



Socioeconomic Factors Relevant to the Inequity in Antenatal Care Accessibility in Vietnam

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Abstract

Introduction: To inform maternal health improvements, the purpose of this study was to identify the socioeconomic factors affecting access to basic antenatal care (ANC).

Methods: 1,360 women (aged 15-49 years) from the Multiple Indicator Cluster Survey were classified according to the frequency of ANC and the health assessments completed.

Results: Low education was the strongest determinant for refusal to use ANC (OR: 9.2-39.3; $p < .01$) and frequency of use below the three recommended visits (OR: 6.9-39.3; $p < .01$). In terms of quality of care, low income (OR: 5.6-25.6; $p < .01$) and living in the Northern Midland and Mountain area (OR: 5.9-8.1; $p < .01$) were associated with incomplete care.

Conclusions: Different approaches are needed for each group, including measures such as improving health literacy and advocating for better services in low-income regions.

Key words: Antenatal care accessibility; Cross-sectional survey; Education levels; Health care inequity; Maternal mortality; Socioeconomic status; Vietnam

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INTRODUCTION

Vietnam is a country with a growing economic and public sector that has exceeded expectations in terms of the quality of maternal and child healthcare for a middle-

income country. Following the economic transition of the 1980s, Vietnam has seen a decline in maternal mortality and is close to achieving the United Nation's 5th Millennium Development Goals (MDGs), which is a three-quarter reduction in the 1990 maternal mortality rates by 2015. Maternal mortality has declined from 233 per 100,000 live births in 1990 to 69 per 100,000 live births in 2009, with approximately two-thirds of this decrease related to safer pregnancies (Central Population and Housing Census Steering Committee, 2010). It is a breathtaking challenge to improve maternal and child health care outcomes from the current level to the same levels as upper middle- and high-income countries to meet the MDGs within the next 15 years. Research has demonstrated the common factors as to why pregnant women in low-middle countries did not receive antenatal care, even though it is essential for reducing maternal mortality rates (Finlayson & Downe, 2013; Simkhada, Van Teijlingen, Porter, & Simkhada, 2008).

Vietnam has 54 different ethnic groups: the majority Vietnamese ethnic group is Kinh, while people with Chinese ethnicity, Hao, have some privileged groups. Other ethnic minorities, which were estimated to be approximately 14.5% of the population in 2006, constitute 44.7% of the poor in Vietnam (The World Bank, 2009). Previous research has emphasized the inequities in maternal and child health care in Vietnam (General Statistics Office, Ministry of Health, and Ministry of Labor, 2012; Målqvist, et al., 2011), including inequity in ANC use between the ethnic minority and majority groups (Goland, Hoa, & Målqvist, 2012; Målqvist, Lincetto, Do, Burgess, & Hoa, 2013), major disparities in ANC use between urban and rural areas (Tran et al., 2011; Tran, Gottvall, Nguyen, Ascher, & Petzold, 2012), between hospital levels such as clinics, district hospitals, or national hospitals (Ngo & Hill, 2011), and between the private and public sectors in certain areas in Vietnam (Tran et al., 2011; Tran et al., 2012; Ngo & Hill, 2011; Trinh, Dibley, & Byles, 2007). Local commune

health stations provide free ANC services in Vietnam, but women, especially wealthy women living in urban areas, tend to prefer private clinics, which require payment (Ngo & Hill, 2011).

Analyzing the complex relationships between factors affecting the use and quality of ANC will identify areas or groups requiring continued focus to further reduce the risk of maternal mortality and inequities, which might also be present in other middle-income countries. This study describes the relationship between socioeconomic status and the use and quality of ANC. The data were taken from the 2011 Viet Nam Multiple Indicator Cluster Survey (MICS) regarding the situation of children and women in Vietnam.

1. METHODS

1.1 Multiple Indicator Cluster Survey (MICS)

The Viet Nam Multiple Indicator Cluster Survey was conducted by the General Statistics Office of Viet Nam

in collaboration with the Ministry of Health and Ministry of Labor, Invalids, and Social Affairs. The United Nations Children’s Fund (UNICEF) provided financial and technical support and the United Nations Population Fund (UNFPA) provided financial support. The goals of the survey were to provide up-to-date information on the situation of children and women in Vietnam and to generate data for the identification of vulnerable groups and inequities.

The MICS 2011 was designed to provide estimates for a large number of indicators regarding the situation of children and women at the national level, in urban and rural areas, and in Vietnam’s six regions. There were three sets of questionnaires in this survey: a household questionnaire, a women’s questionnaire (women aged 15-49 years), and a child questionnaire (for selected households with children younger than five years of age) (Goland et al., 2012; Målqvist et al., 2013).

1.2 Study Design and Sampling in this Survey

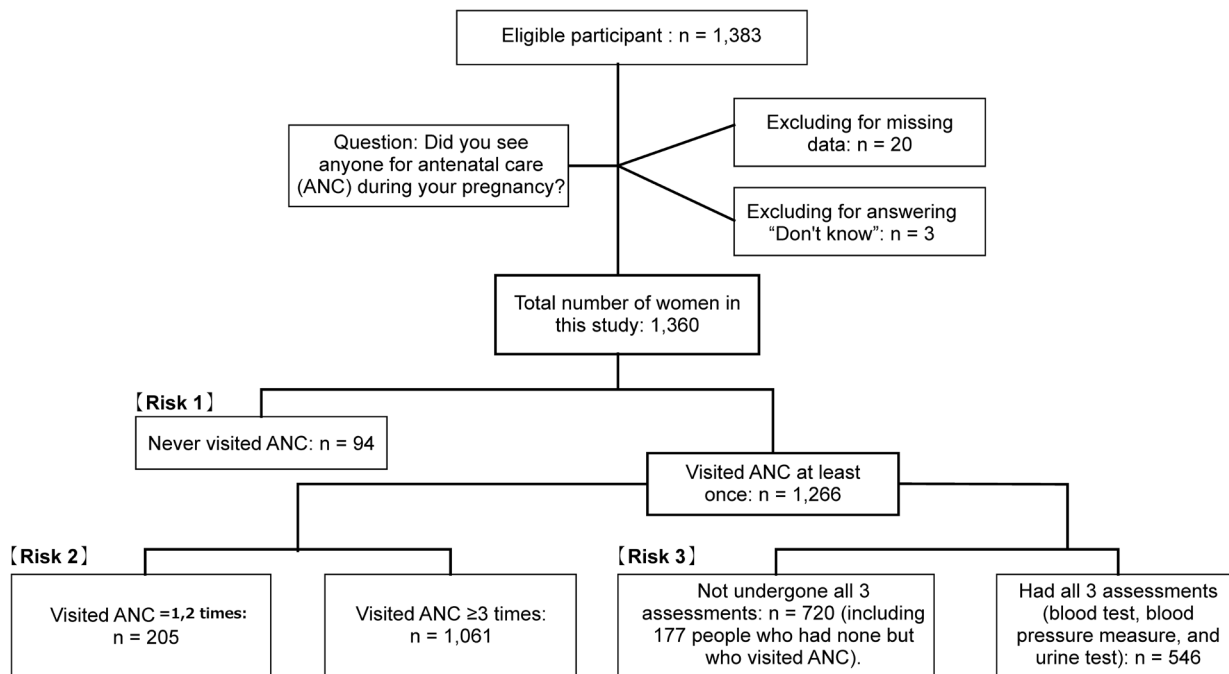


Figure 1.
Participant Selection
Note: ^aANC = Antenatal Care

The data from the MICS 2011 report were collected as follows. Of the 12,000 households selected in the nationwide samples, 11,642 households were available. The data were designed by 20 sample households in 100 clusters (40 urban and 60 rural) in six regions in Vietnam with equal allocation. From the women who completed the household questionnaire, 12,115 women (aged 15-49) were identified to complete the women’s questionnaire, which received 11,663 responses (response rate = 96.3%). Women who gave birth to a child in the two years

before the survey ($n = 1,383$) completed the information regarding maternal and newborn health. After excluding questionnaires with missing or illegible answers, the data from 1,360 women were used in this study (Figure 1).

This study analyzed two aspects of ANC use in Vietnam. The data were analyzed using the international ANC standards recommended by UNICEF and the World Health Organization (WHO), which involve at least three ANC visits before the birth and include four specific assessments (measurement of weight, measurement of

blood pressure, a blood test, and a urine test) (General Statistics Office, 2012). Based on the questionnaire in MICS 2011, three groups were formed: (a) no ANC ($n = 94$), (b) one or two ANC sessions ($n = 205$), and (c) incomplete care assessments (measurement of blood pressure, blood, and/or urinary test) ($n = 720$).

2. SOCIAL RISK FACTORS: CLASSIFICATION AND ASSESSMENT

The conceptual framework from the Commission on Social Determinants of Health identified key socioeconomic status (SES) parameters (Irwin et al., 2006). In order to investigate the effect of SES on ANC use, pregnant women's education level, income of household, ethnicity of the head of household, and the number of the women's children were identified as social risk factors. In addition, two geographical factors—location type (rural/urban) and region—were also included.

Educational history was part of the MICS 2011 questionnaire and responses were organized into five general categories: no schooling, primary, lower secondary, upper secondary and tertiary education.

No direct measurements of income were collected in MICS 2011. However, the data allow for indirect estimation and the creation of a wealth index. The wealth index was calculated using the following information: water sources; toilet facility; housing; type of cooking fuel; electricity; bank account; durable goods, such as a TV or mobile phone; and domestic animals. It was ranked according to the wealth score of the household and divided into quintiles (General Statistics Office, 2012).

The number of children is significant to the culture and societal norms in Vietnam. Since the 1960s, Vietnam has had a population and family planning program, and a two-child policy was introduced in 1988 (Hoa et al., 1996). The policy stipulated that each couple should have

a maximum of two children with 3-5 years between them. The policy is not strictly enforced today, but it had a large effect in that it led to the perception that two children were enough to guarantee a satisfying family life. This study tried to analyze the influence of this social norm on ANC by including the number of children in the family as a variable.

The other two factors, ethnicity of the head of the household and regional factors, were expected to strongly affect ANC accessibility. Ethnicity included all ethnicities in addition to Kinh/Hoa, which is the majority group in Vietnam (Central Population and Housing Census Steering Committee, 2010; The World Bank, 2009; General Statistics Office, 2012).

3. STATISTICAL ANALYSIS

Both descriptive and analytical statistics were undertaken using Statistical Analysis System (SAS) Software 9.3. For each variable, the frequency distribution in the minority and majority ethnicities were compared via chi-square analysis. Multivariate logistic regressions were performed to examine the association between social determinants and ANC use.

Three models were created: Model 1 included the unadjusted data; Model 2 was adjusted for age and geographic area, which are considered to be confounding factors; and Model 3 was adjusted for social factors, including education level, ethnicity of household, economic level, and the number of children, which were considered to be mediating factors. The SAS 9.3 multiple logistic regression was used. Statistical significance was indicated as being $p < .05$.

4. RESULTS

4.1 Participant Characteristics

Table 1
Sociodemographic Characteristics of Participating Women, Comparing Ethnic Minorities and Kinh/Hoa

	Ethnic minority		Kinh/Hoa		p-value	Total	
	<i>N</i>	(%)	<i>n</i>	(%)		<i>n</i>	(%)
Age group (year)							
15-19	39	13.6	36	3.4		75	5.51
20-24	98	34.2	280	26.1		378	27.79
25-29	88	30.7	382	35.6		470	34.56
30-34	35	12.2	247	23.0	<.0001	282	20.74
35-40	18	6.3	102	9.5		120	8.82
40-44	8	2.8	24	2.2		32	2.35
45-49	1	0.4	2	0.2		3	0.22
Education level							

To be continued

Continued

	Ethnic minority		Kinh/Hoa		p-value	Total	
	N	(%)	n	(%)		n	(%)
No education	79	27.5	11	1.0		90	6.62
Primary	75	26.1	129	12.0		204	15
Lower secondary	69	24.0	421	39.2	<.0001	490	36.03
Upper secondary	41	14.3	243	22.7		284	20.88
Tertiary	23	8.0	269	25.1		292	21.47
Wealth index quintile							
Poorest	210	73.2	116	10.8		326	23.97
Second	46	16.0	177	16.5		223	16.4
Middle	13	4.5	227	21.2	<.0001	240	17.65
Fourth	14	4.9	253	23.6		267	19.63
Richest	4	1.4	300	28.0		304	22.35
Region							
Red River Delta	1	0.4	201	18.7		202	14.85
Northern Midland and Mountain areas	152	53.0	126	11.7		278	20.44
North Central area and Central Coastal area	11	3.8	195	18.2	<.0001	206	15.15
Central Highlands	97	33.8	174	16.2		271	19.93
South East	3	1.1	212	19.8		215	15.81
Mekong River Delta	23	8.0	165	15.4		188	13.82
Area							
Rural	243	84.7	577	53.8	<.0001	820	60.29
Urban	44	15.3	496	46.2		540	39.71
Number of children							
1	116	40.4	482	44.9		598	43.97
2	89	31.0	434	40.5	<.0001	523	38.46
3 or more	82	28.6	157	14.6		239	17.57
Ethnicity of household head							
Ethnic minorities						287	21.1
Kinh/Hoa						1073	78.9

The participants' socio-demographic characteristics are listed in Table 1. The data from the 1,360 women who had given birth within the previous two years were included in the final analysis. The average age was 27.4 ± 5.6 years, and 6.6% received no education. In addition, only 17.5% of the women did not follow the Vietnam two-child

policy (Hoa et al., 1996), having three or more children. Preliminary analysis suggested that women within an ethnic minority group were more likely to have less education, live in a low-income household, experience regional bias, and have more than two children than women within the Kinh/Hoa ethnic majority (χ^2 tests; $p < .0001$).

4.2 Socioeconomic Factors Affecting Initial ANC Visitation

Table 2
Analysis of Social Factors Associated With Never Visiting Antenatal Care

	No. in each category	No. people with risk 1	Odds ratio (95% confidence interval)		
			Model 1	Model 2	Model 3
Education level					
No education	90	52	62.1** (34.5-111.7)	35.8** (18.3-69.9)	9.2** (4.3-19.8)
Primary	204	19	4.7** (2.5-8.7)	4.1** (2.1-8.0)	1.8 (0.8-3.7)
More than primary	1066	23	ref	ref	ref
Wealth index quintile	1360				

To be continued

Continued

	No. in each category	No. people with risk 1	Odds ratio (95% confidence interval)		
			Model 1	Model 2	Model 3
Poorest	326	82	28.6** (15.3-53.3)	14.5** (7.2-29.2)	2.9* (1.3-6.8)
More than the poorest group	1034	12	ref	ref	ref
Region					
Northern Midland and Mountain areas	278	54	16.0** (8.4-30.5)	13.9** (7.3-26.8)	3.3** (1.4-7.8)
Central Highlands	271	28	7.7** (3.8-15.3)	6.5** (3.2-13.0)	1.5 (0.6-3.6)
Other areas	811	12	ref	ref	ref
Area					
Rural	820	85	6.8** (3.4-13.7)	5.2** (2.5-10.6)	0.8 (0.3-1.9)
Urban	540	9	ref	ref	ref
Ethnicity of household head					
Ethnic minorities	287	82	35.4** (19.0-66.0)	17.4** (8.4-35.8)	3.9** (1.5-9.7)
Kinh/Hoa	1073	12	ref	ref	ref
Number of children					
3 or more	239	45	5.1** (3.3-7.8)	7.0** (3.8-12.9)	2.1 (1.0-4.4)
1 or 2	1121	49	ref	ref	ref

Model 1: Crude Odds ratio and 95% Confidence intervals

Model 2: Further adjusted for demographic factors (Age, region, and area)

Model 3: Further adjusted for social factors (Education level, wealth index, ethnicity, the number of children)

$p < 0.01$, $p < 0.05$

Socioeconomic parameters identified by the conceptual framework from the Commission on Social Determinants of Health had a significant effect on ANC. Table 2 shows the experimental data on the relationship between the social factors and women who received no ANC. Women who belonged to ethnic minority groups were significantly more at risk of not receiving any ANC compared to women with Kinh/Hoa ethnicity (OR: 3.9; 95% CI [1.5, 9.7]). In addition, the mother's education (OR: 9.2; 95% CI [3.0,

16.9]), wealth index (OR: 2.9; 95% CI [1.3, 6.8]), and region (OR: 3.3; 95% CI [1.4, 7.8]) were independent predictors for the lack of ANC use. In contrast, region and number of previous births did not influence the decision to forgo ANC. These data suggest that the initial decision to use ANC was primarily influenced by the education level, wealth, and regions in ethnic minorities, which may relate to a lack of information regarding the benefits of health care and some physiological barriers to reach such health care.

4.3 Scope for Improvement of ANC Accessibility

Table 3
Logistic Regression Analysis for Social Factors Associated With 1-2 Antenatal Care Visitations

	No. in each category	No. people with risk 2	Odds ratio (95% confidence interval)		
			Model 1	Model 2	Model 3
Education level					
No education	38	20	39.3** (15.2-101.3)	26.4** (9.7-72.3)	6.9** (2.3-20.7)
Primary	185	64	18.7** (8.7-40.2)	5.2** (3.7-7.3)	7.1** (3.0-16.9)
Lower secondary	472	84	7.7** (3.6-16.1)	6.7** (3.1-14.5)	3.9** (1.7-8.8)
Upper Secondary	280	29	4.1** (1.8-9.1)	3.5** (1.6-8.0)	2.4* (1.0-5.5)
Tertiary	291	8	ref	ref	ref
Wealth index quintile					
Poorest	244	100	25.6** (12.1-54.1)	17.6** (7.6-40.8)	5.6** (2.3-14.0)
Second	216	40	8.4** (3.8-18.3)	6.5** (2.8-15.1)	2.7* (1.1-6.7)
Middle	238	38	7.0** (3.2-15.3)	5.7** (2.5-13.0)	3.0* (1.3-7.1)
Fourth	265	19	2.8** (1.2-6.6)	2.6** (1.1-6.1)	1.8 (0.7-4.2)
Richest	303	8	ref	ref	ref

To be continued

Continued

	No. in each category	No. people with risk 2	Odds ratio (95% confidence interval)		
			Model 1	Model 2	Model 3
Region					
Red River Delta	201	15	1.2 (0.6-2.7)	1.0 (0.5-2.2)	1.4 (0.6-3.2)
Northern Midland and Mountain areas	224	63	6.1** (3.2-11.4)	4.9** (2.6-9.2)	2.7** (1.3-5.7)
North Central area and Central Coastal area	201	25	2.2* (1.1-4.4)	1.8 (0.9-3.7)	1.3 (0.6-2.8)
Central Highlands	243	58	4.8** (2.6-9.1)	3.8** (2.0-7.3)	1.9 (1.0-3.8)
South East	214	13	ref	ref	ref
Mekong River Delta	183	31	3.2** (1.6-6.2)	2.7** (1.4-5.4)	1.3 (0.6-2.7)
Area					
Rural	735	162	3.2** (2.2-4.6)	2.8** (1.9-4.1)	1.1 (0.7-1.7)
Urban	531	43	ref	ref	ref
Ethnicity of household head					
Ethnic Minorities	205	83	5.2** (3.7-7.3)	3.1** (2.1-4.5)	1.5 (0.9-2.5)
Kinh/Hoa	1061	122	ref	ref	ref
Number of children					
3 or more than	194	57	2.6** (1.8-3.7)	3.0** (1.9-4.7)	1.7* (1.1-2.8)
1 or 2	1072	148	ref	ref	ref

Model 1: Crude Odds ratio and 95% Confidence intervals

Model 2: Further adjusted for demographic factors (Age, region, and area)

Model 3: Further adjusted for social factors (Education level, wealth index, ethnicity, the number of children)

* $p < 0.01$, ** $p < 0.05$

Table 4
Logistic Regression Analysis for Social Factors Associated With Low Quality of Antenatal Care

	No. each category	No. people with risk 3	Odds ratio (95% confidence interval)		
			Model 1	Model 2	Model 3
Education level					
No education	38	33	11.9** (4.5-31.3)	7.4** (2.6-20.7)	3.1* (1.0-9.3)
Primary	185	138	5.3** (3.5-7.9)	4.4** (2.8-7.0)	2.6** (1.5-4.3)
Lower secondary	472	315	3.6** (2.7-4.9)	3.2** (2.3-4.6)	2.3** (1.6-3.4)
Upper Secondary	280	130	1.6** (1.1-2.2)	1.3 (0.9-1.9)	1.1 (0.7-1.6)
Tertiary	291	104	ref	ref	ref
Wealth index quintile					
Poorest	244	196	9.7** (6.5-14.4)	5.1** (3.1-8.3)	2.3** (1.3-4.1)
Second	216	151	5.5** (3.6-8.0)	3.5** (2.3-5.5)	2.1** (1.3-3.4)
Middle	238	158	4.7** (3.2-6.7)	3.5** (2.3-5.3)	2.4** (1.6-3.7)
Fourth	265	125	2.1** (1.5-3.0)	1.8** (1.3-2.7)	1.5* (1.0-2.2)
Richest	303	90	ref	ref	ref
Region					
Red River Delta	201	90	2.2** (1.5-3.4)	1.9** (1.3-3.0)	2.5** (1.6-3.9)
Northern Midland and Mountain areas	224	167	8.1** (5.3-12.4)	7.0** (4.5-10.8)	5.9** (3.5-9.7)
North Central area and Central Coastal area	201	111	3.4** (2.3-5.1)	3.0** (1.9-4.5)	2.7** (1.7-4.2)
Central Highlands	243	185	8.8** (5.8-13.4)	7.5** (4.9-11.6)	5.4** (3.4-8.5)
South East	214	57	ref	ref	ref
Mekong River Delta	183	110	4.2** (2.7-6.3)	3.8** (2.5-5.8)	2.5** (1.6-4.0)
Area					
Rural	735	493	2.7** (2.2-3.4)	2.4** (1.7-3.1)	1.2 (0.9-1.7)
Urban	531	227	ref	ref	ref

To be continued

Continued

	No. each category	No. people with risk 3	Odds ratio (95% confidence interval)		
			Model 1	Model 2	Model 3
Ethnicity of household head					
Ethnic Minorities	205	171	4.7** (3.2-6.9)	2.2** (1.4-3.4)	1.6 (1.0-2.6)
Kinh/Hoa	1061	549	ref	ref	ref
Number of children					
3 or more	194	149	2.9** (2.0-4.1)	2.6** (1.7-3.9)	1.7* (1.1-2.7)
1 or 2	1072	571	ref	ref	ref

Model 1: Crude Odds ratio and 95% Confidence intervals

Model 2: Further adjusted for demographic factors (Age, region, and area)

Model 3: Further adjusted for social factors (Education level, wealth index, ethnicity, the number of children)

* $p < 0.01$, ** $p < 0.05$

Logistic regression analysis was refined to identify the parameters that defined the Risk 2 group (one or two visits; Table 3) and the Risk 3 group (<3 basic test assessments; Table 4). Overall, these tables indicate that there is scope for improvement regarding the health care level necessary to reduce maternal and child mortality in order to achieve the MDGs in Vietnam. First, pregnant women who had less education were at a higher risk of not receiving the recommended frequency of ANC session or even basic care. For example, women with no education were increased risk of receiving fewer than three ANC sessions (OR:6.9 95% CI[2.3-20.7]), and increased risk of not receiving the three types of basic care (OR:3.1 95% CI[1.0-9.3]) compared to women with tertiary education.

The effect of wealth on the quantity and quality of ANC may reside in the regional differences in ANC practices. It was tested whether certain regions provided better quality of care than others. Table 3 shows that only the Northern Midland and Mountain areas were associated with a significantly higher risk of attending fewer than three ANC visits (OR: 2.7; 99% CI [2.3, 14.0]; $p < .01$) compared to the South East, where Ho Chi Minh, the largest city in Vietnam, is located. On the other hand, all areas increased risk of not receiving basic care compared to the South East. (OR:2.5-5.9) The areas with the highest risk were the Northern Midland and Mountain area (OR: 5.9; 99% CI [3.5, 9.7]; $p < .01$) and Central Highlands (OR: 5.4; 99% CI [3.4, 8.5]; $p < .01$). These two regions have concentrated ethnic minority populations. These data suggest that there is an ethnic bias in health care in Vietnam in which public health stations located in regions inhabited primarily by ethnic minorities might be less visited in part because they provide lower quality services than regions marked by greater wealth and a majority population.

In contrast, the differences between urban and rural areas, and the ethnicity of the head of the household, were not significant in Model 3 (adjusted social factors; Tables 3 and 4). These data suggest that women who are wealthy and educated select the quantity and quality of ANC even if they belong to an ethnic minority and reside in a rural area.

5. DISCUSSION

Previous studies found that ethnic minorities were likely to have less access to ANC (General Statistics Office, 2012; Målqvist, et al., 2011). That result was also confirmed in this study; more than 50% of women from ethnic minorities lived in the North Midland and Mountain area (Table 1) and people who lived in these areas increased higher risk of not receiving ANC (95% CI [1.4,7.8]) in this analysis (Table 2). In addition, education and other social factors were significantly different between the ethnic minorities and Kinh/Hoa, the ethnic majority in Vietnam. Therefore, ethnicity is one of the largest factors influencing access to ANC.

However, there is a difference in trend between Table 2 and both Table 3 and Table 4. Model 3 (shown in both Table 3 and Table 4), which was adjusted by ethnicity, showed that the other social factors, such as mother's education level, wealth, or the number of children, were significantly different among people who had at least one ANC visit, whether they had basic ANC contents such as blood test. With the introduction of the "Doi Moi policy" in 1986, Vietnam has shifted towards a market-oriented economy and health sector reform has introduced a user-pays system for some services in public hospitals and legalized private practice (Ngo & Hill, 2011). A study showed that most women in the Quang Xuong district preferred district hospital-based delivery because of the better quality of care for the mother and newborn, even though the local commune health stations are free or heavily subsidized by the government (Ngo & Hill, 2011; Duong, Lee, & Binns, 2005; Dat, Binns, & Lee, 2004). Therefore, women who have enough education to understand the need for reproductive health and enough money to pay for a hospital typically chose the better-quality alternatives.

The goal of this study was to identify the socioeconomic factors that require additional improvements in order to increase the effectiveness of ANC in Vietnam, and thereby reduce maternal mortality. The findings of this study are consistent with Peters et al., who suggested that there were four barriers to accessing health care in developing countries: accessibility, availability, affordability, and acceptability (Peters et al., 2008).

Vietnam has community health stations in each commune and this has helped increase accessibility in rural areas. However, there are still some regions where many ethnic minorities live, such as the Northern Midland and Mountain areas, which do not have adequate accessibility to health stations because of poor road conditions, lack of transportation, and geographic barriers such as mountains or hills. There are differences in women's ideas regarding availability and affordability in ANC between district hospitals and community health stations and the public and private sectors in Vietnam. Less trust regarding quality of care in health stations determines the preferences of pregnant women (Ngo & Hill, 2011), and is connected to financial status in each family.

Moreover, geographic factors accounted for a difference in the availability of ANC service quality. When comparing the Bavi rural district and Dongda urban district, both of which are in northern Vietnam, it was found that low education and low economic status were the main factors associated with the risk of inadequate ANC in both rural and urban areas (Tran et al., 2012). Previous studies, which selected two districts in Vietnam, found that women in rural areas had fewer visits and less in the way of basic health services (Tran et al., 2011; Tran et al., 2012)^{9,10}. This study found a similar trend in rural and urban areas in Model 2, but when the nationwide demographics, regions, and other social factors, such as wealth, were accounted for, a strong association was found with the risk group that did not receive enough quantitative and qualitative ANC. Therefore, the government should evaluate the improvement of ANC, not with the indicator of whether pregnant women had received ANC or not, but with the indicator that pregnant women had received visits and basic health care at least three times in each region.

In addition, women's education was strongly connected to obtaining reproductive health services. Women's education increases gender equity within the family and educated women participate more in decision making about reproduction (McDonald, 2000). In general, family organization in pre-transitional societies is characterized by social and moral support for a large number of children (McDonald, 2013); however, in this aspect, the two-child policy supported women's reproductive health, even though family structure in Vietnam is similar to that of pre-transitional societies. It was found that lower levels of the mother's education were associated with high-maternal mortality in selected low-income countries (Karlsen et al., 2011). On the other hand, increasing wealth has the potential to lead to upper class women being valued more for their skills and knowledge, and increasing women's contributions to family decision-making.

Lastly, health literacy was once recognized as a benefit of empowerment, and this affected access to and use of information (Kickbusch, 2001; Nutbeam, 2000). In addition, it was emphasized as a positive effect

of education and literacy in maternal and child health (Kickbusch, 2001). In the situation where women had less access to sexual and reproductive health information than men, due to double standards and social attitudes towards women in Vietnam (Thanh et al., 2012), women's education levels indirectly influenced health literacy and access to ANC. Another study found that knowledge, traditional stigma, and accessibility of services are the key factors affecting women's decision making regarding health-related issues (Saha, 2005). In order to abolish traditions and stigmas, it is necessary for women to acquire greater health literacy.

To overcome the four barriers to accessing ANC in Vietnam (accessibility, availability, affordability, and acceptability), there are two approaches: to focus on the service providers or the service receivers (Peters et al., 2008). Previous research on the determinants of ANC use suggested that high-risk groups of women should be targeted to encourage greater use of ANC; however, the quality of ANC service requires improvement as well (Trinh, Dibley, & Byles, 2007, pp.300-310). The most effective intervention would be to improve the quality of health facilities and ANC providers, and educate women about the need for ANC visits and to seek ANC from qualified ANC providers (Trinh, Dibley, & Byles, 2007, pp.927-935). This study clearly showed the target and approach to improve the access of ANC and that national implementation should address both the providers and the receivers.

CONCLUSION

It is important for women, especially ethnic minority women, to have the opportunity to learn the significance of antenatal health care. Other social factors, such as income, are related to areas that need attention to ensure continued improvement in the quality of the maternal health care system in the public sector. Although sufficient ANC services are available for pregnant women, the lack of education and health illiteracy interferes with the use of services that reduce the risk of pregnancy-related mortality. Therefore, women's education levels could explain some of the complex interactions between socioeconomic status and the antenatal health system in middle-income countries.

LIST OF ABBREVIATIONS

ANC	Antenatal Care
MDGs	Millennium Development Goals
MICS	Multiple Indicator Cluster Survey
SES	Socioeconomic Status
UNICEF	United Nations Children's Fund

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