts⁽³¹⁾. Qualitative research from Malawi similarly found that shortages and prolonged waiting times discouraged women from completing ANC schedules, particularly under the expanded recommendations⁽³²⁾.

Finally, exposure to varied and repeated health messages strengthened maternal health-seeking behavior. Women who obtained information from multiple sources were 1.78 times more likely to complete the recommended contacts than those relying on a single source. In peri-urban settings with urban-like infrastructure, women have greater access to diverse information channels including healthcare providers, community networks, and digital media. Exposure to varied and repeated messages across these channels reinforces sustained ANC engagement. Similar associations have been reported in Malawi, Kenya, and India, where access to a wider range of information channels was associated with greater likelihood of completing ANC contacts^(33,34,35).

This study has several limitations. First, the cross-sectional design limits the ability to infer causal relationships between explanatory variables and ANC completion. Second, inclusion required documented birth records from local health centers, which may introduce selection bias and limits

generalizability beyond peri-urban townships. This targeted sample nonetheless captures the population where ANC interventions could have the greatest impact on maternal and infant mortality. Third, self-reported data on family support, transportation costs, and perceived availability of healthcare personnel may be subject to recall bias. To directly address these limitations, particularly the cross-sectional design, future research should consider longitudinal or intervention-based designs, such as pretest posttest nonequivalent group studies, participatory action research, or quasi-experimental approaches, to establish causal pathways and evaluate the effectiveness of targeted interventions in high-risk populations.

Conclusion

This study found that ANC completion remains substantially below the WHO-recommended level among married reproductive-age women in peri-urban Yangon, Myanmar, with only 36.8% completing the full schedule. Key factors associated with ANC completion were husband's informal sector employment, adequate family support, high transportation costs, multiple information sources, and availability of healthcare personnel. Despite ongoing political challenges, Yangon remains Myanmar's most stable region and continues to serve as the primary destination for internal migration, supporting an expanding and diverse population with urgent maternal healthcare needs. These findings carry implications not only for Yangon but for maternal health policy across Myanmar as the country works toward recovery and sustainable development. First, financial support mechanisms such as targeted transport vouchers or conditional cash transfers should offset travel costs specifically for low-income households incurring higher transportation expenses exceeding 4,823 MMK. Second, evidence-based initiatives involving husbands and family members should strengthen social support networks incorporating non-monetary incentives such as priority queuing and partial transport subsidies for accompanying family members. To avoid straining clinic staff, partner-oriented education sessions can occur during regular clinic hours through group counseling facilitated by community health volunteers or auxiliary midwives. Third, health workforce allocation in peri-urban facilities should increase to shorten patient waiting times and improve service availability, addressing a major structural barrier to care completion. Fourth, multi-channel communication strategies concurrently combining community health volunteers, on-site brochures, and digital media should reinforce sustained engagement across the full recommended care schedule. Finally, future research should employ longitudinal or intervention-based designs to evaluate causal pathways and test intervention effectiveness in transitional settings.

Ethical Approval Statement

The study was approved by the Ethical Review Committee for Human Research, Faculty of Public Health, Mahidol University (COA No. MUPH 2025-011), and the Ethical Committee of the Ministry of Health, Myanmar (Ethical 2025/09). Written informed consent was obtained from all participants. For women aged 15–17 years, written consent was also obtained from a parent or legal guardian.

Author Contributions

ATK and SN conceptualized the study and formulated the research objectives. ATK developed the data collection instruments and sampling procedure under the guidance of SN, PT, and KY. ATK conducted data collection and performed the statistical analysis under the supervision of SN. ATK drafted the manuscript, and SN, PT, and KY critically reviewed and revised it for important intellectual content. All authors read and approved the final manuscript prior to submission for publication.

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Conflicts of Interest

The authors declare no conflicts of interest relevant to this study.

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