

Promoting the Utilization of Antenatal and Postnatal Care in Rural Cambodia

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Mortality rates among mothers and neonates are high in Cambodia, and the government has created an initiative to reduce them. Antenatal and postnatal care services are key to this reduction; thus, this study empirically elucidated factors for promoting antenatal and postnatal care in rural Cambodia. Interviews were conducted with 283 mothers, who were asked about their attendance at antenatal and postnatal care. Data were analyzed through logistic regression, and determinants that impact respondents' attendance were examined. This study found that antenatal care is impacted by age, number of children, household size and income, and access to information. However, she is less likely to attend antenatal care if she is involved in certain social groups. A mother is more likely to attend postnatal care if she is older, has fewer children, delivered her baby at a public health center, and received information from the village head. Social capital and unequal access to sources of information impact women's attendance.

Keywords: antenatal and postnatal care, access to pregnancy information sources, social capital, rural Cambodia

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INTRODUCTION

Mortality rates among mothers, children younger than five years old, and neonates are high in Cambodia (United Nations, 2015a, 2016a, b). As of 2015, the mortality rate of pregnant women in the country was 161 per 100,000 live births; that of children younger than five years old was 28.7 per 1,000 live births; and that of neonates was 14.8 per 1,000 live births (WHO, 2017). Among the ASEAN 10 countries, Cambodia belongs to the group with the highest maternal/infant/neonatal mortality rates, along with Laos and Myanmar. Following the adoption of the Sustainable Development Goals (SDGs) by the United Nations (United Nations, 2015b, 2018), in 2016, the Cambodian government created the Fast Track Initiative Road Map for Reducing Maternal and Newborn Mortality (FTIRM) 2016–2020 (Ministry of Health, 2016a) and set a goal by 2020 in the initiative to reduce the maternal and neonate mortality rates to 130 per 1,000 live births or less and 14 per 1,000 live births or less, respectively.

The FTIRM 2016–2020 has set the following indices, such as for antenatal and postnatal care, in order to achieve the UN's SDGs: increase the rate of four or more occasions of attendance at antenatal care from 75.6% in 2014 to 90% in 2020; increase the rate of attendance at a postnatal care within two days following delivery from 90.3% in 2014 to 95% in 2020; and increase the rate of deliveries at healthcare facilities where services with skilled

birth attendance are available from 83.2% in 2014 to 90% in 2020 (Ministry of Health, 2015, 2016b; World Faiths Development Dialogue, 2014).

Antenatal and postnatal care and delivery with skilled birth attendance are key to reducing maternal and neonate mortality rates. The following financial interventions have been implemented by the government as maternity care support (Liljestrand & Sambath, 2012). First, the government, through the Health Equity Funds, provides no-cost health care for poor people. Various systems of no-cost health care for families pre-identified as poor are covering large parts of the country. The government and several major donors, in cooperation, reimburse the facilities for the services provided free to poor women and patients. Transport and food for caretakers who stay with the person who is hospitalized are also part of the Health Equity Funds. Second, a few partner organizations provide vouchers for pregnant women, and these guarantee free maternity care for any woman attending a government health center, while also giving financial remuneration to the facility if the facility provides a package of services (four antenatal visits, facility delivery and one postnatal visit). Third, the government in 2007 launched an incentive scheme, the “live-birth incentive”, for health centers and hospitals; 15 USD is given to the health center and 10 USD to the hospital for every live birth. These combined income streams make staff very motivated to provide good birthing care.

This study focuses on policy-related issues to promote women’s attendance at antenatal and postnatal care in rural Cambodia and empirically analyzes determinant factors for this attendance. In particular, the following hypotheses will be examined. First, the probability of attending antenatal and postnatal care in rural Cambodia vary depending on the attributes of the mother. The maternal age at the time of delivery positively and the number of previous deliveries negatively will affect the probability of attending antenatal and postnatal care. Second, unequal access to sources of information on pregnancy and delivery will affect negatively the probability of women’s attendance at antenatal and postnatal care. Third, mothers’ access to cognitive social capital positively and structural social capital negatively will affect the probability of their attendance at antenatal and postnatal care.

The novelty of this study is that it provides a valuable insight into the impact of access to maternal information and social capital on the attendance at antenatal and postnatal care. Few studies have investigated the impact of access to maternal information and social capital on maternity care attendance. In particular, this study demonstrates that access to information from neighbors and nurses positively influences antenatal care attendance, and access to information from the village head increases postnatal care attendance. However, structural social capital, such as social involvement in a school parent association and a funeral support group, negatively influences antenatal care attendance. Regarding the policy implications, this study reveals that the access to information sources and the involvement in social capital are important factors affecting the attending antenatal and postnatal care, and that the impediments arising from the unequal access and the inappropriate involvement may not simply be reduced to costs in terms of money and time.

The remainder of the study is organized as follows. First, a survey of relevant literature is provided, followed by a discussion of the data and method. Then, the estimated results are presented and discussed. Finally, the findings and policy implications are presented.

LITERATURE REVIEW

Several studies have examined determinants of antenatal and postnatal care in developing countries. The Andersen Behavioral Model (Andersen, 1995) for maternal health service utilization provides a general framework that permits systematic identification of determinants that influence individual decisions to use (or not use) available health care services (Tesfaye et al., 2018). Literature surveys in this area based on Andersen’s study include those by Say and Raine (2007), Simkhada et al. (2008), and Gabrysch and Campbell (2009). These studies cover survey results conducted in countries such as Brazil, Ecuador, Ethiopia, Ghana, Guatemala, India, Jamaica, Jordan,

Kenya, Nepal, Nigeria, Pakistan, Philippines, South Africa, Thailand, Turkey, and so on. Based on the previous studies, this study examines determinants that have an impact on women's attendance at antenatal and postnatal care. In particular, it focuses on the following aspects: (1) maternal factors, (2) socioeconomic factors, (3) available healthcare resources, and (4) access to information and social capital.

First, maternal factors include maternal ages at pregnancy and delivery and the number of previous deliveries. A woman who becomes pregnant at an older age is likely to attend antenatal and postnatal care (Gabrysch & Campbell, 2009). Pregnant women aged 20 years or older, particularly those aged 35 years or older, tend to have high anxiety as they deepen their knowledge of pregnancy, and thus are highly likely to attend maternity care (Denny et al., 2022; Prusty et al., 2015; Sagna & Sunil, 2012; Simkhada et al., 2008). Those who have given birth to few babies are also likely to attend antenatal and postnatal care (Sagna & Sunil, 2012; Simkhada et al., 2008). As the number of deliveries increases, a woman tends to make decisions at her discretion and is then less likely to attend maternity care (Gabrysch & Campbell, 2009; Zhou et al., 2020).

Second, relevant socioeconomic factors include the education history of a pregnant woman, household income, occupation, and the number of household members. A woman with a longer education history is more likely to attend antenatal and postnatal care (Denny et al., 2022; Gabrysch & Campbell, 2009; Prusty et al., 2015; Sagna & Sunil, 2012; Simkhada et al., 2008; Zhou et al., 2020) and a woman married to a man with a longer education history is also more likely to attend antenatal and postnatal care (Adjiwanou et al., 2018; Gabrysch & Campbell, 2009; Kikuchi et al., 2018; Prusty et al., 2015; Sagna & Sunil, 2012; Simkhada et al., 2008). The husband's occupation has an impact on the use of services by a skilled public health nurse, even if the wife gives birth at home (Yanagisawa et al., 2006). A woman in a household with higher income is more likely to attend antenatal and postnatal care (Denny et al., 2022; Prusty et al., 2015; Sagna & Sunil, 2012; Say & Raine, 2007; Simkhada et al., 2008). A woman in a household with a large number of members may be likely to attend maternity care (Simkhada et al., 2008), while, on the other hand, a woman in such a household with an infant is less likely to attend maternity care (Gabrysch & Campbell, 2009; Prusty et al., 2015; Sagna & Sunil, 2012).

Third, available healthcare resources refer to the quantity and quality of healthcare facilities, care fees and available payment methods, government financial support for pregnancy and delivery, and distance to a healthcare facility (Ministry of Health, 2016b). It is likely that a woman who lives in close proximity to a healthcare facility in which midwives, doctors, nurses, and other healthcare professionals regularly work will attend antenatal and postnatal care (Simkhada et al., 2008). If out-of-pocket fees for antenatal and postnatal care are high and she has limited access to government support and health insurance, a woman may be unlikely to attend (Simkhada et al., 2008; Matsuoka et al., 2010). A woman is also unlikely to attend care if she lives far away from a healthcare facility or has limited access to public transport (Kikuchi et al., 2018; Matsuoka et al., 2010; Prusty et al., 2015; Sagna & Sunil, 2012; Yasuoka et al., 2018).

Fourth, social relationships that have an impact on women's attendance at antenatal and postnatal care include access to information and social capital. No previous studies have reported the impact of inequality in access to the sources of pregnancy information on women's attendance at antenatal and postnatal care. While clear results have not been published as to whether or not the information that a pregnant woman has access to and her awareness of health have an impact on her attendance at care (Gabrysch & Campbell, 2009), it has been found that a woman tends to attend if she has higher literacy skills and a deeper knowledge of antenatal and postnatal care (Kikuchi et al., 2018).

Few studies have clearly discussed the relationship between social capital and women's attendance at antenatal and postnatal care. Social capital refers to trust, norms of reciprocity and social networks that can increase the stability and efficiency within society by promoting cooperative behavior between its peoples (Colman, 1988; Putnam, 2000; Putnam et al., 1993). This social capital can be distinguished between cognitive social capital and structural social capital (Harpham et al., 2002; Kawachi et al., 2008; Yip et al., 2007). Cognitive social capital refers to subjective

relationships (emotions) such as trust and norms of reciprocity. Trust can be distinguished between specific trust and general trust. Specific trust refers to trust toward members of an organization that one belongs to. Reciprocity is the act of supporting someone with a hope of some kind of return. In contrast, structural social capital refers to observable social networks and participation (actions) in a social organization. Structural social capital can be categorized into 1) bonding (relationships within an exclusive organization, such as family and relatives, that share a common interest), and 2) bridging (relationship opened to different people between the organizations) (Kawachi et al., 2008; Putnam, 2000).

The structural social capital may have a negative impact on maternity care attendance; traditional, local conventions, as well as opinions from the head of a village, are maintained through social capital (De Silva & Harpham, 2007; Harpham et al., 2006; McTavish & Moore, 2015), which may pose a barrier for women to attend antenatal and postnatal care (Matsuoka et al., 2010), and is thus one negative impact of social capital (Portes, 1998; Story, 2014). To date, no research has examined the impact of social capital on women's attendance at antenatal and postnatal care in Cambodia (Grahn, 2006; Sen, 2012).

METHODS

Ethical Approval

Ethical approval for this study was granted by the ethical committee of Kobe University. The survey was appropriately designed according to the ethical principles (the Declaration of Helsinki).

Survey Outline and Data

A survey was conducted between September 3, 2018, and September 10, 2018, in seven villages in Chi Kraeng District, in the Siem Reap Province in northwestern Cambodia. These villages are in typical rainfed, rice-growing areas of Cambodia and are poor: approximately, 70 percent of the total households in the villages live under the government-defined poverty line for rural areas (3,503 riels/person/day; 4,000 riels $\approx$ 1 USD). The researcher conducted face-to-face interviews with 283 women who have given birth. The respondents were randomly selected from the lists of village households. Oral informed consent was obtained from all respondents prior to data collection. Respondent was voluntary, and confidentiality was maintained. Two main questions were posed to respondents: first, whether the respondent attended antenatal care four or more times at the latest birth; and second, whether the respondent attended a postnatal care within two days of delivery at the latest birth.

Table 1. Antenatal and Postnatal Care by Villages

Village	Antenatal	Postnatal	Observation
OL	35 (87.5)	27 (67.5)	40
CH	66 (91.7)	60 (83.3)	72
DS	19 (73.1)	19 (73.1)	26
KS	64 (82.1)	48 (61.5)	78
TV	12 (85.7)	9 (64.3)	14
RO	26 (83.9)	22 (71.0)	31
CL	19 (86.4)	7 (31.8)	22
Total	241 (85.2)	192 (67.8)	283

The number of respondents who underwent antenatal care four or more times and postnatal care within two days of delivery. The value in parentheses is percentage.

Table 2. Attributes of respondents

Variables	SD	Min	Max
Obs.	283		
Age (years, mean)	31.4	7.59	18 56
Number of Household Members (mean)	5.2	1.76	2 14
(Over 60 years of age, mean)	0.2	0.51	0 2
(Under 15 years of age, mean)	2.1	1.05	0 10
(Under 5 years of age, mean)	1.0	0.73	0 3
Household income (USD/month, mean)	57.7	19.0	15 75
Income of working away from home (USD/month, mean)	18.0	12.7	15 75
Education (primary school not graduated, no.)	205		
Occupation (agriculture, no.)	267		
(forestry, no.)	24		
(others, no.)	121		
Maternal age at delivery (years, mean)	27.6	6.1	15 46
Number of deliveries (mean)	2.37	1.4	0 10
Location of delivery (public health center, no.)	147		
(hospital, no.)	99		
(home and others, no.)	35		
Antenatal care fee (USD, mean)	0.51	0.3	0.1 0.8
Delivery fee (USD, mean)	4.76	17.2	0 200
Fare per travel to healthcare facility (USD, mean)	5.92	8.3	0 60
Number of maternal and delivery information sources (mean)	2.1	0.9	0 5
(family, no.)	45		
(neighbors, no.)	181		
(nurses, no.)	211		
(village head, no.)	128		
(mobile phone and others, no.)	40		
Trust (family)	4.55	0.8	1 5
(neighbors)	3.68	0.5	2 5
(monks)	4.77	0.5	2 5
(nurses)	4.59	0.6	2 5
Merit-making (no.)	41		
Number of social involvements (mean)	1.6	1.0	0 5
(temple/pagoda, no.)	14		
(school parent association, no.)	110		
(funeral support group, no.)	156		
(others, no.)	115		

The scores in trust are the mean from the 5-point Likert scale. The number of maternal and delivery information sources is the mean number of sources such as family, neighbor, nurse, village head, mobile phone and others.

Table 1 shows women's attendance at antenatal and postnatal care by village. According to the skilled birth attendance policy, antenatal and postnatal care services were mainly received at healthcare centers and hospitals. Two hundred and forty-one women (85.2%) answered that they underwent antenatal care four or more times. One hundred and ninety-two women (67.8%) reported that they underwent a postnatal care within two days of delivery. The rates of attendance at postnatal care were lower than those for antenatal care, both overall and by village. The rate of attendance at antenatal care was below the target for 2020 (90%) set by the Cambodian government, and the rate of attendance at postnatal care was significantly lower than the government's target for 2020 (95%).

Table 2 shows the attributes of survey respondents. The total number of respondents was 283, whose mean age was 31.4 years. The mean number of household members was 5.2. Of these, the mean number of household members aged 60 years or older was 0.2, that of household members aged younger than 15 years was 2.1, and that of household members aged younger than five years was 1.0. The mean household income for all villages was 57.7 USD/month, including income sent from household members working away from home (18.0 USD/month). Respondents were asked to select one of the following three options to indicate their household income: 15 USD if household income is less than 30 USD; 45 USD if household income is 30 USD or higher and less than 60 USD; and 75 USD if household income is 60 USD or higher. In terms of educational level, 205 respondents (72.4%) had left primary school before graduation. For their occupation (multiple answers possible), 267 respondents (94.3%) indicated that they worked in the agriculture sector.

The respondents' mean age when they gave birth to their last child was 27.6 years, and their mean number of deliveries as of the last delivery was 2.37 inclusive. Locations of delivery included public health centers (147 respondents, 52.3%), hospitals (99 respondents, 35.2%), and home and others (35 respondents, 12.4%). The antenatal care mean fee is 0.51 USD/appointment; and the delivery mean fee is 4.76 USD. Mothers traveling to a healthcare facility such as a public health center for care and delivery need to pay a mean fare of 5.92 USD per travel. Those living in a rural area pay a greater amount for traveling than for care and delivery. The respondents indicated by selecting multiple options that they received information from at least two sources, such as family, neighbors, nurses, and the village head; many of the respondents indicated that they received information from a neighbor (181 respondents, 63.9%), a nurse (211 respondents, 74.5%), and the village head (128 respondents, 45.2%). The pregnant women and mothers also received information from the administrative organization of the villages (*Saradomna*), which is led by the village head.

Regarding to cognitive social capital, respondents were asked to select one of the following five options to indicate their degree of trust in family, neighbors, monks, and nurses, respectively: 5 if the respondent deeply trusts them; 4 if the respondent relatively trusts them; 3 if the respondent neither trusts or distrusts them; 2 if the respondent relatively distrusts them; and 1 if the respondent completely distrusts them. Their answers were quantified, and the scores given below are the mean from the 5-point Likert scale. The respondents indicated scores of 4.55 for their trust in family, 3.68 for neighbors, 4.77 for monks, and 4.59 for nurses. Among the respondents, 14.4% (41 respondents) have practiced merit-making. Merit-making in Buddhism (monetary granting) is an action in which one accumulates virtues, rather than being purely altruistic in nature. In addition, merit-making is different from norms of reciprocity (monetary lending) in which families and relatives help each other against the risk of income decline.

In terms of structural social capital, some respondents are involved in a funeral support group (156 respondents, 55.1%) and a school parent association (110 respondents, 38.3%). A school parent association (school support committee) is a type of organization set up as part of the government's education reform agenda. This association comprises local residents who provide assistance to children in completing schoolwork and support school management (Pellini 2005). Few respondents (14 respondents, 4.9%) indicated that they visited temples and attended pagodas, Buddhist religious events that are gathering of sutra recitation once a week on a regular basis, mainly attended by older members of their family.

Models

A function for women's attendance at antenatal and postnatal care is determined by the following factors: first, the attributes of the woman, her access to the sources of maternal information and social capital; and second, the attributes of the village which are dummy variables of village heads. Based on these factors, the following function was obtained:

$$Checkups_i = f(X_i, V_i) \quad (1)$$

$Checkups_i$ indicates the probability that woman i will attend antenatal or postnatal care; X_i is a vector indicating the attributes of the woman, the sources of maternal information, and social capital; and V_i is a vector indicating the attributes of the village. The following equation (2) represents the model for empirical analysis.

$$Checkups_i = \beta_0 + \beta_1 X_i + \beta_2 V_i + u_i \quad (2)$$

Parameters from β_0 to β_2 are unknown parameters; u_i is an error term. The subsequent section conducts a logistic regression analysis to estimate the probability that a woman will attend antenatal and postnatal care.

RESULTS

Attendance at Antenatal Care

Table 3 shows the estimated results for the respondent's attendance at antenatal care. Reference variables are as followed: mobile phone and others in information sources, neighbors in trust, and others in social capital, TV in village attributes. The village attributes are controlled, but the village fixed effects other than DS and CH are not

Table 3. Estimated Results of Antenatal Care

	Coefficient	Standard error
Maternal age at delivery	0.0732*	0.0377
Number of deliveries	-0.6772***	0.1901
Number of household members	0.3296*	0.1768
Household income	0.0332**	0.0129
Information source 1 (family)	1.0237	0.7389
Information source 2 (neighbors)	1.0035*	0.5981
Information source 3 (nurses)	1.1376*	0.6061
Merit-making	1.6500**	0.8253
Trust 1 (family)	0.0562	0.3008
Trust 2 (monk)	0.3171	0.5017
Social involvement 1 (temple/pagoda)	0.4166	1.2945
Social involvement 2 (school parent association)	-0.7225*	0.4339
Social involvement 3 (funeral support group)	-1.9697***	0.6962
DS	0.1746	1.1079
CH	1.6561	1.0339
Obs.	278	
McFadden R-square	0.2206	
Log likelihood	-90.632	

Significant level based on p value represents *** 1%, ** 5%, * 10%. Reference variables are as followed: mobile phone and others in information sources, neighbors in trust, and others in social capital, TV in village attributes. The village attributes are controlled, but the village fixed effects other than DS and CH are not shown in the table.

shown in the table.

Considering the estimated results of the respondent's attendance at antenatal care, the coefficients of the following variables were found to be positive and significant: maternal age at delivery, number of household member, household income, information source 2 (neighbors), information source 3 (nurses), and merit-making. These findings imply that a woman's advanced age at the time of delivery, large-sized household, and household high income positively influence her likelihood of attending antenatal care. Compared with those who have not access, women who have access to pregnancy and delivery information from neighbors and nurses are more likely to attend antenatal care. Women who do merit-making are more likely to attend antenatal care compared with those who do not.

Based on the estimated results, the coefficients of the following variables were negative and significant: the number of deliveries, social involvement 2 (school parent association), and social involvement 3 (funeral support group). The magnitude of the coefficients shows that a funeral support group is more effective than a school parent association. Women with higher parity are less likely to attend antenatal care compared with those with lower parity. Compared with those who are not involved, women who are involved in a school parent association or a funeral support group are less likely to attend antenatal care. A pregnant woman who is involved in such an association or a group can obtain information on pregnancy and delivery from other women who have given birth, which may reduce the likelihood that the woman will attend antenatal care. This indicates the significance of the structural social capital embodied in the form of community group activities. In contrast to access to pregnancy and delivery information obtained from neighbors and nurses, maternal information obtained by pregnant women from structural social capital negatively impacts women's attendance at antenatal care. However, the cognitive social capital has no impact on mothers' attendance at antenatal care.

The estimated results for the number of deliveries, the number of household members, household income, which are maternal and socioeconomic factors investigated in the previous studies, remain significant even after the inclusion of other independent factors. The same results were obtained in terms of information source 2 (neighbors), information source 3 (nurses), social involvement 2 (school parent association), and social involvement 3 (funeral support group), which are focused factors in this study.

Attendance at Postnatal Care

Table 4 represents the estimated results of attendance at postnatal care. Reference variables are as followed: mobile phone and others in information sources, neighbors in trust, and others in social capital, TV in village attributes. The village attributes are controlled, but the village fixed effects other than DS and CH are not shown in the table.

The determinants of postnatal care attendance differ from those of antenatal care attendance. In this regard, the coefficients of the following variables were positive and significant: maternal age at delivery, attending antenatal care, location of delivery (public health center), information source 4 (village head), villages DS and CH. This implies that women's advanced age at the time of delivery increases their likelihood of attending postnatal care. It also highlights the role of antenatal care. Women who attend antenatal care are more likely to attend postnatal care compared with those who do not attend antenatal care. This is based on the fact that women receive information on postnatal care and health during their antenatal care appointments and subsequent delivery at a public health center. Women's proximity to a public health center rather than a hospital also increases their likelihood of attending postnatal care. Compared with those who have not access, women who have access to postnatal information from the village head are more likely to attend postnatal care. This is based on the following fact that new mothers receive information on postnatal care from nurses accompanying the village head, when the latter visits the new mothers. Concerning the village attributes, the rates of postnatal care attendance in villages DS and CH were higher than those in the village TV (the reference village). However, the coefficient for the number of deliveries was negative. This implies that the likelihood of a woman's attending postnatal care decreases with increased number of deliveries.

Table 4. Estimated results of postnatal care

	Coefficient	Standard error
Maternal age at delivery	0.0762**	0.0341
Number of deliveries	-0.4329***	0.1628
Attending antenatal care	1.1214**	0.4482
Location of delivery (public health center)	1.4938***	0.3501
Number of household members	0.1040	0.1129
Household income	0.0152	0.0096
Information source 1 (family)	0.1226	0.5015
Information source 2 (neighbors)	0.5639	0.4574
Information source 3 (nurses)	0.5838	0.4737
Information source 4 (village head)	0.9749**	0.4162
Merit-making	0.5496	0.5323
Trust 1 (family)	0.3145	0.2483
Trust 2 (monk)	-0.4324	0.4031
Social involvement 1 (temple/pagoda)	-0.3677	0.9183
Social involvement 2 (school parent association)	-0.3304	0.3621
Social involvement 3 (funeral support group)	-0.5963	0.5114
DS	2.0780**	0.9950
CH	1.9471**	0.8508
Obs.	278	
McFadden R-square	0.2597	
Log likelihood	-128.45	

Significant level based on p value represents *** 1%, ** 5%, * 10%.
Reference variables are as followed: mobile phone and others in
information sources, neighbors in trust, and others in social capital,
TV in village attributes. The village attributes are controlled, but the
village fixed effects other than DS and CH are not shown in the table.

Even after the inclusion of independent factors such as access to maternal information sources and social capital, the results remained significant for maternal age at delivery, number of deliveries, attending antenatal care, and delivery location (public health center). Unlike in the case of antenatal care attendance, access to maternal information from neighbors and nurses did not have a significant impact on postnatal care attendance. However, access to information from the village head was a significant determinant variable. The results were not significant for women's cognitive social capital, which is embodied in merit-making and trust in family and neighbors, and their involvement in the structural social capital, which is embodied in a school parent association and a funeral support group. These social involvements were significant determinant variables for antenatal care attendance.

DISCUSSION

Comparison with Previous Research

This study identified the determinants of antenatal and postnatal care attendance. These factors were compared with those found in previous studies. First, the results of maternal attributes discussed in this study generally correspond to those in the previous studies. The findings reveal that women's advanced age at the time of delivery increases their likelihood of attending both antenatal and postnatal care. This result corresponds to findings by Simkhada et al.

(2008), Gabrysch and Campbell (2009), Sagna and Sunil (2012), and Prusty et al. (2015). However, it differs from the overall trend in Cambodia, where women's advanced age at the time of delivery decreases their likelihood of attending antenatal care (Ministry of Health, 2015). This study also reveals that the likelihood of a woman's attendance at antenatal care decreases with increased number of deliveries. This finding also corresponds to findings by Simkhada et al. (2008), Gabrysch and Campbell (2009), Sagna and Sunil (2012), Soeung et al. (2020), and Zhou et al. (2020).

Second, concerning socioeconomic attributes, it was found that women with a high household income are more likely to attend antenatal care. This finding corresponds to those by Simkhada et al. (2008), Say and Raine (2007), Sagna and Sunil (2012), and Prusty et al. (2015). This study also indicates that the large household size of women makes them more likely to attend antenatal care, in line with Simkhada et al. (2008). However, as has been pointed out in previous studies (Gabrysch & Campbell, 2009; Prusty et al., 2015; Sagna & Sunil, 2012), women with infants are less likely to attend maternity care.

This study did not find the educational history of a pregnant woman to be a significant variable, which differs from the studies by Simkhada et al. (2008), Gabrysch and Campbell (2009), Sagna and Sunil (2012), Prusty et al. (2015), and Zhou et al. (2020). This can be attributed to the fact that many respondents had not completed primary schooling. Unlike the finding by Yanagisawa et al. (2006), occupation was not found to be a significant variable. This can be attributed to the fact that most respondents were engaged in agriculture. The antenatal care fees were also not found to be significant, given that the poor received free treatment under the government's financial support policy.

Difference in Determinants between Antenatal and Postnatal Care

There are several differences between the significant factors influencing antenatal and postnatal care attendance. First, concerning the socioeconomic attributes, while the number of household members and household income are significant variables for antenatal care attendance, they are not significant for postnatal care attendance. Antenatal care attendance and delivery at a public health center are significant variables for postnatal care (Gabrysch & Campbell, 2009; Prusty et al., 2015; Sagna & Sunil, 2012; Simkhada et al., 2008). In this regard, it must be noted that when women attend antenatal care and give birth at a public health center, they receive instructions from health professionals (e.g., midwives), which deepens their understanding of the importance of postnatal care.

Second, neighbors and nurses as the sources of maternal information are significant determinant variables for antenatal care attendance, whereas the village head as the information source is a significant determinant variable for postnatal care attendance. The role of the village head is considered key to promoting postnatal care attendance. In particular, during the visit to new mothers, the village head introduces new mothers to nurses who provide information on postnatal care. Instead of providing information directly, the village heads play a mediating role in information provision. The village dummy variable acts as a significant determinant variable for postnatal care attendance in villages DS and CH. This relationship between the role of the village head and the village dummy variable may be influenced by the active involvement of the heads of DS and CH villages in introducing nurses to mothers. However, this influence of village heads was not observed for antenatal care attendance.

Third, the impact of social capital on antenatal care attendance differs from that of postnatal care attendance. The significant variables for antenatal care are merit-making (the cognitive social capital), and involvement in a school parent association and a funeral support group (the structural social capital). However, these types of social capital do not act as significant determinant variables for postnatal care attendance. Given this, it is important for mothers to obtain information on postnatal health from a public health center during their antenatal care.

Novel Findings

To date, few studies have investigated the impact of access to maternal information and social capital on maternity care attendance. In terms of information access, this study demonstrated that access to information from neighbors

and nurses significantly influences antenatal care attendance, and information provision facilitated by the village head significantly increases postnatal care attendance. In terms of social capital, the study showed the significant influence of structural social capital, which is embodied in the form of community groups such as a school parent association and a funeral support group, in determining antenatal care attendance. In this regard, while access to information from neighbors and nurses positively influences antenatal care attendance, women's access to information resulting from their involvement in structural social capital negatively influences their antenatal care attendance. The latter finding can be attributed to rural women's adherence to shared convention within the structural social capital (Matsuoka et al., 2010; Story, 2014).

Regarding the policy implications, the access to information sources and the involvement in social capital are important factors affecting the attending antenatal and postnatal care, and the impediments arising from inequal access and inappropriate involvement may not simply be reduced to costs in terms of money and time. In order to promote antenatal and postnatal care, it is necessary to pay attention to how pregnant mothers obtain information on pregnant care. Regarding antenatal care, it is necessary to emphasize the information sources such as neighbors and nurses, and to provide correct information to community groups such as a school parent association and a funeral support group. As for postnatal care, giving birth at medical institutions with skilled birth attendance and the role of village heads with nurses are important. The importance of such as access to pregnancy information and social capital has not been reported at all in previous studies.

CONCLUSIONS

This study empirically analyzed the attendance at antenatal and postnatal care in rural Cambodia, based on survey data. The main conclusions are as follows. First, concerning the maternal and socioeconomic factors, the antenatal care attendance is influenced by a woman's age, number of deliveries, household size and income, access to pregnancy information from neighbors and nurses, and merit-making. The antenatal care attendance is also influenced by women's involvement in structural social capital such as a school parent association and a funeral support group. Women involved in such social capital are less likely to attend antenatal care. In relation to factors influencing postnatal care, women are more likely to attend postnatal care if they were at an advanced age at the time of delivery, have fewer deliveries, attended antenatal care, delivered at a public health center, and received information from the village head. However, social capital and access to pregnancy information from neighbors and nurses do not influence postnatal care attendance.

Second, access to the sources of maternal information and social capital influence maternal care attendance. Pregnant women are more likely to attend antenatal care if they receive information from neighbors and nurses. The village head plays an important role in facilitating women's attendance at postnatal care. The structural social capital such as a school parent association and a funeral group negatively influences women's attendance at antenatal care.

This study contains valuable information and policy implications for healthcare authorities, development assistance agencies, and non-governmental organizations providing maternal healthcare services in low-income developing countries characterized by high maternal, child, and neonatal mortality rates. This study provides policy implications for improving the low rates of attendance at antenatal and postnatal care. It also calls for policies that encourage women to deliver at public health centers and, in turn, influence them to attend postnatal care.

However, this study has several limitations. First, villages were selected in collaboration with the Japan International Volunteer Center (NGO) operating in these villages. Thus, there is a possibility of selection bias. Second, given that the respondents were asked to recall their last delivery date extending as far back as a few years, the study suffered from recall bias. Despite these limitations, this study reports valuable results on the impact of access to maternal information and social capital on the attendance at antenatal and postnatal care.

REFERENCES

- Adjiwanou, V., Bougma M., & LeGrand, T. (2018). The effect of partners' education on women's reproductive and maternal health in developing countries. *Social Science & Medicine*, 197, 104-115. <https://doi.org/10.1016/j.socscimed.2017.11.054>
- Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior*, 36(1), 1-10. <https://doi.org/10.2307/2137284>
- Colman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, S95-S120.
- De Silva, M. J., & Harpham, T. (2007). Maternal social capital and child nutritional status in four developing countries. *Health & Place*, 13(2), 341-355. <https://doi.org/10.1016/j.healthplace.2006.02.005>
- Denny, H. M., Laksono, A. D., Matahari, R., & Kurniawan, B. (2022). The determinants of four or more antenatal care visits among working women in Indonesia. *Asia Pacific Journal of Public Health*, 34(1), 51-56. <https://doi.org/10.1177/10105395211051237>
- Gabrysch, S., & Campbell, O. M. (2009). Still too far to walk: Literature review of the determinants of delivery service use. *BMC Pregnancy and Childbirth*, 9, 1-18. <http://www.biomedcentral.com/1471-2393/9/34>
- Grahn, H. (2006). *In search of trust: A study on the origin of social capital in Cambodia from an institutional perspective*. Lund University, Department of Political Science. <https://lup.lub.lu.se/luur/download?func=downloadFile&recordId=1323897&fileId=1323898>
- Harpham, T., De Silva, M. J., & Tuan, T. (2006). Maternal social capital and child health in Vietnam. *Journal of Epidemiology & Community Health*, 60(10), 865-871. <https://doi.org/10.1136/jech.2005.044883>
- Harpham, T., Emma, G., & Elizabeth, T. (2002). Measuring social capital within health surveys: Key issues. *Health Policy and Planning*, 17(1), 106-111. <https://doi.org/10.1093/heapol/17.1.106>
- Kawachi, I., Subramanian, S. V., & Kim, D. (Ed.). (2008). *Social Capital and Health*. New York, NY: Springer.
- Kikuchi, K., Yasuoka, J., Nanishi K., Ahmed, A., Nohara, Y., Nishikitani, M., ... & Nakashima, N. (2018). Postnatal care could be the key to improving the continuum of care in maternal and child health in Ratanakiri, Cambodia. *PloS One*, 13(6), e0198829. <https://doi.org/10.1371/journal.pone.0198829>
- Liljestrand, J., & Sambath, M. R. (2012). Socio-economic improvements and health system strengthening of maternity care are contributing to maternal mortality reduction in Cambodia. *Reproductive Health Matters*, 20(39), 62-72. [https://doi.org/10.1016/S0968-8080\(12\)39620-1](https://doi.org/10.1016/S0968-8080(12)39620-1)
- Matsuoka, S., Aiga, H., Rasmey, L. C., Rathavy, T., & Okitsu A. (2010). Perceived barriers to utilization of maternal health services in rural Cambodia. *Health Policy*, 95(2-3), 255-263. <https://doi.org/10.1016/j.healthpol.2009.12.011>
- McTavish, S., & Moore, S. (2015). On est ensemble: Social capital and maternal health care use in rural Cameroon. *Globalization and Health*, 11(1), 1-8. <https://doi.org/10.1186/s12992-015-0121-0>
- Ministry of Health. (2015). *Cambodia demographic and health survey 2014*. Retrieved from <https://dhsprogram.com/pubs/pdf/fr312/fr312.pdf>
- Ministry of Health. (2016a). *Fast track initiative road map for reducing maternal and newborn mortality 2016-2020*. Phnom Penh: Author. Retrieved from https://cambodia.unfpa.org/sites/default/files/pub-pdf/FTIRM_2016_2020_english.pdf
- Ministry of Health. (2016b). *Health strategic plan 2016-2020 (HSP3)*. Phnom Penh: Author. Retrieved from [http://hismohcambodia.org/public/fileupload/carousel/HSP3-\(2016-2020\).pdf](http://hismohcambodia.org/public/fileupload/carousel/HSP3-(2016-2020).pdf)
- Pellini, A. (2005). Decentralisation of education in Cambodia: Searching for spaces of participation between traditions and modernity. *Compare: A Journal of Comparative and International Education*, 35(2), 205-216. <https://doi.org/10.1080/03057920500129866>
- Portes, A. (1998). Social capital: Its origins and applications in modern sociology. *Annual Review of Sociology*, 24(1), 1-24. <https://doi.org/10.1146/annurev.soc.24.1.1>
- Prusty, R. K., Buoy, S., Kumar, P., & Pradhan, M. R. (2015). Factors associated with utilization of antenatal care services in Cambodia. *Journal of Public Health*, 23, 297-310. <https://doi.org/10.1007/s10389-015-0680-9>
- Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. New York, NY: Simon & Schuster.
- Putnam, R. D., Leonardi, R., & Nanetti, R. Y. (1993). *Making democracy work: Civil traditions in modern Italy*. Princeton, NJ: Princeton University Press.
- Sagna, M. L., & Sunil, T. S. (2012). Effects of individual and neighborhood factors on maternal care in Cambodia. *Health & Place*, 18(2), 415-423.

- <https://doi.org/10.1016/j.healthplace.2011.12.006>
- Say, L., & Raine, R. (2007). A systematic review of inequalities in the use of maternal health care in developing countries: Examining the scale of the problem and the importance of context. *Bulletin of the World Health Organization*, 85(10), 812-819. <https://dx.doi.org/10.2471%2FBLT.06.035659>
- Sen, V. (2012). Social capital in an urban and a rural community in Cambodia. *Cambodia Development Review*, 16(2), 6-10.
- Simkhada, B., van Teijlingen, E. R., Porter, M., & Simkhada, P. (2008). Factors affecting the utilization of antenatal care in developing countries: Systematic review of the literature. *Journal of Advanced Nursing*, 61(3), 244-260. <https://doi.org/10.1111/j.1365-2648.2007.04532.x>
- Soeung, K., Loahasiriwong, W., & Sornlom, K. (2020). Socioeconomic disparities, pregnancy factors and inadequate antenatal care utilization in rural Cambodia. *Indian Journal of Public Health Research & Development*, 11(7), 1520-1525.
- Story, W. T. (2014). Social capital and the utilization of maternal and child health services in India: A multilevel analysis. *Health & Place*, 28, 73-84. <https://doi.org/10.1016/j.healthplace.2014.03.011>
- Tesfaye, G., Chojenta, C., Smith, R., & Loxton, D. (2018). Application of the Andersen-Newman model of health care utilization to understand antenatal care use in Kersa District, Eastern Ethiopia. *PloS One*, 13(12), e0208729. <https://doi.org/10.1371/journal.pone.0208729>
- United Nations. (2015a). *The sustainable development goals (SDGs)*. Retrieved from <https://kh.one.un.org/content/unct/cambodia/en/home/the-sdgs.html>
- United Nations. (2015b). *The millennium development goals report*. New York, NY: United Nations Statistics Division. Retrieved from <http://mdgs.un.org/unsd/mdg/Resources/Static/Products/Progress2015/English2015.pdf>
- United Nations. (2016a). *Rapid integrated assessment: Cambodia SDG profile card*. Phnom Penh: United Nations Cambodia. Retrieved from https://cambodia.un.org/sites/default/files/2019-11/RIA_Template2%20-%20Country%20SDG%20Profile_07Oct2016.pdf
- United Nations. (2016b). *Summary analysis of rapid integrated assessment: Cambodia SDG profile card*. Phnom Penh: United Nations Cambodia. Retrieved from https://cambodia.un.org/sites/default/files/2019-11/RIA_Cambodia_Analysis_07Oct2016.pdf
- United Nations. (2018). *Global indicator framework for the sustainable development goals and targets of the 2030 agenda for sustainable development*. New York, NY: United Nations Statistics Division Development Data and Outreach Branch. Retrieved from https://unstats.un.org/sdgs/indicators/Global%20Indicator%20Framework%20after%20refinement_Eng.pdf
- World Faiths Development Dialogue. (2014). *Reducing maternal mortality in Cambodia: Faith dimensions*. Washington, DC: Author. Retrieved from <https://berkeleycenter.georgetown.edu/publications/reducing-maternal-mortality-in-cambodia-faith-dimensions>
- World Health Organization (WHO). (2017). *World health statistics 2017: Monitoring health for the SDGs, sustainable development goals*. Geneva: Author. Retrieved from <https://apps.who.int/iris/bitstream/handle/10665/255336/9789241565486-eng.pdf?sequence=1&isAllowed=y>
- Yanagisawa, S., Oum, S., & Wakai, S. (2006). Determinants of skilled birth attendance in rural Cambodia. *Tropical Medicine & International Health*, 11(2), 238-251. <https://doi.org/10.1111/j.1365-3156.2005.01547.x>
- Yasuoka, J., Nanishi, K., Kikuchi, K., Suzuki, S., Ly, P., Thavrin, B., ... & Mizutani, T. (2018). Barriers for pregnant women living in rural, agricultural villages to accessing antenatal care in Cambodia: A community-based cross-sectional study combined with a geographic information system. *PloS One*, 13(3), e0194103. <https://doi.org/10.1371/journal.pone.0194103>
- Yip, W., Subramanian, S. V., Mitchell, A. D., Lee, D. T. S., Wang, J., & Kawachi, I. (2007). Does social capital enhance health and well-being? Evidence from Rural China. *Social Science & Medicine*, 64(1), 35-49. <https://doi.org/10.1016/j.socscimed.2006.08.027>
- Zhou, D., Zhou, Z., Yang, C., Ji, L., Ghose, B., & Tang, S. (2020). Sociodemographic characteristics associated with the utilization of maternal health services in Cambodia. *BMC Health Services Research*, 20(1), 1-12. <https://doi.org/10.1186/s12913-020-05652-1>