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Determinants of Utilization of Maternal and Child Health Services among Muslim in a Southern Border Province of Thailand

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Introduction

Maternal and child health service is the one of health service that promote antenatal care, postnatal care through infant and child health care. The preceding account of the indigenous practices observed during pregnancy, childbirth, and the postpartum period demonstrates that despite a number of rational measures devised to ease and facilitate labor and delivery, certain practices are potentially dangerous and can imperil the life of both mother and child. These practices could well contribute significantly to the high maternal and infant mortality prevailing in the rural area (Bhatia, 1981). Estimates of maternal mortality in 1996 indicate that around 585,000 women die each year of pregnancy–related causes, 99 percent of them in developing countries. The gap in maternal mortality ratios between more developed and less developed regions is wide, In 1990, there were more than 480 maternal deaths per 100,000 live births in the less developed regions compared with about 27 per 100,000 live births in the more developed regions (United Nations, 1998).

Regarding the utilization maternal and child health services in Thailand, the implementation outcome of the Decade Goals of Child Health Development during 1990 – 2000 of the Ministry of Public Health reported that Maternal Mortality Ratio had decreased by half due to the great success of maternal and child health programme. More than 90 percent of pregnant women had attended ANC with doctors, nurses and health officers, while about 93 percent had delivery at health service facilities (Ministry of Public Health, 2001).

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The result of sample survey on Evaluation of Family Health Project conducted by the Department of Health reported that 4.6 percent of all deliveries were attended at home with the highest in the North-Eastern (6.6 percent) and Southern regions (4.8 percent) respectively. About 5.5 percent were attended by trained/untrained traditional birth attendants (TBAs) and others, among which the highest is in the Southern region (8 percent), followed by the North-Eastern region (7.3 percent) (Department of Health, 1996). In the Southern region particularly Yala, Pattani and Narathiwat Provinces where most population are Muslim, the delivery rate with TBAs was higher than those of the region and the national levels. In the year 2000, women in Yala, Pattani and Narathiwat had deliveries with the TBAs at 25.2, 37.9 and 44.2 percent respectively. In 1993, the number of trained and untrained TBAs of Yala, Pattani, and Narathiwat, was 591, 447, and 580 respectively. Six years after that (during 1994 – 2000) the number was decreased to 418 in Yala, but increased to 575 in Pattani, and 664 in Narathiwat (Health Promotion Center Region 12, 2002). It showed that the women in the southern border provinces still favor to utilize maternal and child health care with TBAs. Utilization of services during pregnancy, delivery and post delivery are important to the maternal and child health. If women had delivery at health service facilities with health personnel, the maternal and child death would become less.

In this study, the research area included Pattani province, which is one of the 3 southern provinces of Thailand that have predominantly Thai Muslim population. Pattani was chosen because its culture and features were similar to the other 2 provinces (Yala and Narathiwat). The determinants to utilization of maternal and child health service among Muslim's women in Pattani are examined. Both individual characteristics and household characteristics are using as the determinants of utilization of MCH services.

Individual characteristics are measured using five factors that are women's education, women's occupation , age at first marriage , place of residence and ability to speak Thai. The education advantage is affected through greater access to maternal and child health service. More education for women enhances decision making autonomy within the home. Education is hypothesized to strengthen women's say in family

decisions concerning their own lives and well-being (Jejeebhoy,1996). This notice is supported by the study in Napal which found that the odd of women with more than primary education used antenatal care from a modern source, delivery at health facility, and received assistance from modern source were 2.5, 3.44 and 3.75 times higher than women with less than primary education respectively (Matsumaru & Gubhaju, 2001). For women's occupation, wage work is often argued to be most likely to engender a sense of autonomy and control. Thus, employment in jobs that allow greater autonomy is associated with a greater likelihood of utilization of health service (Miles-Doan & Brewster, 1998).

Obermeyer (1993) indicated that in Morocco and Tunisia earlier age at marriage is negatively correlated with both antenatal care and delivery in hospital. In the same study it was showed that women living in the urban area had a higher standard of living. More education and more exposure to media has a positive correlation with the usage of maternal and child health care. Similarly, the effect of language has been debated. The language is important among the minority group since they have their own language. The problem occur when they communicate with the outside society, especially those who can only communicate in their own language. In 3 southern border provinces of Thailand , more than 74 percent among Muslim's people speak dialect language (Yawee) (NSO,1990 cited in NSO,1998). Not all of health personnel in this area can speak Yawee, Some group of Muslim women might thus not be able to access to MCH services.

Household characteristics are measured using four variables : family structure, relationship with head of household, number of members in household and head of household's gender. The household is usually the fundamental social unit in which men, women, and children live . It is also the basic unit of production and consumption. In extended family, the decision making belong to only one person, male or female, in the family but usually the elderly (Swasyat, 1996). Decision making is less for women living in extended families than for those in nuclear families, especially if women are not the household's heads. Besides, the relationship of women in household affect women's autonomy. By limiting autonomy, women's access to social, health care

can be limited . In Napal, Niraula & Morgan (1996) found that autonomy of women was lower when she lived in household with her father-in-law as head. Regarding the number of members in household, Obermeyer (1993) showed that utilization of antenatal care and delivery in hospital is negatively correlated with number of people in household. In addition, head of household's gender is effected by health seeking behavior. The economic status of the household as a determinant of utilization of health services is also important since it reflects the ability of the household to pay for the cost that are associated with using health service. However, female head of household are often poorer than male head of household. Due to their lower economic status, female head of household may have lower utilization of health care.

Research Methodology

The analysis is based on data from Fertility and Health Survey Project, Pattani Province conducted by Health Promotion Region 12, Yala Province. The samples were selected by probability proportional to size (PPS.) The survey was ordered with non-replacement technique. In case the sample households had no target population or the target population was away at the time of interview, they were followed up for interview without replacement by other households. In this study, the additional sample size was included to replace the households with no target population or failed to the interview, so as to represent the population of Pattani Province. The field work of this survey was scheduled between February – April, 2000. The study aimed to recruit any Muslim's women age 15-49 who had also given birth at least one live infant. Then 2,052 Muslim's women were selected. The samples size that used for analysis depended on each objective of analysis. The analysis is divided into three parts. The first part is analysis involving the pattern of utilization MCH services. The sample is 1,602 women who gave birth in the year 1995-1999. The second part deal with the trend in utilization MCH services. All of 2,052 women were used. The last part, 1,219 Muslim's women who gave last birth in the year 1995-1999 were chosen to analyse the determinants of utilization MCH services.

Patterns of the Utilization of Maternal and Child Health Services

The analysis of the patterns of the utilization of maternal and child health services used data from the pregnancy history of women who gave birth during the five year period of 1995-1999. There were a total of 1,602 children born in this period.

Antenatal Care

Most women obtain antenatal care from traditional birth attendants (TBAs) in addition to health officials. A high percentage of those at the young age have antenatal care with both groups, the level then lower steadily until age group 30-34. After that, it begins to be higher again in the 35-49 age group. The percent receiving antenatal care only with health officials is lowest in the young and older age groups. An interesting point is that the percent obtaining antenatal care only from TBAs is lowest in the young age group and steadily increases until it peaks to 20 percent in the 40-49 age group (Figure 1).

Place of Delivery

More than 60 percent of women give birth at home. Women in the 20-24 age group are more likely to give birth at home than women in the 15-19 age group. The percentage declines in the 25-34 age group, and thereafter constantly increases until it reaches its highest point in the 40-49 age group, where more than 70 percent of women give birth at home (Figure 2).

Birth Attendants

Women at the beginning and end of their reproductive life are those likely to give birth with TBAs as their birth attendants. Those in the 25-39 age group have the lowest percentage having a TBAs as the birth attendants. The percentage giving birth with both a TBA and a health official as attendants is low across all age groups (Figure 3)

From the pattern of the utilization of maternal and child health service it can be seen that those who utilize the service the least appear to be women at the early and the end of their reproductive years. The reason is that women aged 15-20 years are still young so the decision about what services to use most likely will rest with the family, especially the elderly who still prefers using traditional methods and services. Those in the 35-49 age group who have children are those who have had previous experience in childbirth. They believe that this time, childbirth will be easier; at the same time, because the women are older, they may be embarrassed with having to give birth with officials standing around. Besides, because of they had many of children, some women may be afraid that the officials will try to persuade them to undergo sterilization or use birth control, which is at odds with their feelings so they do not go to utilize the services. These two groups, younger and older age groups, are also those who have the highest chances of becoming pregnant because they are highly fertile. The Public Health Ministry announced that as one of their requirements for becoming a model mother, the first child should be born when the woman is between 20-30 years of age (Ministry of Public Health, 2001), because it is safest during this time. They do not recommend having a child when the mother is over 35 years old, as it puts both the child and the mother at greater risk (Pichaisanit, 1987).

Figure 1

Pattern of utilization of ANC, 1995-1999

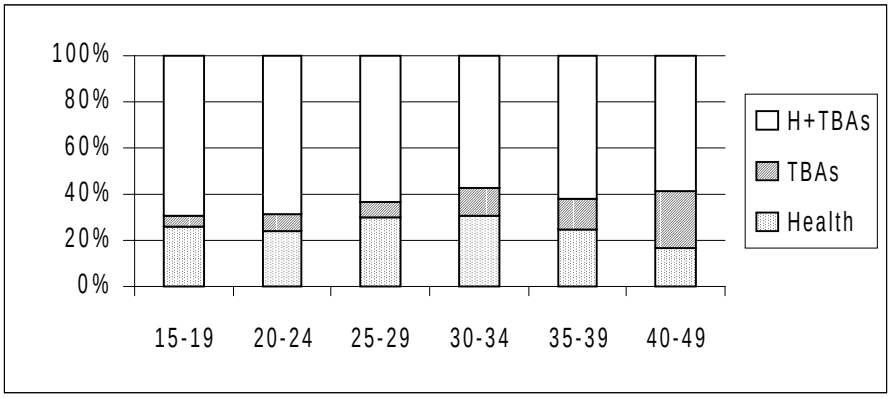


Figure 2

Pattern of utilization of place of delivery, 1995-1999

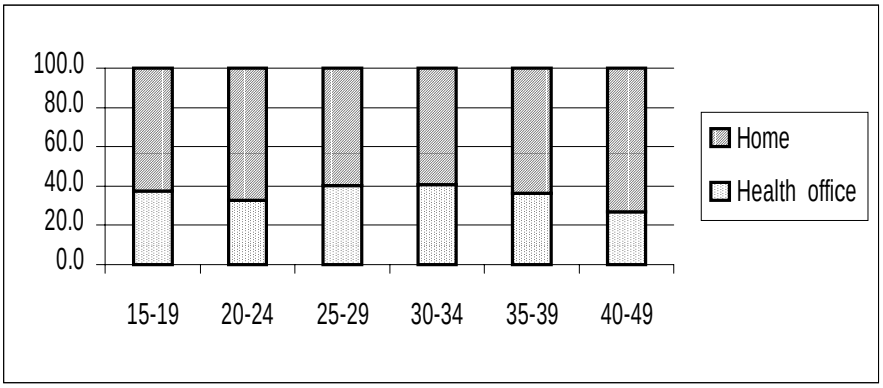
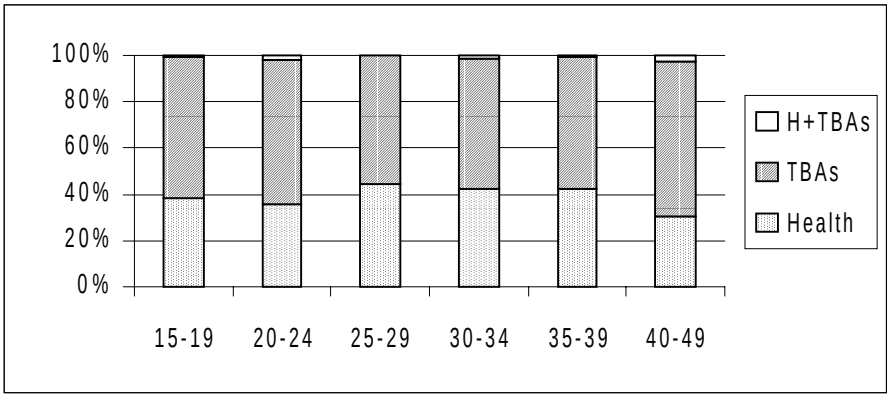


Figure 3

Pattern of utilization of birth attendants, 1995-1999



From Figures 1 to 3, a relationship can be observed between type of antenatal care, the place of birth and the type of birth attendant. It is clearly seen that 90 percent of the women who have antenatal care with health officials only will give birth in the health center. Even those few who give birth at home will request the presence of a health official. This suggests that the objective of those who choose to have their antenatal care with health officials is to have their childbirth attended by health officials.

In the same vein, those who choose TBAs for antenatal care will give birth at home with a TBA. From table 1 it can be seen that 97 percent of those who have antenatal care with TBA give birth at home. The remaining 3 percent gave birth in the health center. These few women probably had complications in childbirth that made it necessary to change of place of delivery. When analyzing those who participate in childbirth, 96 percent are attended by a TBA while one percent is attended by both a TBA and a health official. It is also assumed that for women who chose to have only TBAs for antenatal care, but who had both TBAs and health officials to help with childbirth, complications were experienced during delivery.

An interesting fact is that although women who choose to have antenatal care with both TBAs and health officials is high, it can be seen from table 6.1 that 80 percent of those women give birth at home, with 77 percent of the births being attended by only a TBA. This suggests that the intention of these women in choosing antenatal care with health officials in addition to a TBA is a kind of reassurance, just in case some difficulties or complications occur during pregnancy.

Table 1: Percentage distribution of antenatal care by place of delivery and birth attendants

	Ante natal care			Total
	Health officer	TBAs	TBAs+ Health officer	
Place of delivery				
1. Health office	93.7	2.6	18.4	37.1
2. Home	6.3	97.4	81.6	62.9
Total	100.0 (431)	100.0 (153)	100.0 (1,018)	100.0 (1,602)
Birth attendants				
1. Health officer	100.0	2.6	20.7	40.3
2. TBAs		96.1	77.6	58.5
3. TBAs+ Health officer		1.3	1.7	1.2
Total	100.0 (431)	100.0 (153)	100.0 (1,018)	100.0 (1,602)

Trend in utilization of maternal and child health services

Analysis of the trend in utilization of maternal and child health services for 2,052 Muslim women who were 15-49 years old and gave birth from 1979-1999 (21 years) was undertaken. The analysis includes information on 5,670 children ever born.

Antenatal Care

It was found that the trend in using only TBAs for antenatal care declined continuously, from 80 percent in 1979 to less than 10 percent in 1999. At the same time, the trend for antenatal care with only health officials and health officials coupled with TBAs constantly increased. The rate of increase for women who choose to have antenatal care with both health officials and TBAs is higher than for those who choose only health officials (Figure 4).

Place of Delivery

During the past 21 years, most women gave birth at home as opposed to the health center. However, the percentage giving birth at home is decreasing in direct proportion to the increasing number of women giving birth in the health center (Figure 5).

Birth Attendants

The percentage using only TBAs as birth attendants has been decreasing. An increasingly higher proportion women are choosing health officials as their birth attendants. The proportion choosing both has changed little over the time period (Figure 6).

Figure 4

Trend of utilization of ANC, 1979-1999

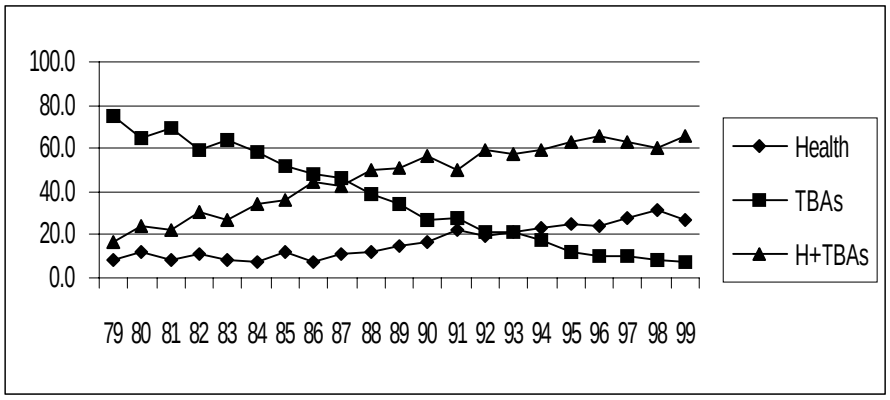


Figure 5

Trend of utilization of place of delivery, 1979-1999

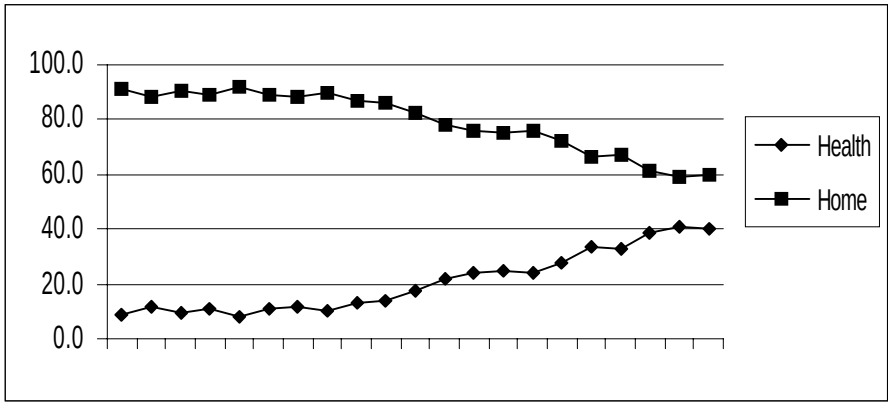
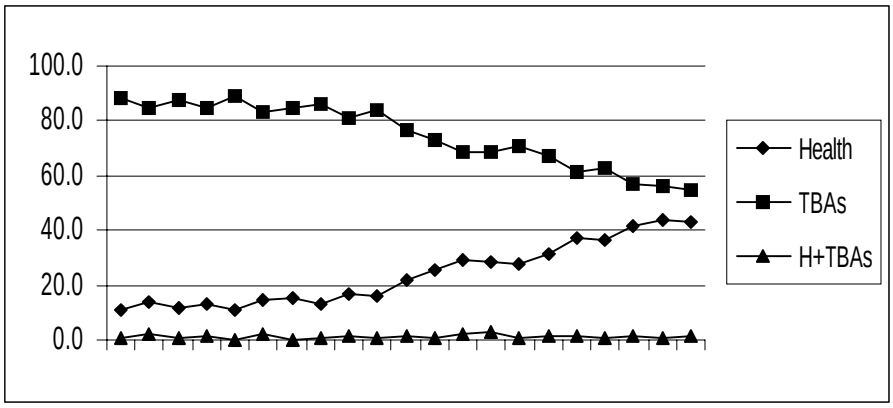


Figure 6

Trend of utilization of birth attendants, 1979-1999



In summary, during the past two 2 decades there has been an increasing trend of the utilization of maternal and child health services. Although antenatal care with a TBA is still favored, women will also now choose to have antenatal care with a health official together with the TBA. Even though the percent of women who give birth at home is declining, the level is still much higher than for women who give birth at the health center. Choosing TBAs during childbirth is still popular, more popular than choosing health officials as birth attendants, but the trend is such that it can soon be expected that more women will choose health officials than TBAs as their birth attendants. Those who choose to have antenatal care with health officials only do so to avoid using the services of a TBA, and this group is assumed to have less risk in pregnancy and childbirth than other groups.

The most interesting fact is that giving birth with both a TBA and health official has changed little over time. Women will usually choose to have ANC with a TBA, but the reason why they also chose a health official is so that the official can prepare a birth certificate for the baby, as well as reassurance that even if complications occur during labor, there is still someone there to help. However, by using both, the cost of childbirth increases. Women who use only the TBA generally pay less than

those who use health officials. The cost can also be seen as an influencing factor. Another variable to be considered is the emotional side of childbirth: women may be more comfortable giving birth at home with the TBA than giving birth with a health official that they hardly know.

The Correlation of Socioeconomic Determinants Affecting the Utilization of Maternal and Child Health Services

This section, 1,219 Muslim's women who had given last birth in the year 1995-1999 were chosen to analyse the socioeconomic determinants of utilization MCH services. The socioeconomic determinants are divided into 2 characteristics as individual characteristics and household characteristics. The utilization of maternal and child health (MCH) service includes antenatal care (ANC), place of delivery, and birth attendants. Logistic regression analysis is used for analysis. The measurement scale of independent and dependent variables are defined as shown in Table 2.

Table 2: Description of dependent and independent variables

Variable name	Scale of variables
Dependent variables	
1. Maternal and Child Health Services	
1.1 Ante natal care	0 = TBAs and TBAs+Health officer 1 = Health officer
1.2 Place of delivery	0 = At home 1 = Health office
1.3 Birth attendants	0 = TBAs and TBAs+Health officer 1 = Health officer

Table 2: (continued)

Variable name	Scale of variables
Independent variables	
1. Individual Characteristics	
1.1 Women's education	Categories
- No schooling	Reference
- 1-4 years	1 = 1-4 years
- 5-6 years	2 = 5-6 years
- over 6 years	3 = over 6 years
1.2 Women's occupation	Categories
- Housewives	Reference
- Employee	1 = Employee
- Agriculture	2 = Agriculture
- Merchant and other	3 = Merchant and other
1.3 Age at first marriage	Interval scale
1.4 Residence	Categories
- Non-municipal	Reference
- Municipal	1 = Municipal
1.5 Thai speaking	Categories
- Cannot speak Thai	Reference
- Little	1 = Little
- Speak well	2 = Speak well
2. Household Characteristics	
2.1 Household structure	Categories
- Extended family	Reference
- Nuclear family	1 = Nuclear family
2.2 Relationship with head of Household	Categories
- Daughter-in-law	Reference
- Wife	1 = Wife
- Daughter	2 = Daughter
- Other	3 = Other
2.3 Number of household members	Interval scale
2.4 Head of household's gender	Categories
- Female	Reference
- Male	= Male
3. Control Variable	
3.1 Women's age at last delivery	Interval scale

The analysis on utilization of MCH services, bivariate analysis between individual and household characteristics of women and utilization of MCH services is presented first. This is followed by logistic regression analysis to determine the net effects of each of the independent variables.

The bivariate analysis is undertaken for overall utilization of MCH services. The results from table 3 show a statistical significance at 0.01 level, there is a positive association between education and having ANC with health officer, delivery at health service facilities, and birth attended by health officer. Women with a higher level of education were most likely to utilize health services. Women engaged in merchant had a higher rate of utilization of MCH services with a health officer than did women of other occupations. Women engaged in agriculture had a lower likelihood of utilization of MCH services than did other groups. Age at first marriage had a positive association with utilization of MCH services with a health officer. As age at first marriage increased, utilization of MCH services also increased. Women living in municipal area utilized of MCH services with a health officer more than those living in non-municipal area. Ability in speaking Thai had a positive correlation with utilization of MCH services. Women who can speak Thai fluently had a higher level of utilization of MCH services.

Regarding household characteristics, women living in households with fewer household members had higher utilization of MCH services with a health officer more than those living in more household members. However, the relationship of household structure, the relationships with household head, and sex of household head with utilization of MCH services was not statistically significant (Table 3).

Table 3: Percentage distribution of individual and household characteristics by utilization of MCH

Characteristics		ANC		Place of Delivery		Birth attendants		Number
		H[1]	T[2]	Health office	Home	H[1]	T[2]	
Individual characteristics								
Education*	1 No schooling	16.0	84.0	26.0	74.0	30.0	70.0	150
	2 1-4 years	19.8	80.2	30.7	69.3	34.2	65.8	339
	3 5-6 years	28.9	71.1	36.4	63.6	40.5	59.5	494
	4 over 6 years	43.2	56.8	59.7	40.3	61.4	38.6	236
Occupation*	1 Housewives	28.1	71.9	38.5	61.5	42.6	57.4	481
	2 Employee	22.5	77.5	34.3	65.7	37.3	62.7	338
	3 Agriculture	20.6	79.4	29.4	70.6	32.0	68.0	228
	4 Merchant&Oths	45.3	54.7	55.8	44.2	59.3	40.7	172
Age at first	< 20	22.6	77.4	33.1	66.9	35.6	64.4	839
Marriage*	20-24	35.1	64.9	45.0	55.0	50.9	49.1	291
	25-34	49.4	50.6	61.8	38.2	66.3	33.7	89
Residence*	1 Non municipal	24.5	75.5	34.9	65.1	38.5	61.5	1058
	2 Municipal	47.8	52.2	59.0	41.0	61.5	38.5	161
Thai speaking*	1 Can't speak	12.9	87.1	19.6	80.4	22.7	77.3	163
	2 Little	21.0	79.0	31.6	68.4	35.3	64.7	572
	3 Speak well	40.3	59.7	51.9	48.1	55.2	44.8	484
Household characteristics								
Household	1 extended family	25.5	74.5	37.3	62.7	39.9	60.1	652
Structure	2 nuclear family	30.0	70.0	39.0	61.0	43.4	56.6	567
Relationship	1 Daughter-in-law	30.8	69.2	39.2	60.8	41.4	58.6	143
With head of	2 Daughter	26.5	73.5	37.3	62.7	41.3	58.7	343
Household	3 Wife	27.9	72.1	37.5	62.5	41.1	58.6	648
	4 Others	23.5	76.5	43.5	56.5	43.5	56.5	85
Household	1 2-5 persons	33.0	67.0	44.9	55.1	47.8	52.2	385
Member*	2 6-8 persons	26.9	73.1	37.3	62.7	40.7	59.3	565
	3 over 8 persons	21.2	78.8	29.7	70.3	34.2	65.8	269
Head of	1 female	28.1	71.9	39.6	60.4	41.5	58.5	217
Household	2 male	27.4	72.6	37.7	62.3	41.5	58.5	1002
gender								

1 = Health officer 2 = Traditional birth attendants (TBAs) and TBAs + Health officer

* P-value < 0.01

Utilization of Antenatal Care

Logistic regression analysis was employed to determine the relationship between individual characteristics, household characteristics and utilization of antenatal care (see Table 4). It was found that the variables having significant positive relations with utilization of antenatal care are occupation, age at first marriage, place of residence, ability to speak Thai and family structure. While the other background variables the were include in the model such as education, relationship with head of household , household member and gender of household head have smaller and less consistent effects on the likelihood of utilization of antenatal care at the health office.

Women engaged in merchant and other occupations had odds of utilization of antenatal care with health officer that were 1.6 times (OR = 1.62) higher than odds for housewives. As age at first marriage increased one year, the odds of utilization of antenatal care at the health office increased by six percent. Women who speak Thai fluently and residing in municipal area had odds of utilization of antenatal care with a health officer that were 2.9 and 2.1 times higher than those who cannot speak Thai, and residing in a non-municipal area respectively. (Table 4)

Utilization of Place of Delivery

The analysis shows that variables having a significant positive association with delivery at a health facility were age at first marriage, residence, and Thai speaking ability. The number of household's members had a significant negative relationship. Occupation, household structure, relationship with head of household, and gender of household head were not significantly related to place of delivery.

Women age at first marriage increased by one year odds of delivery at health service facilities increased by five percent. Those living in municipal area had odds of delivery at health service facilities 2.1 times higher than odds for women who were living in non-municipal areas. A similar result was found among those speaking little and speaking Thai very well, with odds of using the delivery service at health

facilities 3.2 and 2.1 times higher respectively than the odds of those unable to speak Thai. Household size had a negative relation with delivery at health facilities. As household size increased by one member the odds of utilization of delivery service at health facilities decreased by nine percent. (Table 4)

Utilization of Birth Attendants

Women's age at first marriage, residence and Thai speaking ability had positive associations to utilization health officer as birth attendants. Household members had negative relation to use health officer as birth attendants. However, women's education, occupation, household structure, relationship with head of household and head of household gender were not related to the probability of a birth being attended by a health officer.

As women's age at first marriage increased 1 year, the odds of utilization of delivery services by a health officer increased 6 percent. Women residing in municipal areas, speaking little Thai and speaking Thai very well had delivery by health officer 1.9, 2.1 and 3.5 times higher than the odds of those living in non-municipal areas and unable to speak Thai respectively. (Table 4)

Table 4: Logistic results for utilization of maternal and child health care

General characteristics		Ante natal care		Place of delivery		Birth attendants	
		B	Exp (B)	B	Exp (B)	B	Exp (B)
Individual characteristics							
Education	1 No schooling (reference)						
	2 1-4 years	-0.1502	0.8605	-0.3050	0.7371	-0.3672	0.6727
	3 5-6 years	0.1561	1.1689	-0.2226	0.8004	-0.2624	0.7692
	4 over 6 years	0.7750	1.3198	0.3270	1.3868	0.1360	1.1457
Occupation	1 Housewives (reference)						
	2 Employee	-0.1328	0.8757	-0.0259	0.9745	-0.0846	0.9189
	3 Agriculture	-0.1239	0.8835	-0.1615	0.8509	-0.2489	0.7797
	4 Merchant&Oth	0.4804	1.6167*	0.3297	1.3905	0.2922	1.3393
Age at first marriage		0.0594	1.0612**	0.0476	1.0487*	0.0625	1.0645**
Residence	1 Non municipal (reference)						
	2 Municipal	0.7596	2.1374**	0.7342	2.0838**	0.0654	1.9228**
Thai	1 Can't speak Thai (reference)						
speaking	2 Little	0.5249	1.6903	0.7428	2.1018**	0.7755	2.1717**
	3 Speak well	1.0803	2.9456**	1.1764	3.2427**	1.2415	3.4608**
Household characteristic							
Household	1 extended family (reference)						
Structure	2 nuclear family	0.5577	1.7466*	0.2197	1.2457	0.3992	1.4906
Relationship	1 Daughter-in-law (reference)						
with	2 Wife	-0.5308	0.5881	-0.2923	0.7465	-0.3546	0.7015
head of	3 Daughter	-0.1201	0.8868	0.0275	1.0279	0.1043	1.1099
Household	4 Others	-0.3959	0.6731	0.2467	1.2798	0.1498	1.1616
Household member		-0.0579	0.9437	-0.0813	0.9219*	-0.0634	0.9385*
Head of	1 female (reference)						
Household	2 male	-0.0443	0.9566	0.0483	1.0495	0.0943	1.0989
gender							
Control variable							
Women age at last delivery		0.0155	1.0156	0.0159	1.0161	0.0204	1.0206
Model Chi-square		136.303		140.197		138.224	
Significance		0.000		0.000		0.000	
N		1,219		1,219		1,219	

** P-value < 0.01 * P-value < 0.05

The analysis of socioeconomic determinants of utilization of MCH services suggests that education has an insignificant association with utilization of all types of modern health services such as ANC, place of delivery and birth attendants. This is because most of educated or uneducated women were likely to have ANC with both TBA and health officer, delivery at home by a TBA. Only those in merchant and other occupations were found to have different utilization of MCH services compared to housewives. Women working as merchant have more access to media, socialize more with others, and earn their own income, thus they had more chances to utilize such services from health officer than did housewives. Similarly, women with higher age at first marriage were more likely to utilize such services. Women with higher age of marriage were likely to have higher autonomy than women who married at a younger age. Consequently, they have higher levels of utilization of MCH services from a health officer. Another interesting variable is the ability to speak Thai language. It was found that women who were able to speak little Thai or speak Thai very well were more likely to use MCH services compared to women who were unable to speak Thai at all. Usually, the Malayu language (Yawee) is used in communication within Muslim families and communities. The ability of women to speak Thai indicates that they were modern than those who were unable to speak Thai and they can access to Thai language media . So that they were likely to utilize the services at health facilities where Thai language was spoken by most health officer. Similarly, women residing in municipal area were more likely to utilize MCH services with health officers than were women residing in non-municipal areas, since media and service outlets were more available, accessible and convenient in municipal areas.

Household structure and number of household's members had significant relationships with the utilization of MCH services. Women in nuclear families were more likely to use these services that were women living in extended families. Women in nuclear families need not to rely as much on the decision of their elder relatives compared to women living in extended families. Moreover, they usually rely on their own decision on various matters such as the family expenses. Hence they become more used to using such services. It was found that a family with additional member tended to be less likely to use the delivery service at health facilities. Since they had to take

care of many household members they may have an economic burden and need to save any possible cost and delivery at home costs less than delivery at health facilities.

Predicted Probabilities of Utilization of Maternal and Child Health Care

In order to improve the understanding of effects, in the following section the predicted percent of women using the health office of personnel for ante natal care, place of delivery and birth attendants are presented. The estimated probability is of the form:

$$\text{Prob (event)} = \frac{e^{Z}}{1 + e^{-Z}}$$

or

$$\text{Prob (event)} = \frac{1}{1 + e^{-Z}}$$

where $Z = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + \ldots + B_kX_k$

e = the base of the natural logarithms

B_1 to B_k represents the logistic regression coefficient

X_1 to X_k represents the independent variables

The predicted percents are calculated for selected independent variables that were statistically significant at 0.05 level in the logistic regression model. For the utilization of health officer for ante natal care; occupation, age at first marriage, residence, Thai speaking, and household structure were selected from the model. The model for utilization of the health office to delivery uses age at first marriage, residence, Thai speaking and household members. Women's age at first marriage, residence, Thai speaking and household member were shown to have the strongest effects in the utilization of health officers as birth attendants. Therefore, logistic regression analysis was run with these independent variables to predict probabilities of utilization of maternal and child health. The logistic regression coefficients are shown in Table 5.

Table 5: Logistic regression coefficients used to predicted probability for utilization of health officer and health office for maternal and child health.

Independent variables	Logistic regression coefficients		
	Ante natal care	Place of delivery	Birth attendants
Occupation (Housewives)			
X_1 Employee	-0.1193	-	-
X_2 Agriculture	-0.1190	-	-
X_3 Merchant and other	-0.4962	-	-
X_4 Age at first marriage	0.0795	0.0696	0.0811
Thai speaking			
(Can't speak Thai)			
X_5 Little	0.5376	0.5987	0.5688
X_6 speak well	1.2332	1.2124	1.1481
Residence (Non-municipal)			
X_7 Municipal	0.7159	0.7955	0.7410
Household structure			
(Extended family)			
X_8 Nuclear family	0.3585	-	-
X_9 Household member	-	-0.0755	-0.0639
Constant	-3.5587	-2.1787	-2.2628

Reference variables are in the parenthesis

Where

X_1 is employee

$X_1 = 1$ if the women were employee

$X_1 = 0$ otherwise

X_2 is agriculture

$X_2 = 1$ if the women were agriculture occupation

$X_2 = 0$ otherwise

X_3 is merchant and other occupation

X_3 = 1 if the women were merchant and other

X_3 = 0 otherwise

X_4 is age at first marriage

X_5 speaks a little Thai

X_5 = 1 if the women can speak Thai little

X_5 = 0 otherwise

X_6 speak Thai well

X_6 = 1 if the women can speak Thai well

X_6 = 0 otherwise

X_7 is residence

X_7 = 1 if the women resides in municipal area

X_7 = 0 if the women resides in non-municipal area

X_8 is nuclear family

X_8 = 1 if nuclear family

X_8 = 0 otherwise

X_9 is household member

The predicted probabilities for utilization of maternal and child health care are calculated below.

1. Utilization of health officer for ante natal care

Logit (probability of utilization of health officer for ante natal care)

$$= - 3.5587 - 0.1193 (x_1) - 0.1190(x_2) + 0.4962 (x_3) + 0.0795(x_4) + 0.5376(x_5) + 1.2332(x_6) + 0.7159(x_7) + 0.3583(x_8)$$

The results of the predicted percent of women using a health officer for ante natal care is shown in Table 6. It is predicted that 14 percent of women who are working in agriculture, age at first marriage is17 years old, can speak a little Thai, live in a non-municipal area and in an extended family use a health officer for ante natal care. The percent increases two times (28 percent) if women work as a merchant and

other and age at first marriage is 20. This percent increases to nearly 70 percent for women who live in a municipal area, can speak Thai well and live in a nuclear family.

Table 6: Predicted probability utilizing of health officer for ante natal care

Characteristics	Value	Probability (%)
1. Women whose occupation is agriculture, age at first marriage is 17, can speak a little Thai, live in a non-municipal area and in an extended family.	$1/1+e^{-[-3.5587 - 0.1193(0) - 0.1190(1) + 0.4962(0) + 0.0795(17) + 0.5376(1) + 1.2332(0) + 0.7159(0) + 0.3583(0)]}$	14.324
2. Women whose *occupation is merchant and other, age at first marriage is 20*, can speak a little Thai, live in a non-municipal area and in an extended family.	$1/1+e^{-[-3.5587 - 0.1193(0) - 0.1190(1) + 0.4962(1) + 0.0795(20) + 0.5376(1) + 1.2332(0) + 0.7159(0) + 0.3583(0)]}$	28.193
3. Women whose *occupation is merchant and other, age at first marriage is 20*, *can speak Thai well*, live in a municipal area and in an extended family.	$1/1+e^{-[-3.5587 - 0.1193(0) - 0.1190(1) + 0.4962(1) + 0.0795(20) + 0.5376(0) + 1.2332(1) + 0.7159(0) + 0.3583(0)]}$	44.046
4. Women whose *occupation is merchant and other, age at first marriage is 20, can speak Thai well, live in a municipal area and in an nuclear family.*	$1/1+e^{-[-3.5587 - 0.1193(0) - 0.1190(1) + 0.4962(1) + 0.0795(20) + 0.5376(0) + 1.2332(1) + 0.7159(1) + 0.3583(1)]}$	69.739

2. Utilization of health office as place of delivery

Logit (probability of utilization of health office as place of delivery)

$$= - 2.1787 + 0.0696(x_4) + 0.5987(x_5) + 1.2124(x_6) + 0.7955(x_7) - 0.0755(x_9)$$

The results of predicted percent using the health office as their place of delivery is shown in Table 7. Approximately 30 percent of women age at first marriage is 17 years old, can speak a little Thai, live in a non-municipal area and live in a household with six members are predicted to deliver at the health office. This contrasts with around 50 percent if the women's age at first marriage is 20 and can speak Thai well. The percent increases to 71 percent if women live in a municipal area, and live in a household with four members.

Table 7: Predicted probability utilizing health office as place of delivery

Characteristics	Value	Probability (%)
1. Women whose age at first marriage is 17, can speak a little Thai, live in a non-municipal area and in a household with six members	$1/1+e^{-[-2.1627 + 0.0696(17) + 0.5987(1) + 1.2124(0) + 0.7955(0) - 0.0755(6)]}$	29.947
2. Women *whose age at first marriage is 20*, *can speak Thai well,* live in a non-municipal area and in a household with six members	$1/1+e^{-[-2.1627 + 0.0696(20) + 0.5987(0) + 1.2124(1) + 0.7955(0) - 0.0755(6)]}$	49.317
3. Women *whose age at first marriage is 20*, *can speak Thai well, live in a municipal area* and in a household with six members	$1/1+e^{-[-2.1627 + 0.0696(20) + 0.5987(0) + 1.2124(1) + 0.7955(1) - 0.0755(6)]}$	68.313
4. Women *whose age at first marriage is 20*, *can speak Thai well, live in a municipal area and in a household with four members*	$1/1+e^{-[-2.1627 + 0.0696(20) + 0.5987(0) + 1.2124(1) + 0.7955(1) - 0.0755(4)]}$	71.488

3. Utilization of health office as birth attendant

Logit (probability of utilization of health officer as birth attendant)

$$= - 2.2628 + 0.0811(x_4) + 0.5688(x_5) + 1.1481(x_6) + 0.7410(x_7) - 0.0639(x_9)$$

The percent of utilizing a health office as the birth attendants for women age at marriage is 17, can speak a little Thai and stay in a non-municipal area is 33 percent. The percent increases to 53 percent if the woman age at first marriage is 20 and speak Thai well. There is 73 percent utilization if the woman lives in a municipal area and has 4 members in household (Table 8).

Table 8: Predicted probability utilization health officer as a birth attendant

Characteristics	Value	Probability (%)
1. Women whose age at first marriage is 17, can speak a little Thai, lives in a non-municipal area and in a household with six members	$1/1+e^{-[-2.2628+ 0.0811(17) + 0.5688(1) + 1.1481(0) + 0.7410(0) – 0.0639(6)]}$	33.210
2. Women whose *age at first marriage is 20*, can speak a little Thai, lives in a non-municipal area and in a household with six members	$1/1+e^{-[-2.2628+ 0.0811(20) + 0.5688(1) + 1.1481(0) + 0.7410(0) – 0.0639(6)]}$	38.808
3. Women whose *age at first marriage is 20*, *can speak Thai well,* lives in a non-municipal area and in a household with six members	$1/1+e^{-[-2.2628+ 0.0811(20) + 0.5688(0) + 1.1481(1) + 0.7410(0) – 0.0639(6)]}$	53.093
4. Women whose *age at first marriage is 20*, *can speak Thai well, lives in a municipal area and in a household with four members*	$1/1+e^{-[-2.2628+ 0.0811(20) + 0.5688(0) + 1.1481(1) + 0.7410(1) – 0.0639(4)]}$	72.962

Conclusion

Utilization of MCH services is a crucial factor in reducing maternal and infant morbidity and mortality. Although the coverage of such services has increased than that in the past, nonetheless, Muslim's women in this study still have a lower rate of utilization of MCH services at health service outlets than the general women. During the past several decades, various strategies were initiated to enhance the utilization of MCH services at government service outlets among women in the Southern region, but it yielded less achievement in comparison with other regions. Only ANC with heath personnel was increased but in combination with TBAs at the same time, while most delivery were attended by TBA at home. Trend of having delivery at home by TBAs was high which reflected the preference of having ANC and delivery by TBAs at home. This probably depends on social characteristics, local cultures and beliefs that regard delivery as a normal activity. In addition, social structure might be another factor affecting traditional service acceptance. Boonmongkol & Denduang (1996) had mentioned about the treatment behavior generally found among the minority that they mostly relied on their relatives and neighbors. The members of the group had very tight relationship and tended to practice self-treatment among family members and relatives. Besides, they mostly utilized traditional treatment in their community.

As for women autonomy, the principle of Muslim region allowed women to express their opinion freely (Mutahhari, 1986), and hold equal social status as men did (Badawi, 1980). It was, however, found in this study that social characteristics, community cultures had embedded these women as the followers without much self-discouragement. They accepted the decisions made by their husbands and elderly. As a result, utilization of traditional or local health service become highly popular, while public health service was less accessed although health centers were available in every sub-district. Less utilization of public health service may be due to lack of knowledge of the services and the popularity of using local services influenced by local norm, tradition and culture.

Policy Recommendation

For the policy recommendation with regard to the Muslim's maternal and child health programme in the southern border of Thailand which may be derived from this study are as follows :

1. Problem solving needs active cooperation among various groups and sectors as a key to success. For maternal and child health, the community themselves did not realize the problems while health officer observed such problems from their work. Therefore, the government sectors need to seek vital cooperation from the community particularly the District Administrative Authority (DAA) in identifying and solving the MCH problems.

2. Accessibility of MCH service is important to the health of both mothers and infants. According to the result, Muslim women still have less access to the services of MCH, and treatment at government health service facilities. Importantly, less accessibility may due to their lack of knowledge about risk condition of pregnancy and delivery that required treatment. Such knowledge would enhance women's decision to utilize advance treatment. These women and their husbands as well as their elderly relatives should be educated with essential knowledge about health care, especially among those having ANC with TBAs. Individuals are of key media in providing information access to these groups. Village health volunteers should also be well trained to transfer the knowledge to the women in the community. Moreover, religious leaders and community leaders should be educated and accordingly disseminated the knowledge to the public. Other media such as the radio-broadcasting programme in Yawee speaking should be included with maternal and child health care contents.

3. As the number of TBAs in 2 Southern border provinces, Pattani and Narathiwat, are increasing, it reflects the high popularity of utilization of ANC and delivery with TBAs. Although having ANC and delivery with TBAs are riskier than

with health officers, the TBAs are still important human resource and in need in the community especially in the remote area. In the future, close cooperation between public health officers and the TBAs should be implemented but with lesser role of TBAs in attending delivery. However, the TBAs roles have to be emphasized more on surveillance aspect through training and refresher courses. The training must focus on finding risk factors of pregnant women so that the TBAs are able to transfer the risk cases earlier.

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