

**The Relationship between Women's Decision-Making inside
Household and Women's Health**

A Case Study of Cambodia

By

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requirements for the degree of**

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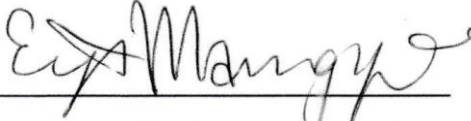
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ABSTRACT

The Relationship between Women's Decision-Making inside Household and Women's Health: A Case Study of Cambodia

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The aim of this paper is to examine the relationship between women's decision-making and women's nutritional status in Cambodia by using Cambodia Demographic Health Survey data in 2000. Since this paper focuses on women's power inside the household, this paper applies whether women have final say on eight household decisions making to measure women's power. Women body mass index (BMI), and chronic energy deficiency (CED) are used to measure women's health.

By using the multiple ordinary least squares and binary logistic regression model, this paper finds that the relationship between women's decisions inside the household, and women's health (BMI) in Cambodia are not correlated after controlling all socio-demographic characteristics. This paper also finds out that women's decisions and CED are not related. In this sense, women's power in the context of decision making inside the household are not the critical determinants of women's health in Cambodia. On the other hand, this paper provides the empirical evidence that women characteristics and household characteristics have strong relationships with women's decisions making power. Moreover, this paper highlights that the policy that can encourage women's education and health is important for Cambodia.

Key words: Body Mass Index; Chronic Energy Deficiency; Household's decision-making; Cambodia

TABLE OF CONTENTS

ACKNOWLEDGMENTS.....	iii
ABSTRACT	iv
TABLE OF CONTENTS	v
LIST OF TABLE	vi
LIST OF ACRONYMS.....	vii
CHAPTER I: INTRODUCTION	1
CHAPTER II: LITERATURE REVIEW	6
CHAPTER III: DATA AND ECONOMETRIC MODEL.....	11
3.1. Data description.....	11
3.2 Variable descriptions	11
3.2.1 Measures of BMI as women’s health and Chronic Energy Deficiency	13
3.2.2 Measures of household decision-making.....	13
3.2.3 Measures of household characteristics and women’s characteristics	14
3.3 Descriptive statistics	16
3.4 Relationship between BMI, CED and household decision-making	19
3.5 Empirical Specifications.....	22
CHAPTER IV: RESULTS AND DISCUSSION.....	25
5.1 Relationship between women’s final say on household decisions and socio-demographic characteristics	25
5.2 Relationship between BMI, CED and household decision-making power	29
CHAPTER V: CONCLUSIONS.....	34
REFERENCES.....	36
APPENDIX.....	38

LIST OF TABLE

Table 1- Variable Descriptions	12
Table 2- Definitions and descriptive statistics of variables used in the analysis	18
Table 3- BMI, CED and women’s decision making power	19
Table 4- Relationship between wife having final say over household decision-making and socio-demographic characteristics.....	26
Table 5-A Multiple regression model of log BMI and CED on wife’s decision-making power and socio-demographic characteristics (Wife has final say on large household purchases).....	30
Table 5-B Multiple regression model of log BMI and CED on wife’s decision-making power and socio-demographic characteristics (Wife has final say on purchasing household daily need).....	38
Table 5-C Multiple regression model of log BMI and CED on wife’s decision-making power and socio-demographic characteristics (Wife has final say on having another child).....	39
Table 5-D Multiple regression model of log BMI and CED on wife’s decision-making power and socio-demographic characteristics (Wife has final say on seeking her own health care)	40
Table 5-E Multiple regression model of log BMI and CED on wife’s decision-making power and socio-demographic characteristics (Wife has final on visit friends or relatives).....	41
Table 5-F Multiple regression model of log BMI and CED on wife’s decision-making power and socio-demographic characteristics (Wife has final say on what to do for sick child).....	42
Table 5-G Multiple regression model of log BMI and CED on wife’s decision-making power and socio-demographic characteristics (Wife has final say on deciding whether to work)	43
Table 5-H Multiple regression model of log BMI and CED on wife’s decision-making power and socio-demographic characteristics (Wife has final say on whether to use contraception).....	44
Table 5-I Multiple regression model of log BMI and CED on wife’s decision-making power and socio-demographic characteristics (Wife has final say on deciding any decision making)	45

LIST OF ACRONYMS

CDHS:	Cambodia Demographic and Health Survey
MoH:	Ministry of Health
MoWA:	Ministry of Women’s Affairs
NIS:	National Institute of Statistics
USAID:	The U.S. Agency for International Development
UNFPA:	United Nations Population Fund
UNICEF:	United Nations Children’s Fund

CHAPTER I: INTRODUCTION

Women in developing countries not only carry out housework for the family but also participate in labor force for the national economy. In addition to bearing and taking care of their children, and doing housework, women are working for earning incomes to support the needs for their households. Women in developing countries contribute 60 and 80 percent of world's food production.¹ Therefore, they are not only producers but also supporters of household food security.

As a developing country, agriculture is still the main sector for economic development in Cambodia. Women in Cambodia, in both rural and urban areas, play an important role for strengthening household status as well as national economy. The history of Cambodia has shown that Cambodian women produce 60-80 percent of all food. Because of the loss of men in the civil war, women play a key role in agricultural production, particular in peanut cultivation.²

CDHS (2000) revealed that approximately three quarters of women in Cambodia are working. Out of women labor force, 48% of women work occasionally and 24% of women work throughout the year. In terms of urban and rural areas, a higher proportion of women (47%) in urban areas work year-round while a smaller proportion of rural

¹ Retrieved from [FAO participation in rural women panel 15 October/New York](#)

File Format: PDF/Adobe Acrobat - [Quick View](#)
15 Oct 2008 ... the food in most **developing countries**.

² Retrieved from FAO (Food and Agricultural Organization) women and food security, www.fao.org/FOCUS/E/Women/Sustine.htm

women (19%) perform year round work. In rural areas, a higher proportion of women (54%) work seasonally in comparison to urban women (17%). In term of wages, well-educated women in non-agriculture sector earn more than ordinary women earn in agriculture sector.

Regarding household characteristics in Cambodia, households are predominantly headed by men especially in rural areas and men are more likely to make key decisions in the households (MoWA, 2004). Moreover, there is a physical violence between husband and wife. One fourth of married women whose ages are between 15 and 49 suffered from the physical violence since the age of 15. Regarding women's education, women with no education, illiterate women, and partially literate women account for 28%, 32%, and 24% respectively of the whole country (CDHS, 2000).

On the other hand, diseases—*anemia*, *malaria* and *iron deficiency* are factors that negatively affect the women's health. CDHS (2000) revealed that 58% of women suffered from some extent of *anemia*, while 44% bored mild *anemia*. Besides, 13% of women had moderate *anemia* and one percent of women suffered from severe *anemia*. Furthermore, *malnutrition* is one of the factors that contribute to the women's health problem. One out of five Cambodia women suffers from *malnutrition*. Especially, young women aged 15-19 years and rural women are more likely to suffer from *malnutrition* as compared to other women. Based on the above factors—*occupation*, *education*, and *health*, women in rural areas seem to suffer more than women in urban area.

Therefore, “paying special attention to women's and children's health, and controlling and preventing communicable diseases” is one of the objectives of the

Cambodian government. The goal of the Ministry of Health is “to achieve economic and social development and to contribute to the alleviation of poverty for Cambodia” (CDHS, 2000). Paying attention to such situations, many recent studies have focused on women’s role inside of households and they intensively investigate on the relationship between women’s role inside of households or the health of women and its effects on the welfare of their family as a mean of reducing malnutrition especially in developing countries.

Women empowerment or women’s role was defined “women right to have the power to control their own lives within and outside the home”.³ Smith et al. (2003) defined women’s status as women’s power relative to men’s. Low status of women is more likely to have less control over household resources, tighter income constraints, less access to information and health services, poor mental health and lower self-importance. Hindin (2000) revealed that women who have no say in household decisions are more likely to have a lower body mass index and a higher probability of chronic energy deficiency. Moreover, Hindin (2005) discovered that women who have less final say over household decisions are more likely to experience malnutrition or to have lower body mass index (BMI).

Accordingly, many previous studies have found that there is a close relationship between women’s decision making power and women’s health. Some studies reach the conclusion that women with higher education have greater decision

³ Retrieved from [Guidelines on Women's Empowerment](http://www.un.org/popin/unfpa/taskforce/guide/iatfwemp.gdl.html)
WOMEN'S EMPOWERMENT: A DEFINITION 4. www.un.org/popin/unfpa/taskforce/guide/iatfwemp.gdl.html - [Cached](#) - [Similar](#)

making power, which helps to improve their nutritional status, children's health and also their household food security (see, for example, Becker, Fonseca-Becker & Schenck-Yglesias, 2006; Olumakaiye, and Ajayi, 2006; Guha-khasnobis & Hazarika, 2006). Encouraging women's power through changing the community norm and value can have the positive effect on maternal health and child health as well (see, Mason et al., 2003 & Haddad, 1999). The couple's joint decision-makings and male participation lead to the improvement of women's pregnancy health (see, for example, Mullany, Hindin & Stan Becker, 2005). Moreover, some studies conclude that earning incomes are crucial since women earning income have more power to make the decisions, compared to women not earning incomes (see, Andersonm & Eswaran, 2009).

There are numerous previous studies, which examine the effects of women's household decision-makings on women's health. Many of them find that there is a close relationship between women's household decision-making and women's health. In this paper, Cambodia is used as a case study to analyze the relationship between women's power inside of the households and women's health. By applying the multiple OLS model and Logistic regression model, the results of this paper show that women's decision-making and women's health (BMI), and CED (Chronic Energy Deficiency) are statistically uncorrelated at the conventional level. This paper finds out that such decision-makings have a negative relationship with their BMI and have a positive relationship with CED; however, they are not statistically significant at conventional level. Therefore, this paper draws the conclusion that women's role in the context of

having final say on the household decision-makings is not a critical determinant of the nutritional status for women in Cambodia.

The rest of the paper proceeds as follows: Chapter 2 reviews previous studies related to the relationship between women's decision-making and women's health status. Chapter 3 describes data and explains the model specification. Chapter 4 analyzes the results. Finally, Chapter 5 draws conclusions.

CHAPTER II: LITERATURE REVIEW

Recently, numerous economic studies have examined the relationship between women's decision-making power and women's nutritional status for both developed and developing countries. Most of the studies find that there is a close relationship between women's decisions making and women's nutritional status. In addition, such well-known studies have intensively studied the roles of women in the context of inside-household decision-making. They concluded that those women who have final say on the decisions are likely to have higher nutritional status.

Hindin (2000) found that women who have no say in household decisions are more likely to have a lower body mass index and a higher probability of chronic energy deficiency. She examined this relationship based on data from the 1994 in Zimbabwe and she applied the Ordinary Least Squares Mutiple Regression Models.

Furthermore, by using cross sectional data, Hindin (2005) explored the relationship between women's final say into household decisions and their nutritional status in three countries—Zimbabwe, Zambia and Malawi which have experienced droughts, HIV/AIDS prevelance, and less favorable gender norms for women. She found that women in Malawi with less final say into decision-makings are more likely to have chronic energy deficiency (CED) than women in other countries. She also concluded that women who make all household decisions seem to have an incresed risk of CED particularly in Malawi because women in Malawi tend to survive in poor conditions as compared to other countries.

Similarly, some other studies examined women's power through the comparison of women who do and do not earn income. For example, using household level data from rural Bangladesh, Andersonm and Eswaran (2009) investigated the increase in women's power through the comparison of women who earn incomes and who do not earn incomes. They concluded that earning income could be an important factor in empowering women.

In addition, some studies take into account women status not only on their comparative power of men and women but also on the degree of equality between them. Accordingly, Smith et al. (2003) intensively studied the relationship between women's status and children's nutrition based on wives' decision-making power relative to their husbands in the household and the degree of equality between men and women in the community in three developing countries—South Asia, Sub-Saharan Africa, Latin America, and the Caribbean. Their results strongly showed that women's status has a significantly positive effect on children's health in all countries. They also found that women with higher role have better health, and they can provide higher-quality care to their children.

Haddad (1999), besides, examined the variation in the status of women relative to men in seven Asian Countries—India, Pakistan, Bangladesh, Philippines, Vietnam, Sri Lanka and People Republic of China by using cross sectional data. His study revealed that the status of women relative to men is the lowest in Pakistan, India, and

Bangladesh. He also suggested that equality between status of women and men has a positive impact on child growth.

Among the related studies, some studies used women's education as a proxy for women's power in making household decisions. For example, Olumakaiye and Ajayi (2006) used the Chi-Square method and examined the data from Nigeria. They concluded that higher educated women are likely to provide varieties of food, thereby increasing the household of food security for the households. Guha-khasnobis and Hazarika (2006) also found that well-educated mother can provide long term nutritional status for their children in Paskistan.

Further, Mason et al. (2003) examined multiple measures of married women's empowerment in 56 communities in five Asian countries—India, Malaysia, Paskistan, the philippines, and Thailand. Their analysis showed that the gender relationship is heavily influenced by community norms and values. They also suggested that women's education and employment opportunities could be raised by changing the community norms and values, which can help to improve women's status.

In addition, Becker, Fonseca-Becker, and Schenck-Yglesias (2006) analyzed husbands and wives' reports of women's decision-making power and their effects on preventive health behaviors in Western Guatemala. In their analysis, the authors applied four questions on household decision making to assess husband and wife's report of decision-makings and another three related questions, which represent recent health

behaviors. They concluded that women with equal educational level with her husband have greater decision-making power compared to women with no education.

Moreover, by using multivariate regression techniques, Mullany, Hindin & Becker (2005) investigated whether women's autonomy hampers male participation in pregnancy health in Katmandu, Nepal. In their analysis, women's autonomy was measured by increasing power on final say on household decision-makings, and male involvement was measured by communication and negotiation within couples in making decisions. They found that higher women autonomy is related with lower male participation in pregnancy health. Besides, they discovered that the higher level of male participation is concerned with joint decision making between the husband and the wife. In addition, their analysis suggested that enhancing the husband involvement and joint decision-makings of the couple in reproductive health and family's health is likely a good strategy for achieving the goal of both women's empowerment and women's health.

Although there are many studies which have shown the correlation between women's decision-makings and women's nutritional status by using different analytical methods for developing countries, few studies have focused on Cambodia. Therefore, this paper addresses the roles of women and women's health in Cambodia and applies the study approach by Hindin (2000) for purpose of this paper. Accordingly, this paper defines women's power inside the household based on eight key questions, which are used to measure women's decision-makings, to explore the effects of women's role on

women's nutritional status in Cambodia. This paper uses cross sectional data from the Cambodia Demographic and Health Survey (CDHS) conducted in 2000. Moreover, this paper applies the Ordinary Least Squares Multiple Regression Models and Logistic Regression Model to analyze the effects of women's role on women's health in Cambodia. To capture the effects of women's role and nutritional status, socio demographic characteristics are used as control variables in this study.

CHAPTER III: DATA AND ECONOMETRIC MODEL

3.1. Data description

The data used in this analysis is taken from the Cambodia Demographic and Health Survey (CDHS) 2000 to analyze the effects of women's decision-making on women's health and anthropometry. This survey was the first nationally-representative survey conducted in Cambodia on population and health issues. The 2000 Cambodia Demographic and Health Survey (CDHS) was carried out by the National Institute of Statistics (NIS) of the Ministry of Planning and the Ministry of Health (MoH) from February to July 2000. UNICEF, UNFPA and USAID were the sponsoring agencies for the survey.

The CDHS 2000 provides detailed information on many demographic, health and social issues, and two types of questionnaires, household questionnaire and women questionnaire, were used in this survey. The contents of these questionnaires were based on the international MEASURE DHS+ model.

The survey covered a sample of 12,810 households and 15,557 women aged between 15- 49 years. Since this paper is most concerned with decision-makings among married women, the analysis of data in this study was based on a sample of 2,740 married women whose ages were between 15 and 49 because the household decision-making module covered only these 2,740 women.

3.2 Variable descriptions

Table (1) describes the variable definitions. The variables that are defined in this analysis include women's BMI (Body Mass Index), whether women have CED (Chronic

Energy Deficiency) or not, women's household decision-making and women's characteristics and household characteristics.

Table 1- Variable Descriptions

Variables	Descriptions
Wives or Women level Variables	
Wives or Women BMI	
<i>BMI</i>	Body Mass Index for Women
<i>CED</i>	Wife or a woman who has "Chronic Energy Deficiency" (BMI is less than 18.5)
Women's household decision-making power	
<i>large_hh_purchases</i>	Women have final say on making large household purchases
<i>hh_daily_need</i>	Women have final say on purchases for household daily needs
<i>own_health_care</i>	Women have final say on own health care
<i>another_child</i>	Women have final say on having another child
<i>on_work</i>	Women have final say on work
<i>visit_friend</i>	Women have final say to visit friends and relatives
<i>use_contraception</i>	Women have final say on using contraception
<i>medical_care</i>	Women have final say on seeking medical care for sick child
<i>any_decision</i>	Women have final say on any household's decisions
Women's Characteristics	
<i>Age</i>	Women's Age between (15-49)
<i>Age (years) /10</i>	Women's Age divided by 10
<i>(Age/10) ^2</i>	Women's Age divided by 10 the whole squared
<i>Height</i>	Women's Height between (130cm-180cm)
<i>Educ</i>	Women's Highest education level (no education=0, Primary=1, Secondary=2, Higher=3)
Women's earns Cash	
<i>Currently_working (Dummy)</i>	Women who are currently working for earning
Household level variables	
<i>Wealth</i>	Wealth index (poorest=0, next poor=2, average=3, rich =4, richest=5)
Rural Residence	
<i>Rural(Dummy)</i>	Household lives in rural area=1; live in urban area=0
Head of household	
<i>female (Dummy)</i>	women who are the heads of the household (Dummy female's gender : female=1 ; male=0)

3.2.1 Measures of BMI as women's health and Chronic Energy Deficiency

In this analysis, there are two different indicators: BMI and CED. BMI is a continuous indicator and CED is a dichotomous indicator. BMI {weight in kg/ (height in meter) ²} is the first indicator which measures the nutritional health of Cambodian women. Women whose BMIs are between 18.5 and 24 (i.e., $18.5 \leq \text{BMI} \leq 24$) are considered to have good health and better nutritional status. BMI greater than 24 (BMI >24) are considered as obese.

The second measure, CED (Chronic Energy Deficiency), is defined as women whose BMI are less than 18.5 kg/m^2 and refers to women who suffer from severe malnutrition. As CED is a dichotomous variable that takes the value one if women suffer from CED and takes the value zero if women do not suffer from CED. Since CED measures the severe case of under-nutrition, 21.76% or 285 of Cambodian women suffer from CED and their BMI are lower than 18.5.

3.2.2 Measures of household decision-making

To explore the relationships between women's participation in household decision-making and women nutritional status, eight questions are used in this analysis. The following eight different types of decision-makings were asked to women; whether they alone or jointly with their husbands or someone else have the final say in each decision. The eight questions are:

- (1) Who in your family usually has the final say on deciding whether to purchase large household items such as a television or a radio?
- (2) Who in your family usually has the final say on deciding whether to purchase household daily needs such as food or clothing?

- (3) Who in your family usually has the final say on seeking whether to use the medical services for their own health care?
- (4) Who in your family usually has the final say on deciding whether to work to earn the money?
- (5) Who in your family usually has the final say on deciding whether to have another child?
- (6) Who in your family usually has the final say on deciding whether to visit friends or relatives?
- (7) Who in your family usually has the final say on deciding whether to use contraception?
- (8) Who in your family usually has the final say on what to do for sick child?

The dummy variable is created for each of eight questions. The dummy variable is coded as one if the women have the final say on each decision making either solely or jointly with other household members, and otherwise, zero. In addition to the eight household decision-makings, a variable that describes whether women have any say in any of the eight decision-makings is also created. A dummy of any decision is one if women have the final say on at least one of any decision -makings and zero if women do not have final say on any decision-making.

3.2.3 Measures of household characteristics and women's characteristics

The following variables are used to measure household and women characteristics.

Household wealth: The DHS data do not collect the information on household income in measuring of household wealth. Instead of using household income as

household wealth, the DHS data gathered the information on the household ownership and used a number of consumer items as well as dwelling characteristics as household wealth index. This information is widely accepted and it has been used in a large number of countries as a measure of wealth index (Rutstein & Tohson, 2004). In this analysis, thirteen household possessions such as electricity, radio, television, car, refrigerator, bicycle, motorcycle, telephone, bed net sleeping, toilet facility, material floor, cooking fuel, and sources of drinking water are used to calculate the household wealth index. Each asset is coded as one if the household possesses the item, and otherwise it is zero. Then, by calculating a weighted sum by using the principle component analysis, the wealth index is estimated for each household. The sample households are divided into five groups and they are coded as one for the poorest group and five for the richest group. This categorical variable is the wealth index used for this study.

Rural residence: Based on the place the women live in, a dummy variable is created. For the households which live in rural areas are coded as one otherwise it is zero if households live in urban areas.

The head of the household: A dummy variable is created for female household heads. The dummy variable is one if the household head is female and zero if the head of household is male.

Regarding women characteristics, age and age squared capture a non-linear relationship between age and women's decision-making. Since women's age can be

correlated with women's decision-making, both age and age squared are included in this model.

Height: To control for the effect of health status of women on the household decision-makings, women's height is included in this model. Women height is assumed between 130 cm and 180cm for this analysis. Values outside of this range are considered as irrelevant and they are treated as missing.

Education: As education is an important factor in women decision-makings, the level of women's education is controlled in this model. There are three educational levels: no education, primary education, secondary education or higher.

Women earn cash: a dummy variable is created for women who earn cash. That is, this dummy variable is one if the woman earns cash and zero otherwise.

3.3 Descriptive statistics

Since observations with missing information are removed in this analysis, the sample sizes in table (2) are smaller than the original observation numbers. Table 2 describes the definitions and descriptive statistics of the key variables used in this analysis.

Among 1,310 women, their mean BMI is 20.69 kg/m² and standard deviation (SD) 2.29. Among them, 285 or 21.76 % of women suffer from inadequate nutritional health or chronic energy deficiency (CED).

Regarding women's decision-makings, women are most likely to have the final say on daily household purchase (84.13%) and on their own health care (79.25%). On the other hand, fewer women have final say over the decision-makings about large

household purchases (57.59%), whether or not to work (42.88%), having medical care for sick child (41.98%), visiting friends (46.99%), and using contraception (43.42%), respectively. Moreover, 25.93% of women, which is the least percentage, has the final say on having another child. In terms of any decision-making, the percentage of women have the final say in at least in one of the eight decision-makings is 72.56%, while women have the final say over none of eight decision-makings is 27.44%.

Rural residence, household wealth, and female-headed household are important characteristics to estimate women's nutritional health. The percentage of women who live in the rural areas is 88.41% and 11.85% of women are in urban areas. The mean of household wealth index is 3.07 with the standard deviation 1.40.

The mean age of women who aged between 15 and 49 is 2.99 with a standard deviation of 1.01. Women's height ranges from 130 cm to 180 cm; the mean height is 152.71 with a standard deviation 5.25. Regarding women's education, the majority of women (55.57%) have at most primary education while women with no education are (32.79%). The combined secondary and higher education are 11.49%. The percentage of women working for earning cash is 78.01% and 21.99% do not earn cash.

Table 2- Definitions and descriptive statistics of variables used in the analysis

Variable	Description	Percent	N
Dependent Variables			
Mean BMI	18-30.16 (kg/m ²)	Mean=20.69,SD=2.29	1310
Wife has CED	NO	78.24	1025
	YES	21.76	285
Wife's household decision-making power			
(a)Wife has final say over large household purchases	NO	42.02	266
	YES	57.59	367
(b)Wife has final say over purchases of household daily need	NO	15.87	99
	YES	84.13	525
(c)Wife has final say over having another child	NO	74.07	320
	YES	25.93	112
(d)Wife has say over own health care	NO	20.75	99
	YES	79.25	378
(e)Wife has final say on work	NO	57.12	357
	YES	42.88	268
(f)Wife has final say on medical care for sick child	NO	58.02	264
	YES	41.98	191
(g)Wife has final say on visit to friends and relatives	NO	53.01	326
	YES	46.99	289
(h)Wife has final say on whether to use contraception	NO	56.58	275
	YES	43.42	211
(i)Wife has final say on any decision-making	NO	72.56	460
	YES	27.44	174
Household Characteristics			
Rural Residence	NO	11.85	325
	YES	88.41	2417
Household wealth		Mean=3.07, SD=1.40	2427
Head of Household	Male	78.34	2148
	Female	21.66	598
Wife's Characteristics			
Age (years) /10	(15-49)	Mean=2.99, SD=1.01	2724
(Age/10) ^2		Mean=10.005, SD=6.22	2724
Height (cm)	(130-180)	Mean =152.71, SD=5.25	1316
Education			
	None	32.79	899
	Primary	55.73	1528
	Secondary or higher	11.49	315
Wife earns cash			
	NO	21.99	609
	YES	78.01	2139

3.4 Relationship between BMI, CED and household decision-making

Table 3- BMI, CED and women's decision-making power

Decision-makings	Mean BMI	Beta	% with CED	OR for CED
Wife has final say over large household purchase				
No	21.31	-----	0.20	-----
Yes	20.58	-0.033 (P=0.005)***	0.24	1.28 (p= 0.206)
Wife has final say over purchases of household daily need				
No	21.18	-----	0.17	-----
Yes	20.85	-0.016 (P=0.304)	0.23	1.43 (p=0.214)
Wife has final say over having another child				
No	21.22	-----	0.21	-----
Yes	21.37	0.008 (P=0.638)	0.16	0.76 (p= 0.343)
Wife has final say over own health care				
No	21.18	-----	0.17	-----
Yes	20.88	-0.015 (P=0.363)	0.23	1.42 (p= 0.227)
Wife has final say on work				
No	21.23	-----	0.21	-----
Yes	20.5	-0.032 (P=0.007)***	0.24	1.20 (p=0.35)
Wife has final say on medical care for sick child				
No	21.14	-----	0.20	-----
Yes	21.25	0.004 (P= 0.787)	0.21	1.07 (p=0.788)
Wife has final say on visit to friends and relatives				
No	21.23	-----	0.19	-----
Yes	20.61	-0.028 (p=0.019)**	0.26	1.49 (p=0.044)**
Wife has final say on whether to use contraception				
No	21.22	-----	0.22	-----
yes	20.86	-0.014 (P= 0.291)	0.18	0.83 (p=0.417)
Wife has any say on household decisions				
No	21.22	-----	0.20	-----
Yes	20.23	-0.044 (P=0.000)***	0.28	1.60 (p=0.018)**

Statistically significant at: * P≤0.10; **P≤0.05; ***P≤0.01

Table 3 indicates the relationship between BMI, CED and women's household decision-making power. The first column of table (3) shows the mean BMI separately for women who have final say and no say over household decision-making. It is clear that the mean BMI is higher for women who have no final say than for women who have final say on the following six decisions: final say on making large household purchase and purchases of household daily needs, seeking for own health care, using contraception, whether or not to work, and whether or not visit to friends. On only two decisions, having another child and seeking medical care for sick child, mean BMI is slightly higher for women who have final say than for women who do not.

By regressing \log_e BMI on each of the decision-making variables, column (2) provides the beta coefficients for eight separate linear regression models. The results show that six of eight decisions are negatively related with BMI. Among them, only four of the eight beta coefficients of decision-makings are statistically significant at the conventional levels.

The beta coefficients of large household purchase and whether or not to work are statistically significant at the 1% level. In terms of magnitude, the results imply that women have final say on making large household purchases and whether or not to work are associated with 3.3%, and 3.2% lower BMI, respectively. The decision on whether or not to visit friends is significantly related to BMI at the 5% level, which means that having the final say on visit to friends or relatives is associated with 2.8% lower BMI. In addition, the beta coefficient is strongly significant for any decision making at the 1%

level. In this sense, having the final say over at least one decision-making has the strongest association with BMI, which implies that mean BMI is 4.4% lower for women who have final say on at least one decision-making than women who do not have final say on any decision-making. Accordingly, the results above, columns (1) and (2), suggest that women who have final say on such household decision-makings tend to have lower BMI.

Column (3) describes the percentage relationship between the decision-makings and CED, and column (4) examines the relationship between women having CED and household decision-makings by using logistic regression. CED was separately calculated for women with and without the final say for each of eight decision-makings. In addition, the odds ratio was computed for CED.

In this case, the results show almost the same interpretations as the previous results above. The percentages of CED are higher for women with final say on six decision-makings and two decisions are lower in CED for women with the final say. Of eight decision-makings, only one decision-making about visit to friends is statistically related to CED at the 5% level and none of the rest is statistically significant related to CED at the conventional levels. In this case, the significant beta coefficient on any decision implies that having final say on at least one decision is associated with higher risk of CED (1.6 times) than having none of the decision-makings.

In terms of the size and the magnitudes of the odd ratio, column (4) shows that the magnitude of CED for those women who have final say on the decisions are greater

than the magnitude of CED for those women who have no say on the decision-makings, except two decisions, having another child and using contraception. However, the only significant results are for final say on visit to friends or relatives and final say on any decision-making.

In sum, as can be seen in table 3, the results unexpectedly show that women who have final say on household decision-makings are mostly associated with lower nutritional status or lower BMI and higher risk of CED.

3.5 Empirical Specifications

The following models are used for analyzing the effect of women household decision-making on their health.

The first logistic regression model examines the relationship between women's decision-making and socio-demographic characteristics.

$$(1) \quad \text{Prob} (WDM) = f(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon)$$

Where:

- The dependent variable, WDM is women's decision-making which represents an either the women solely or jointly with other household members have the final say over each of the following decision-makings.

large_hh_purchases: women have final say on making large household purchases

hh_daily_need : women have final say on making purchases for household daily needs

own_health_care : women have final say on their own health care

another_child : women have final say on having another child

on_work : women have final say on whether or not to work

visit_friend: women have final say to visit friends and relatives

use_contraception : women have final say on whether to use contraception

medical_care : women have final say on deciding medical care for sick child

any_decision : women have final say on making any household's decision

- X_1 is a vector of household characteristics, which includes a dummy of rural residence, a dummy of female-headed household, and the household wealth index.
- X_2 is a vector of women's characteristic, which consists of women's age, age-squared, dummies of women's education, height and a dummy of women who earn cash.
- ε is the remaining error.

The second regression analyzes the relationship between women's health (BMI) and women decision making with the adjustment of the control variables.

$$(2) \quad \text{Log}_e \text{WBMI} = \beta_0 + \beta_1 \text{WDM} + \beta_2 X_1 + \beta_3 X_2 + \varepsilon$$

Where:

- *WBMI* is the dependent variable that represents women's health (log BMI).
- *WDM* is the main independent variable, which is each decision making.
- X_1 and X_2 , household characteristics and women's characteristics respectively, are used as controls. These control variables include a dummy of rural residence

dummy, the wealth index, a dummy of female-headed household, age, age squared, height, dummies of women education, and a dummy of women who earn cash.

- ε is the remaining error.

The third regression investigates the relationship between CED and women decision-making after controlling for the control variables, using the logistic model.

$$(3) \quad \text{Prob}(WCED) = f(\beta_0 + \beta_1 WDM + \beta_2 X_1 + \beta_3 X_2 + \varepsilon)$$

Where:

- **WCED** is the dependent variable, which is equal to one if the women have chronic energy deficiency (CED) and zero otherwise.
- **WDM** is the main independent variable which is each decision making.
- **X_1 and X_2** , the control variables, are household characteristics and women's characteristics respectively, are the same set of control variables as before.
- ε is the remaining error.

CHAPTER IV: RESULTS AND DISCUSSION

5.1 Relationship between women's final say on household decisions and socio-demographic characteristics

Using the first multivariate logistic regression model, table 4 displays the characteristics of women who have final say on household decision-making. The odd ratio for each independent variable is shown in table 4.

The variables—female-headed household, women age, and women work for earning cash are strongly associated with final say on household decision-making. Since the estimated coefficients on female-headed household are statistically significant to eight decisions, female-headed is the strongest predictor of the household decision-making. Accordingly, the result implies that as compared to husband headed, wife headed has more power to make the decisions in the household. They are 6.24, 5.76, 4.82, 4.35, 3.59, 3.27, 2.12, and 9.33 times more likely to make the decision on whether or not to work, having another child, visit to their friends or relatives, seeking medical care for children, making large household purchase, using contraception, seeking on their own health care, and at least one of any decision-making, respectively.

Of nine decisions, women-headed household is not significant for only one decision, which is making purchases on household daily needs. Probably, this is due to the higher women participation in the decision on daily needs, no matter whether she is a household head or not.

Table 4- Relationship between wife having final say over household decision-making and socio-demographic characteristics

	Large household purchases	Daily needs	Own health care	Work	Another child	Medical for children	Visit friend	Use contraception	Any Decision
Rural	0.72	0.85	0.79	0.34	1.16	1.50	0.53	0.53	0.26
Residence	(P= 0.276)	(P=0.701)	(P=0.585)	(P=0.001)**	(P=0.731)	(P=0.258)	(P=0.040)**	(P=0.05)*	(P=0.000)*
				*					**
Household wealth	0.99	1.06	1.07	0.91	0.89	0.88	1.01	0.83	0.89
	(P=0.931)	(P=0.540)	(P=0.500)	(P=0.199)	(P= 0.228)	(P= 0.108)	(P=0.913)	(P=0.02)**	(P=0.185)
Head of household (female)	3.59	1.45	2.12	6.24	5.76	4.35	4.82	3.27	9.33
	(P=0.000)***	(P=0.248)	(P=0.021)**	(P=0.000)**	(P=0.000)*	(P=0.000)*	(P=0.000)***	(P=0.000)*	(P=0.000)*
				*	**	**		**	**
Age(years)/10	0.01	0.14	0.06	0.01	3.04	0.81	0.01	0.02	0.0007
	(P=0.000)***	(P=0.030)**	(P=0.002)***	(P=0.000)**	(P=0.414)	(P=0.815)	(P=0.000)***	(P=0.000)*	(P=0.000)*
				*				**	**
(Age/10)^2	1.89	1.30	1.49	2.27	0.89	1.06	1.93	1.75	2.82
	(P=0.000)***	(P=0.054)*	(P=0.006)***	(P=0.000)**	(P=0.580)	(P= 0.723)	(P=0.000)***	(P=0.000)*	(P=0.000)*
				*				**	**
Height (cm)	1.01	0.98	0.99	1.01	0.97	0.99	0.97	0.99	0.98
	(P=0.576)	(P=0.364)	(P=0.593)	(P=0.660)	(P=0.177)	(P= 0.474)	(P=0.115)	(P=0.988)	(P=0.313)
Education									
-No education	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
-Primary education	0.85	1.36	1.29	0.79	0.93	1.14	0.78	1.08	0.88
	(P=0.411)	(P=0.237)	(P=0.348)	(P=0.291)	(P=0.797)	(P=0.565)	(P=0.241)	(P=0.748)	(P=0.608)
-Secondary or higher education	0.68	1.44	1.37	0.75	0.87	0.74	1.27	1.30	0.95
	(P=0.300)	(P=0.464)	(0.539)	(P=0.486)	(0.805)	(P=0.513)	(P=0.528)	(P= 0.518)	(P=0.908)
Wife earns cash	1.53	4.39	3.23	1.76	1.20	0.97	2.50	2.08	3.30
	P=(0.068)*	(P=0.000)**	(P=0.000)***	(P=0.036)**	(P=0.571)	(P= 0.913)	(P=0.001)***	(P=0.005)*	(P=0.001)*
		*						**	**
Pseudo R Square	0.129	0.107	0.122	0.231	0.115	0.0743	0.177	0.117	0.214
N	621	614	468	613	425	447	603	477	622

Statistically significant at: *P≤0.10; **P≤0.05; ***P≤0.01.

Regarding women age, both younger and older ages are significantly associated with seven decision-makings. In term of the magnitude, the odd ratios are larger in an older age for each decision-making. Therefore, older women have more decision-making power than younger counterpart does. Further, the squared age is significant in almost all cases, implying that as women are older, women gain the decision-making power more than proportionally.

Furthermore, women who work for earning cash is a strong predictor for women's decision-making as well. According to the results, women who earn cash have more power to say on all decisions except the decisions on having another child and seeking medical care for children. As compared to women who do not earn cash, women who earn cash have final say 4.39 times on purchases of household daily needs, 3.23 times on their own health care, 1.53 times on large household purchase, 1.76 times on whether or not to work, 2.5 times to visit friends or relatives and 2.08 times on using contraception, respectively. In addition, women who earn cash have final say, 3.3 times, on at least one of all decision-makings. However, the estimated coefficient of women earning cash is statistical insignificance to two-decision makings—having another child and seeking medical care for children. Accordingly, women who earn cash have more final say over household decisions.

Rural residence is somewhat associated with household decision-makings since rural residence is significantly associated with four of nine decisions at the conventional levels. According to the results, women in rural areas have final say 0.34 times on

whether or not to work, 0.53 times on visit to friends, 0.53 times on whether or not to use contraception and 0.26 times on at least on one decision making, respectively. Thus, as compared to urban women, women in rural area less likely to have the final say on these decisions in the household.

Among the nine decision-makings, the estimated coefficient of household wealth is significantly related to only one decision, which is whether to use contraception. In term of magnitude, one unit increase in the wealth index is associated with 0.83 times less likely to have final say on contraception. It is surprising that women's educations and women's height are not significantly associated with any of the decisions making in this analysis. Therefore, both women's education and women's height are weak predictors in an estimation of women's decision-making.

In sum, as described in table 4, the logistic regression provides the empirical evidence that among women characteristics—female-headed households, women's age, and women who earn cash are strongly correlated with women's decision-making. In contrast, education and height are weak predictors in the estimation of household decision-making. On the other hand, household characteristics—rural residence and household wealth are somewhat associated with decision-makings; however, they are not strong predictors for household decision-making.

5.2 Relationship between BMI, CED and household decision-making power

By using the multivariate OLS model, table 5-A shows the relationship between BMI and household decision-making power. Only one decision is shown in this table. The rest of the tables are shown in appendix. The reason why only one decision is shown in table 5-A is that all coefficient estimates on BMI are rather similar so that only one table is selected to explain the relationship between BMI and decision-makings. The first column of table 5-A shows the relationship between women BMI and socio-demographic characteristics before including the variable of decision-makings.

Table 5-A**Multiple regression model of log BMI and CED on wife's decision-making power and socio-demographic characteristics****(Wife has final say on large household purchases)**

	Linear regression of log BMI (Betas)		Logistic regression of CED (ORs)	
Wife has final say on Large household purchases	(-----)	-0.017	(-----)	1.122
Rural Residence	-0.022*	-0.033*	1.294	1.505
Household wealth	0.006*	0.009**	1.007	1.006
Head of household (female)	-0.008	-0.015	1.225	1.183
Age (years)/10	0.100***	0.082**	0.291***	0.412
(Age/10)^2	-0.014***	-0.011*	1.213***	1.154
Height (cm)	0.0003	0.002*	0.994	0.979
Education				
-No education	(-)	(-)	(-)	(-)
-Primary education	0.021***	0.017	0.721**	0.734
-Secondary or higher education	-0.002	0.002	1.116	1.075
Wife earns cash	-0.013	-0.026*	1.192	1.311
R-squared	0.0389	0.0563	-	-
N	1297	616	1297	616

Statistically significant at: *P≤0.10; **P≤0.05; ***P≤0.01

The results of the first column show that rural residence, household wealth, women age and primary education are statistically significant for women BMI at the conventional levels. Rural residence is associated with lower BMI, whereas the higher

level of household wealth is associated with higher BMI. The results imply that women in rural areas are lower in BMI 2.2 % than those women who are in urban areas, and that an increase in one unit of household wealth is associated with 0.6% higher in women BMI as expected. On the other hand, female-headed household is not significantly related to BMI. In terms of women characteristics, the result implies that younger women have higher nutritional status than older women have. Regarding education, it is not surprising that primary education is positively correlated with BMI where the reference group is women without formal education. It is surprising that women with secondary or higher education on average have a lower BMI in comparison with women without formal education, but the effect is not significant. The variable women earning cash is not a significant predictor in the multivariate model.

In sum, the first column shows that rural residence is negatively correlated with BMI while women age, wealth index and primary education are positively correlated with BMI. In this sense, women in Cambodia especially those who live in rural areas, who are older, who are poor, and women who have no formal education seem to have lower nutritional status.

The second column of the table shows the relationship between \log_e BMI and one of the decision-makings, decision on large household purchase, after controlling women characteristics and household characteristics. The results surprisingly show that none of the coefficients on the household decisions is correlated with BMI at the conventional levels. (Also, see the appendix table for other decisions).

The interesting point here is that—decision on making large household purchases, making purchase on household daily need, whether or not to work and at least one of any decisions show unexpected negative sign in relation to BMI. These results are still consistent with the results from table 3. However, p-values are not significant for all women's decision-makings. As a result, women's decision-makings are not correlated with women BMI.

However, the predictors—rural residence, household wealth, women's age, and women's earning cash are still statistically significant at the conventional levels, and some of the estimated coefficients are statistically insignificant. In terms of education, after adding the variable decision-makings, the negative relationship between secondary education and BMI change to positive relationship for most cases. However, both primary and secondary educations are not significantly correlated with women BMI since their p-values do not reach statistical significance at conventional levels. Therefore, women's education and BMI are not correlated.

By using the logistic regression model, column 3 and column 4 in table 5 examine the relationship between CED, socio-demographic characteristics and decision-making. Surprisingly, household characteristics—rural residence, household's wealth, and female-headed household, are not significantly related to CED. Only two variables: women age and primary education are significantly associated with CED at the 1% and 5% levels, respectively. Accordingly, women with primary education suffer from CED less often 0.72 times as compared to women with no education. Moreover, younger and

older women suffer from less CED. The odd ratio shows that older women suffer less of CED than younger women.

Finally, after controlling socio demographic characteristics, the results in column 4 surprisingly show that only one decision-making about having another child is significantly associated with the risk of CED. The rest of all household decisions are not significantly correlated with CED. According to the results, not only the estimated coefficients of all decision-makings but also the estimated coefficients of women characteristic and household characteristic are not statistical significance with having CED. As a result, women decisions and CED are not correlated.

In conclusion, according to the results of table 5, since the beta coefficients of women final say on the decision-making power do not reach statistical significance with BMI and having CED, this paper concludes that women's decision-making powers are not critical determinants of women's health in Cambodia.

CHAPTER V: CONCLUSIONS

This paper explores the effects of women decision-making power inside the household on women health for Cambodia by using multiple OLS model and logistic regression model. In this paper, eight household decisions are used as women's power to make household decision-making. In addition, the socio-demographic characteristics are employed as control variables to capture the effects of women's decision-making on women's health.

By using CDHS 2000 data set, this paper finds out unexpected results for the relationship between BMI, CED and women's decision-making power. Before controlling for socio-demographic characteristics, this paper finds out that six of eight household decisions are negatively related with women BMI. In this sense, women who have final say on decision-makings seem to have lower BMI and higher risk of CED for Cambodia.

After controlling socio-demographic characteristics, this paper shows the statistical evidence that none of women's household decision-making is correlated with women BMI for Cambodia. Similarly, by using the logistic regression, this paper finds that women's household decisions are associated with a higher CED although the effect is not statistically significant at conventional levels. Therefore, this paper concludes that women's role in terms of household decision-makings are not critical determinants of nutritional health of women in Cambodia.

This paper strongly provides the empirical evidence that socio-demographic characteristics—rural residence, head of household, women age and women work for earning cash are strongly correlated with women's household decision-making.

Therefore, this paper suggests that the policy which encourages the improvement of the social-demographic characteristics such as women's education and women's health, may improve women's power inside of households in Cambodia.

A further study also is needed to support direct policy toward better health status of women in Cambodia by taking into consideration of the important of women's role in socio-economic development.

REFERENCES

- Anderson, S., & Eswaran, M. (2009). What determines female Autonomy? Evidence from Bangladesh. *Journal of Development Economics*, 90, 179-191.
- Becker, S., Fonseca-Becker, F., & Schenck-Yglesias, C. (2006). Husbands' and wives' reports of women's decision-making power in Western Guatemala and their effects on preventive health behaviors. *Journal of Social Science & Medicine* 62, 2313-2326.
- Food and Agricultural Organization (FAO). (2010). *women and food security*. Retrieved February 10, 2010, from www.fao.org/FOCUS/E/Women/Sustin-e.htm.
- Food and Agricultural Organization (FAO), Retrieved February 10, 2010, from FAO participation in rural women panel 15 October/ New York, File format: PDF/ Adobe Acrobat – Quick view 15 Oct 2008....the food in most developing countries.
- Guha-Khasnobis, B., & Hazarika, G. (2006). Women Status and Children's food security in Pakistan. Discussion Paper No.2006/03, UNU-WIDER, United Nation University ,World Institute for Development Economics Research.
- Haddad, L. (1999). Women's Status: Levels, Determinants, Consequences for Malnutrition, Interventions, and Policy. *Asian Development Review*, 17 (1), pp.96-131.
- Hindin, M. J. (2000). Women's power and anthropometric status in Zimbabwe. *Journal of Social Science & Medicine* 51, 1517-1528.
- Hindin, M. J. (2005). Women's input into household decisions and their nutritional status in three resource-constrained settings. *Journal of Public Health Nutrition* 9(4), 485-493.
- Mason, K.O., & Smith, H. L. (2003). Women empowerment and social context: Results from five Asian Countries.
http://siteresources.worldbank.org/INTEMPowerment/Resources/13323_womens_empowerment.pdf
- Ministry of Women's Affairs (MoWA). (2004). The progress report on implementation of Beijing platform for an action on women issues (1995-2005).
- Mullany, B.C., Hindin, M.J., & Becker, S. (2005). Can women's autonomy impede male involvement in pregnancy health in Katmandu, Nepal? *Journal of Social Science & Medicine* 61, 1993-2006.

- National Institute of Statistics (NIS). (2000). Directorate General for Health, Cambodia, & ORC Macro. *Cambodia Demographics and Health Survey 2000: preliminary report*. Phnom Penh, Cambodia: Directorate General for Health.
- Olumakaiye, M.F., & Ajayi, A.O. (2006) .Women's empowerment for household food security: The place of education. *The Journal of Human Ecology*, 19 (1): 51-55.
- Rutstein, S.O., & Johnson, K. (2004). The DHS Wealth Index. DHS Comparative Reports No.6. Calverton, Maryland: ORC Macro.
- Smith, L .C., Ramakrinan U., Ndiaye A., L. Haddad., & R. Martorell. (2003). The Importance of Women's Status for Child Nutrition in Developing Countries. IFPRI Research Report No. 131. Washington, DC: International Food Policy Research Institute.
- United Nations, (UN). (2010).*Guidelines for women empowerment*. Retrieved February 10, 2010, from www.un.org/popin/unfpa/taskforce/guide/iatfwemp.gdl.html

APPENDIX

Table 5-B

**Multiple regression model of log BMI and CED on wife's decision-making power
and socio-demographic characteristics**

(Wife has final say on purchasing household daily need)

	Linear regression of log BMI (Betas)		Logistic regression of CED (ORs)	
Wife has final say on purchasing household daily needs	(-----)	-0.003	(-----)	1.273
Rural Residence	-0.022*	-0.029	1.294	1.464
Household wealth	0.006*	0.009**	1.007	1.000
Head of household (female)	-0.008	-0.019	1.225	1.192
Age (years)/10	0.100***	0.088**	0.291***	0.442
(Age/10)^2	-0.014***	-0.012**	1.213***	1.146
Height (cm)	0.0003	0.002	0.994	0.980
Education				
-No education	(-)	(-)	(-)	(-)
-Primary education	0.021***	0.017	0.721**	0.748
-Secondary or higher education	-0.002	0.001	1.116	1.159
Wife earns cash	-0.013	-0.027*	1.192	1.314
R-squared	0.0389	0.0496	-	-
N	1297	609	1297	609

Statistically significant at: *P≤0.10; **P≤0.05; ***P≤0.01

Table 5-C

Multiple regression model of log BMI and CED on wife's decision-making power and socio-demographic characteristics

(Wife has final say on having another child)

	Linear regression of log BMI (Betas)		Logistic regression of CED (ORs)	
Wife has final Say on another child		0.019		0.534*
Rural Residence	(-----) -0.022*	-0.055**	(-----) 1.294	3.653**
Household wealth	0.006*	0.016***	1.007	0.861
Head of household (female)	-0.008	-0.013	1.225	1.648
Age (years)/10	0.100***	0.044	0.291***	1.368
(Age/10)^2	-0.014***	-0.005	1.213***	0.984
Height (cm)	0.0003	0.002	0.994	0.989
Education				
-No education	(-)	(-)	(-)	(-)
-Primary education	0.021***	0.021	0.721**	0.792
-Secondary or higher education	-0.002	0.012	1.116	1.701
Wife earns cash	-0.0128	-0.036**	1.192	1.778*
R-squared	0.0389	0.061	-	-
N	1297	421	1297	421

Statistically significant at: *P≤0.10; **P≤0.05; ***P≤0.01

Table 5-D

Multiple regression model of log BMI and CED on wife's decision-making power and socio-demographic characteristics

(Wife has final say on seeking her own health care)

	Linear regression of log BMI (Betas)		Logistic regression of CED (ORs)	
Wife has final say on own health care	(-----)	0.008	(-----)	1.168
Rural Residence	-0.022*	-0.026	1.294	1.699
Household wealth	0.006*	0.006	1.007	1.061
Head of household (female)	-0.008	-0.032 **	1.225	1.481
Age (years)/10	0.100***	0.107**	0.291***	0.280
(Age/10)^2	-0.014***	-0.014**	1.213***	1.217
Height (cm)	0.0003	0.001	0.994	0.986
Education				
-No education	(-)	(-)	(-)	(-)
-Primary education	0.021***	0.017	0.721**	0.767
-Secondary or higher education	-0.002	-0.001	1.116	1.198
Wife earns cash	-0.0128	-0.028*	1.192	1.168
R-squared	0.0389	0.066	-	-
N	1297	463	1297	463

Statistically significant at: *P≤0.10; **P≤0.05; ***P≤0.01

Table 5-E**Multiple regression model of log BMI and CED on wife's decision-making power and socio-demographic characteristics****(Wife has final on visit friends or relatives)**

	Linear regression of log BMI (Betas)		Logistic regression of CED (ORs)	
Wife has final say on visit friends or relatives		0.011		1.348
Rural Residence	(-----) -0.022*	-0.035*	(-----) 1.294	1.631
Household wealth	0.006*	0.009*	1.007	1.005
Head of household (female)	-0.008	-0.014	1.225	1.083
Age (years)/10	0.100***	0.072*	0.291***	0.578
(Age/10)^2	-0.014***	-0.010	1.213***	1.099
Height (cm)	0.0003	0.001	0.994	0.991
Education				
-No education	(-)	(-)	(-)	(-)
-Primary education	0.021***	0.018	0.721**	0.701
-Secondary or higher education	-0.002	0.006	1.116	0.977
Wife earns cash	-0.0128	-0.030*	1.192	1.525
R-squared	0.0389	0.049	-	-
N	1297	598	1297	598

Statistically significant at: *P≤0.10; **P≤0.05; ***P≤0.01

Table 5-F**Multiple regression model of log BMI and CED on wife's decision-making power and socio-demographic characteristics****(Wife has final say on what to do for sick child)**

	Linear regression of log BMI (Betas)		Logistic regression of CED (ORs)	
Wife has final say on medical care for sick child		0.016		0.905
Rural Residence	(-----) -0.022*	-0.042*	(-----) 1.294	1.796
Household wealth	0.006*	0.017***	1.007	0.883
Head of household (female)	-0.008	-0.020	1.225	1.393
Age (years)/10	0.100***	0.050	0.291***	1.660
(Age/10)^2	-0.014***	-0.006	1.213***	0.951
Height (cm)	0.0003	0.002	0.994	0.989
Education				
-No education	(-)	(-)	(-)	(-)
-Primary education	0.021***	0.014	0.721**	0.930
-Secondary or higher education	-0.002	0.012	1.116	1.630
Wife earns cash	-0.0128	-0.034*	1.192	1.576
R-squared	0.0389	0.0590	-	-
N	1297	443	1297	443

Statistically significant at: *P≤0.10; **P≤0.05; ***P≤0.01

Table 5-G**Multiple regression model of log BMI and CED on wife's decision-making power and socio-demographic characteristics****(Wife has final say on deciding whether to work)**

	Linear regression of log BMI (Betas)		Logistic regression of CED (ORs)	
Wife has final say on work		-0.015		1.076
	(-----)		(-----)	
Rural Residence	-0.022*	-0.037*	1.294	1.622
Household wealth	0.006*	0.009**	1.007	1.007
Head of household (female)	-0.008	-0.010	1.225	1.077
Age (years)/10	0.100***	0.070*	0.291***	0.448
(Age/10)^2	-0.014***	-0.010	1.213***	1.144
Height (cm)	0.0003	0.002	0.994	0.981
Education				
-No education	(-)	(-)	(-)	(-)
-Primary education	0.021***	0.019	0.721**	0.715
-Secondary or higher education	-0.002	0.002	1.116	1.066
Wife earns cash	-0.0128	-0.029*	1.192	1.49
R-squared	0.0389	0.038	-	-
N	1297	608	1297	608

Statistically significant at: *P≤0.10; **P≤0.05; ***P≤0.01

Table 5-H**Multiple regression model of log BMI and CED on wife's decision-making power and socio-demographic characteristics****(Wife has final say on whether to use contraception)**

	Linear regression of log BMI (Betas)		Logistic regression of CED (ORs)	
Wife has final say on use contraception	(-----)	0.003	(-----)	0.677
Rural Residence	-0.022*	-0.038*	1.294	2.147
Household wealth	0.006*	0.011**	1.007	0.899
Head of household (female)	-0.008	-0.021	1.225	1.455
Age (years)/10	0.100***	0.072	0.291***	0.694
(Age/10)^2	-0.014***	-0.010	1.213***	1.077
Height (cm)	0.0003	0.001	0.994	1.005
Education				
-No education	(-)	(-)	(-)	(-)
-Primary education	0.021***	0.0123	0.721**	0.800
-Secondary or higher education	-0.002	-0.007	1.116	1.765
Wife earns cash	-0.0128	-0.033**	1.192	1.810*
R-squared	0.0389	0.047	-	-
N	1297	474	1297	474

Statistically significant at: *P≤0.10; **P≤0.05; ***P≤0.01

Table 5-I

Multiple regression model of log BMI and CED on wife's decision-making power and socio-demographic characteristics

(Wife has final say on deciding any decision making)

	Linear regression of log BMI (Betas)		Logistic regression of CED (ORs)	
Wife has final say on any decision		-0.0246		1.515
Rural Residence	(-----) -0.022*	-0.037*	(-----) 1.294	1.630
Household wealth	0.006*	0.009**	1.007	1.014
Head of household (female)	-0.008	-0.010	1.225	1.039
Age (years)/10	0.100***	0.067	0.291***	0.621
(Age/10)^2	-0.014***	-0.009	1.213***	1.090
Height (cm)	0.0003	0.002	0.994	0.980
Education				
-No education	(-)	(-)	(-)	(-)
-Primary education	0.021***	0.017	0.721**	0.738
-Secondary or higher education	-0.002	0.003	1.116	1.079
Wife earns cash	-0.0128	-0.023	1.192	1.266
R-squared	0.0389	0.0577	-	-
N	1297	617	1297	617

Statistically significant at: *P≤0.10; **P≤0.05; ***P≤0.01