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**Correlation Between Maternal and Child Health Services and Mortality**  
by

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# **Correlation Between Maternal and Child Health Services and Mortality**

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## **ABSTRACT**

The Department of Health (DOH) recommends that all pregnant women have at least four antenatal care visits during each pregnancy<sup>1</sup>, the first of which should occur in the first trimester of the pregnancy which was established by previous studies to be the most risky stage. The 2003 National Demographic and Health Survey (2003 NDHS) data show that seven in ten women made at least four antenatal care visit, while five in ten women made the first visit in the first trimester of pregnancy.

In terms of delivery care, only 38 percent of live births were delivered in a health facility, and only 60 percent of all births were attended by a health professional.

Meanwhile, the delivery of postnatal care services is aimed at preventing the occurrence of maternal and infant morbidity and mortality in the country by checking whether there are complications arising from the delivery and providing the mother with information on how to care for herself and her child. The DOH recommends that mothers receive a postpartum check within two days after delivery. In the 2003 NDHS, only one in three women who delivered outside a health facility followed this recommendation, and a total of 65 percent received postnatal care.

This paper will study the correlation between availment of pre-natal and post-natal services and birth attendance to mortality. It will utilize logistic regression analysis using data from the 2003 NDHS. The paper aims to provide useful evaluation on directing policies to subgroups of women that need immediate intervention so as to achieve the fourth and fifth goals of the MDG.

## **INTRODUCTION:**

One of the Department of Health (DOH) National Objectives for Health is to ensure that 80 percent of mothers are provided with essential health care packages. The package includes: (a) tetanus toxoid immunization, (b) nutrition, including Vitamin A, folic acid and iron supplementation, (c) treatment of existing disease, if any, (d) recognition, early detection and management of complications before, during and after pregnancy, (e) clean and safe delivery, (f) promotion and support of breastfeeding, (g) information services for family planning, (h) STD/HIV prevention, and (i) dental care. The package is very comprehensive and most of these are provided during prenatal care of mothers.

Meanwhile, the basic premise of the Safe Motherhood Initiative is that childbirth must not carry with the risk of death or disability for the woman and her infant. Deaths due to

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<sup>1</sup> 2003 National Demographic and Health Survey

pregnancy and childbirth are both too high in developing countries like the Philippines. To address this concern, the DOH provided several recommendations on maternal and child health as follows<sup>2</sup>: (1) at least four times of prenatal visits, the first of which is on the first trimester; and (2) postnatal care should be given within two days after delivery, at most one week after. More recently, the DOH provided for seven visits for prenatal services throughout the pregnancy.

The 2003 National Demographic and Health Survey (2003 NDHS) data show that seven in ten women made at least four antenatal care visit, while five in ten women made the first visit in the first trimester of pregnancy. Furthermore, women avail of prenatal services for curative rather than preventive reason (Landicho, University of the Philippines Population Institute, October 2006).

In terms of delivery care, only 38 percent of live births were delivered in a health facility, and only 60 percent of all births were attended by a health professional.

The delivery of postnatal care services is aimed at preventing the occurrence of maternal and infant morbidity and mortality in the country by checking whether there are complications arising from the delivery and providing the mother with information on how to care for herself and her child. In the 2003 NDHS, only one in three women who delivered outside a health facility followed the DOH recommendation, and a total of 65 percent received postnatal care.

Analyzing the 1998 NDHS, Alcantara, Rodriguez and Cabigon (2000) found that all other things being equal, children of mothers who had sought prenatal care during pregnancy had a 34 percent reduced likelihood of dying in the first five years of life. Likewise, those who were delivered at home had significantly higher (137 percent) risks of under-five mortality compared to those delivered in a health facility. Children of mothers not visiting a health facility in the past six months had a higher risk of dying in the first 12 months of life by 49 percent.

#### **OBJECTIVES / SIGNIFICANCE:**

This paper will study the correlation between availment of pre-natal services, birth attendance and post-natal services to mortality. It will utilize logistic regression and binary

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<sup>2</sup> <http://www.doh.gov.ph>

logit analyses using data from the 2003 NDHS. The paper aims to provide useful evaluation on directing policies to subgroups of women that need immediate intervention so as to achieve the fourth and fifth goals of the Millennium Development Goals.

Specifically, the paper aims to:

- a. Determine the socio-demographic characteristics (age, education, occupation, wealth index quintile, type of place of residence, region) of women availing maternal and child health services;
- b. Determine the characteristics of the pregnancy (wanted pregnancy, complication/s with previous pregnancy, complication during pregnancy and childbirth) and their relation to availment of health care services;
- c. Determine the health care utilization by women's status (decision-making);
- d. Relate the findings with mortality.

The information to be obtained from this study is useful in identifying subgroups of women who are in need of maternity care in planning for improvement of services and/or identifying the needed services and other requirements of women.

Readers are cautioned, however, that since the study will utilize the 2003 NDHS data, the results are limited to the perspective of the respondents of the survey.

#### **CONCEPTUAL FRAMEWORK:**

The conceptual framework (figure 1) represents the effect of the background of the clients, in this study the respondents, i.e. socio-demographic characteristics (age, education, occupation, wealth index quintile, type of place of residence, region), characteristics of the pregnancy (whether the pregnancy was wanted or not, complication/s with previous pregnancy, complication during pregnancy and childbirth with the last child), and clients' status (capability to make decisions in the household), to her practice or availment of maternal and child health services (MCHS), specifically pre-natal, delivery and post-natal services. Ultimately, the study will focus on the effect of the practice or availment of MCHS to mortality.

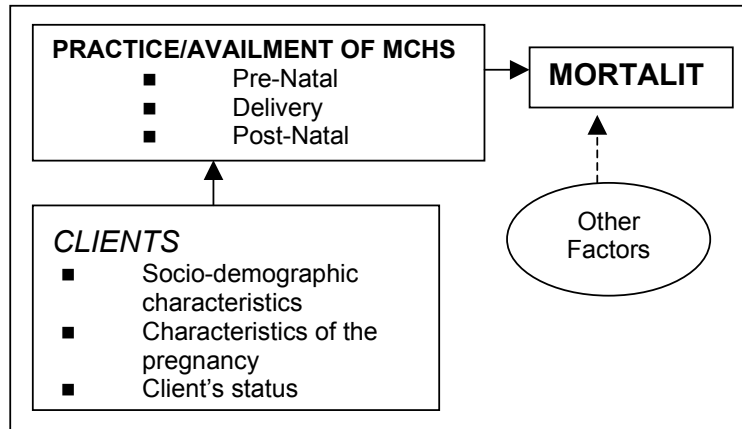


Figure 1. Framework on the Relationship Among Clients, Practice/Availment of Maternal and Child Health Services, and Mortality

**DATA AND METHODOLOGY:**

The women’s questionnaire of the 2003 NDHS was administered to 13,663 women 15 to 49 years of age. The study will utilize the socio-demographic characteristics of the respondents as described in the previous section. Meanwhile, the variables/data items in the 2003 NDHS that were used as components of the characteristics of pregnancy, of health care services, and of mortality are enumerated in table 1.

<b>Table 1. Components of Characteristics of Pregnancy, Health Care Services and Mortality</b>	
<b>Characteristics of Pregnancy</b>	
<b>Previous complication</b>	
	Symptoms on prenatal: vaginal bleeding Symptoms on prenatal: headache Symptoms on prenatal: dizziness Symptoms on prenatal: blurred vision Symptoms on prenatal: swollen face Symptoms on prenatal: swollen hands Symptoms on prenatal: pale or anemic Ever had a terminated pregnancy Other such pregnancies Pregnancies terminated before calendar beginning Last birth caesarean section
<b>Complications during pregnancy and childbirth</b>	
	During pregnancy, had difficulty with daylight vision During pregnancy, had difficulty with night blindness Labor problem: >12 hrs Labor problem: excessive bleeding Labor problem: fever/bad smell Labor problem: convulsion Reason for Caesarian delivery

<b>Complications during pregnancy and childbirth</b>	
	<ul style="list-style-type: none"> <li>High blood pressure</li> <li>Convulsion</li> <li>Baby too big</li> <li>Narrow pelvic bone</li> <li>Head not in position</li> <li>Fetal distress</li> <li>Labor beyond 12 hrs</li> <li>Mother tired (&lt; 12 hrs)</li> <li>Water broke early</li> <li>Excessive bleeding</li> </ul>
<b>Decision-making</b>	
	<ul style="list-style-type: none"> <li>When child is seriously ill, can decide whether med tx sought</li> <li>Getting medical help for self: know where to go</li> <li>Getting medical help for self: getting permission to go</li> <li>Getting medical help for self: getting money needed for tx</li> <li>Getting medical help for self: distance to health facility</li> <li>Getting medical help for self: having to take transport</li> <li>Decision maker for using contraception</li> <li>Who decides how to spend money</li> <li>Final say on own health care</li> <li>Final say on making large household purchases</li> <li>Final say on making household purchases for daily needs</li> <li>Final say on visits to family or relatives</li> <li>Final say on food to be cooked each day</li> </ul>
<b>Health Care Services</b>	
<b>Prenatal</b>	
	<ul style="list-style-type: none"> <li>Tetanus injections before birth</li> <li>Prenatal: doctor</li> <li>Prenatal: nurse or midwife</li> <li>Prenatal: traditional birth attendant</li> <li>Antenatal care for pregnancy: nurse</li> <li>Antenatal care for pregnancy: midwife</li> <li>Received tetanus injection prior to this pregnancy</li> <li>Timing of first antenatal check</li> <li>Antenatal visits for pregnancy</li> </ul>
<b>Delivery</b>	
	<ul style="list-style-type: none"> <li>Assistance: doctor</li> <li>Assistance: nurse/midwife</li> <li>Place of delivery: <ul style="list-style-type: none"> <li>Government hospital</li> <li>Government health center</li> <li>Government health post</li> <li>Other public</li> <li>Private hosp/clinic</li> <li>Other private medical facility</li> </ul> </li> <li>Assistance at delivery: nurse</li> <li>Assistance at delivery: midwife</li> </ul>
<b>Postnatal</b>	
	<ul style="list-style-type: none"> <li>After birth, health professional checked health</li> <li>After birth, health professional checked health by provider <ul style="list-style-type: none"> <li>Doctor</li> <li>Nurse/midwife</li> <li>Other person</li> </ul> </li> <li>Place for checkup <ul style="list-style-type: none"> <li>Respondent's home</li> <li>Other home</li> <li>Government hospital</li> <li>Government health post</li> </ul> </li> </ul>

<b>Postnatal</b>	
	Other public Private hosp/clinic Private doctor Private nurse/midwife Industry-based clinic Other private
<b>Mortality</b>	
	Sons who have died Daughters who have died Pregnancy that did not end in live birth How many such pregnancy Baby born alive or dead Month of pregnancy (end) Year of pregnancy (end) Months of pregnancy Respondent or someone ended the pregnancy

**SUMMARY OF FINDINGS:**

<b>Table 2. Availment of Health Care Services by Socio-Demographic Factors: 2003 NDHS</b>			
<b>Socio-Demographic Factors</b>	<b>Health Care Services (%)</b>		
	<b>Prenatal</b>	<b>Delivery</b>	<b>Postnatal</b>
Age 5-year groups			
15-19	79.2	52.5	75.5
20-24	66.1	61.2	75.1
25-29	61.7	63.2	77.2
30-34	65.4	62.0	77.8
35-39	66.4	56.6	76.3
40-44	73.1	48.0	75.7
45-49	81.8	53.4	76.2
Highest educational level			
No education	43.1	11.0	56.8
Primary	60.3	34.9	68.3
Secondary	67.2	63.1	78.8
Higher	71.7	86.1	83.8
Respondent's occupation			
Not working	63.4	58.3	74.3
Prof., Tech., Manag.	76.0	79.9	83.3
Clerical	69.9	82.7	82.0
Sales	68.9	60.8	81.3
Agric-self employed	56.9	19.3	92.4
Agric-employee	62.8	24.5	71.0
Services	63.2	73.2	79.6
Skilled manual	68.8	61.5	76.0
Unskilled manual	63.5	37.9	72.1
Wealth index quintile			
Poorest	56.9	25.1	70.7
Poorer	64.0	51.6	74.8

Socio-Demographic Factors	Health Care Services (%)		
	Prenatal	Delivery	Postnatal
Middle	67.4	72.4	78.2
Richer	72.8	84.4	79.1
Richest	75.9	92.4	85.5
Type of place of residence			
Urban	68.0	79.1	79.9
Rural	63.8	40.9	73.3
Region			
National Capital Region	66.5	87.8	79.7
Cordillera Admin Region	62.2	60.8	65.3
I – Ilocos	66.2	74.5	69.5
II - Cagayan Valley	71.5	53.2	68.2
III – Central Luzon	67.7	85.8	77.9
IVA - CALABARZON	68.8	74.7	74.1
IVB - MIMAROPA	59.7	29.3	79.9
V – Bicol	64.6	47.8	78.6
VI - Western Visayas	64.3	47.4	72.4
VII - Central Visayas	65.3	68.5	77.6
VIII - Eastern Visayas	63.1	36.5	69.0
IX - Zamboanga Peninsula	64.8	31.4	62.3
X - Northern Mindanao	68.8	41.0	83.7
XI – Davao	71.4	47.7	82.0
XII - SOCCSKSARGEN	65.3	37.1	86.1
XIII - Caraga	65.3	42.6	91.5
ARMM	56.6	21.7	76.2

Eight out of ten women in high-risk pregnancies, i.e. those who belong to the oldest age group 45-49 and youngest 15-19, availed of prenatal services. Women between 25-29 and 30-34 age group mostly avail of delivery care and postnatal services. As educational attainment improves, the availment of health care services also increases.

Professionals, technical persons and in managerial positions avail mostly of prenatal and postnatal services. Women in agriculture-related occupations are the ones with the lowest turnout in delivery services. As women become marginalized, they tend to avail less of these services. Those in the urban areas have a higher percentage of availment due to accessibility of health care providers. Women in the Autonomous Region for Muslim Mindanao have the lowest percentage of availment of delivery services. Caraga show the highest turnout in postnatal services.

<b>Table 3. Availment of Health Care Services by Characteristics of Pregnancy and Women's Status: 2003 NDHS</b>			
<b>Characteristics of Pregnancy</b>	<b>Health Care Services (%)</b>		
	<b>Prenatal</b>	<b>Delivery</b>	<b>Postnatal</b>
Wanted pregnancy			
No	60.3	56.5	74.6
Yes	71.8	63.4	78.7
Presence of complication in previous births			
No	50.5	55.3	71.3
Yes	84.7	65.5	83.1
Complication during pregnancy and childbirth			
No	56.4	56.3	73.5
Yes	92.2	69.8	85.3
<b>Women's Status</b>			
Decision Making			
No	61.9	48.3	80.5
Yes	66.0	60.0	76.5

Women whose pregnancies are wanted are more likely to avail of health care services. This is also apparent in women who experienced complication in previous births, during pregnancy, and childbirth. More women who decide for themselves avail more of prenatal and delivery services.

<b>Table 4. Department of Health Recommended Availment of Prenatal and Postnatal Services by Socio-Demographic Characteristics, Characteristics of Pregnancy and Women's Status (%): 2003 NDHS</b>				
	<b>7 or more prenatal visits</b>	<b>4 or more prenatal visits</b>	<b>first prenatal visit in first trimester</b>	<b>postnatal after 1 week of less</b>
Age 5-year groups				
15-19	20.7	57.4	35.8	53.9
20-24	21.7	46.9	33.9	43.9
25-29	25.6	47.8	35.3	41.4
30-34	26.2	50.8	39.7	45.3
35-39	23.5	47.0	37.0	44.3
40-44	22.4	48.8	38.0	51.2
45-49	25.6	50.2	38.8	58.4
Highest educational level				
No education	5.8	18.4	14.6	32.4
Primary	12.7	36.3	25.9	39.5
Secondary	23.1	50.1	36.4	45.0
Higher	40.3	62.2	50.4	51.0
Respondent's occupation				
Not working	21.0	45.6	33.0	40.8
Prof., Tech., Manag.	42.6	65.3	56.0	56.8
Clerical	42.6	63.6	51.8	50.0

	7 or more prenatal visits	4 or more prenatal visits	first prenatal visit in first trimester	postnatal after 1 week of less
Sales	23.9	49.8	35.9	50.3
Agric-self employed	9.3	19.1	13.3	50.2
Agric-employee	10.8	37.9	28.4	42.9
Services	27.4	48.1	40.4	42.2
Skilled manual	26.7	50.5	36.8	45.9
Unskilled manual	15.9	40.7	29.6	44.2
Wealth index quintile				
Poorest	11.0	32.8	22.4	39.0
Poorer	14.0	42.5	28.1	41.7
Middle	25.7	50.7	38.5	45.9
Richer	35.4	61.9	48.0	48.6
Richest	50.4	69.6	60.8	54.0
Type of place of residence				
Urban	31.7	55.3	43.5	46.5
Rural	16.9	42.0	29.8	42.9
Region				
National Capital Region	33.1	55.2	46.6	41.7
Cordillera Admin Region	16.3	39.1	26.4	33.7
I - Ilocos	17.0	42.9	32.1	43.3
II - Cagayan Valley	18.7	51.9	46.8	36.0
III - Central Luzon	28.3	54.0	41.2	45.8
IVA - CALABARZON	35.0	55.6	48.3	43.8
IVB - MIMAROPA	17.2	39.8	26.3	47.2
V - Bicol	14.5	35.4	24.3	49.5
VI - Western Visayas	22.6	46.2	33.4	38.6
VII - Central Visayas	24.0	52.1	29.5	45.0
VIII - Eastern Visayas	14.9	39.6	21.2	38.9
IX - Zamboanga Peninsula	14.1	48.7	39.0	36.0
X - Northern Mindanao	21.0	46.9	37.1	56.8
XI - Davao	28.4	54.6	40.4	54.0
XII - SOCCSKSARGEN	24.5	52.4	37.5	54.3
XIII - Caraga	32.4	54.7	35.7	58.3
ARMM	7.2	24.5	16.1	42.3
Wanted pregnancy				
No	19.3	42.6	29.6	39.6
Yes	29.5	54.9	43.9	50.0
Presence of Complication in Previous Births				
No	14.7	34.1	24.4	32.7
Yes	35.9	66.4	51.5	59.4
Complication during and childbirth				
No	20.5	41.7	31.3	37.6
Yes	34.6	67.9	51.4	64.3
Decision Making				
No	22.5	37.9	27.6	55.5
Yes	24.3	48.7	36.7	44.6

Delimiting the variables to those recommended by the DOH, more than half of the women in age groups, 15-19, 30-34, and 45-49 had four or more prenatal visits, while at most one out of four in all age groups had seven or more visits. More women in the 30-34-year age group had their first prenatal visit in the first trimester compared to the rest of the age groups.

Women with higher educational attainment had a larger turn out in prenatal and postnatal visits. Women in agriculture remain to have the lowest number that had prenatal and postnatal visits. As income grows, the number of visits increase. Women in ARMM have the lowest percentage who availed of prenatal services while NCR maintains a high turnout.

It is not redundant to underscore that the first prenatal visit should be made during the first trimester, as this stage posts the most risk. The 2003 NDHS showed that the variance of compliance to this recommendation was from only 13.3 percent of women in agriculture-self-employed occupation, to 60.8 percent of women in the richest quintile. Moreover, the availment of postnatal services based on the DOH recommendation of after first week or less from childbirth ranged only from 32.4 percent of women with no education to 64.3 percent of women who experienced complication during pregnancy and childbirth.

<b>Table 5. Binary Logistic Regression Coefficients for Mortality (by Socio-Demographic Characteristics)</b>				
	B	S.E.	Sig.	Exp(B)
Age 5-year groups				
15-19			0.0000	1.0000
20-24	0.6089	0.0002	0.0000	1.8384
25-29	1.0118	0.0002	0.0000	2.7504
30-34	1.2742	0.0002	0.0000	3.5758
35-39	1.7084	0.0002	0.0000	5.5199
40-44	2.2340	0.0002	0.0000	9.3375
45-49	2.5599	0.0003	0.0000	12.9351
Highest educational level				
No education			0.0000	1.0000
Primary	-0.0385	0.0002	0.0000	0.9623
Secondary	-0.5166	0.0002	0.0000	0.5965
Higher	-0.6803	0.0002	0.0000	0.5065
Respondent's occupation				
Not working			0.0000	1.0000
Prof., Tech., Manag.	-0.0844	0.0001	0.0000	0.9190
Clerical	-0.4670	0.0002	0.0000	0.6269
Sales	0.1081	0.0001	0.0000	1.1142
Agric-self employed	-0.2866	0.0005	0.0000	0.7508
Agric-employee	-0.2567	0.0001	0.0000	0.7736
Services	0.5394	0.0002	0.0000	1.7150
Skilled manual	0.1493	0.0002	0.0000	1.1610
Unskilled manual	0.2190	0.0001	0.0000	1.2448

Wealth index quintile				
Poorest			0.0000	1.0000
Poorer	-0.1946	0.0001	0.0000	0.8231
Middle	-0.4004	0.0001	0.0000	0.6701
Richer	-0.4993	0.0001	0.0000	0.6070
Richest	-0.7581	0.0001	0.0000	0.4686
Type of place of residence				
Urban	-0.0650	0.0001	0.0000	0.9371
Region				
National Capital Region			0.0000	1.0000
Cordillera Admin Region	0.4365	0.0002	0.0000	1.5473
I - Ilocos	0.2161	0.0002	0.0000	1.2412
II - Cagayan Valley	0.0256	0.0002	0.0000	1.0259
III - Central Luzon	-0.0724	0.0001	0.0000	0.9302
IVA - CALABARZON	0.1024	0.0001	0.0000	1.1078
IVB - MIMAROPA	0.4321	0.0002	0.0000	1.5404
V - Bicol	0.2743	0.0001	0.0000	1.3157
VI - Western Visayas	0.2270	0.0001	0.0000	1.2549
VII - Central Visayas	-0.1686	0.0001	0.0000	0.8448
VIII - Eastern Visayas	0.3802	0.0002	0.0000	1.4626
IX - Zamboanga Peninsula	0.0491	0.0002	0.0000	1.0503
X - Northern Mindanao	0.4520	0.0002	0.0000	1.5714
XI - Davao	0.2422	0.0002	0.0000	1.2741
XII - SOCCSKSARGEN	0.0595	0.0002	0.0000	1.0613
XIII - Caraga	0.2457	0.0002	0.0000	1.2785
ARMM	-0.1622	0.0002	0.0000	0.8502
Constant	-1.5175	0.0003	0.0000	0.2193

Table 5 shows that the odds of the occurrence of mortality increased as the woman ages, with emphasis on the 35 year-old and above women, while the likelihood of mortality decreased as the woman becomes more educated.

Women who are involved in sales, services, skilled and unskilled manual occupations were more likely to experience mortality. Meanwhile, as the woman becomes richer, she was less likely to experience mortality.

The odds of experiencing mortality of women in urban areas were 0.9371 less likely than those who were in their rural counterpart. It is interesting to note that women in Central Luzon, Central Visayas and ARMM are less likely to report experiencing mortality than those in the National Capital Region.

<b>Table 6. Binary Logistic Regression for Mortality (Using Characteristics of Pregnancy and Respondents' Decision-Making)</b>				
	B	S.E.	Sig.	Exp(B)
Wanted Pregnancy	-0.0853	0.0001	0.0000	0.9183
With Previous Complication	1.7215	0.0001	0.0000	5.5930
Without Complication During Pregnancy and Childbirth	-0.5654	0.0001	0.0000	0.5681
Can Make Decisions	-0.0746	0.0003	0.0000	0.9281
Constant	-1.5008	0.0003	0.0000	0.2229

In terms of the characteristics of the pregnancy and respondents' decision-making, table 6 depicts those who wanted the pregnancy as of its occurrence ("then"), those who experienced no complication during the pregnancy and childbirth, and those who has the capability to make decisions were less likely to experience mortality. On the other hand, those who experienced complication during their previous pregnancies were 5.5930 more likely to experience mortality.

<b>Table 7. Binary Logistic Regression for Mortality (Using Availment of Health Care Services)</b>				
	B	S.E.	Sig.	Exp(B)
Prenatal	-0.2558	0.0001	0.0000	0.7743
Delivery	-0.6034	0.0001	0.0000	0.5470
Postnatal	-0.1615	0.0001	0.0000	0.8509
Constant	-0.2280	0.0001	0.0000	0.7961

The most interesting finding of the study is that when a woman availed of any of the maternal and child health services, i.e. prenatal services, delivery care, and postnatal services, she became less likely to experience mortality.

### **CONCLUSIONS AND RECOMMENDATIONS:**

In general, the study revealed that women who were perceived to be vulnerable, such as those in the oldest and youngest age groups, those who experienced any complication in their previous births, during pregnancy and childbirth, are more likely to avail of prenatal and postnatal health services.

The increase in likelihood of availing health care services increased as the level of education and wealth index quintile increase. Meanwhile, women in rural areas are less likely to seek prenatal services, delivery care or postnatal services.

Women who were more than 35 years of age, less educated, involved in sales, services, skilled and unskilled manual occupation, with less financial capacity, in rural areas, did not want the pregnancy (either too soon or do not want to have more), experienced complication in the previous or latest pregnancy, and do not have access to the decision-making in the household, have greater chance of experiencing any of the mortality variables described in table 1.

Finally, women who availed of any of the health care services decreased the chance of experiencing pregnancy- and childbirth-related mortality, which is empirically the substance of the design of maternal and child health services package.

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<http://www.doh.gov.ph>