The Risk of Childbearing: A Philippine Study of Pregnancy Complications and Maternal Mortality

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Acknowledgements

Introduction

There are many risks associated with pregnancy; more than half a million women, nearly all of them (99 percent) in the developing world, die each year in pregnancy or childbirth (Blurn & Fargues, 1990; Population Reports, 1988). These deaths are only part of the story. For every women who dies, many other suffer serious sometimes permanent injuries as a result of pregnancy (Population Reports, 1988).

In a recent national demographic study (The Safe Motherhood Survey, part of the 1993 National Demographic Survey) covering more than 8,400 (8481) women of reproductive age, a majority of the women reported at least one pregnancy-related complication and a substantial number reported suffering two or more maternal ailments (Pagtolun-an & Badoles, 1995). More than a fourth of these women (26.3 percent) reported ailments and complications during pregnancy, 33.8 percent reported ailments during childbirth, and 19.1 percent experienced ailments during the six-weeks of postpartum period.

While life-threatening risks associated with childbearing are shared by pregnant women all over the world, it is undeniable that some women are more exposed to these risks than others, because of certain beliefs, attitudes, and practices.

This study attempts to look at these women and to examine those characteristics that compound their exposure to a dangerous pregnancy. Primarily, the. study is aimed at showing the impact of maternal care on the incidence of pregnancy-related complications and on identifying other factors associated with pregnancy ailments and maternal death. Specifically, the objectives are:

1.   to determine the patterns of pregnancy and childbirth related illnesses, complications and deaths for the past three years in the rural and urban areas of Misamis Oriental Province.

2.   to identify and assess the impact of various factors that influence maternal morbidity and mortality such as age of mother at childbirth or delivery, duration of marriage, the interval in years between this pregnancy and the last pregnancy, parity, prenatal care and prenatal care provider, education of mother, household income, occupation of father, place of residence of mother, birth attendant and training of birth attendant, place of delivery, and distance to the nearest health facility.

3. to compare the result of this provincial study to the national study-the Safe Motherhood Survey of the 1993 Philippine National Demographic Survey (Philippine National Statistics Office, 1994).

Research Design

The study (Omran, 1986) uses a case-control design to cover 100 maternal death cases and 300 control women in the study area from January 1, 1990 to September 30, 1994. Identification and verification of maternal death cases require the following procedures. The first was the examination of death certificates and identifying women of reproductive age (13 to 49 years old) who died between January 1, 1990 to September 30, 1994. From this procedure, a preliminary listing of women who died in their reproductive ages was made. Then in order to come up with a more complete listing of women who died in their reproductive ages, records of deaths in hospitals and health clinics were also examined and reviewed. This is followed by interviewing key informants such as traditional birth attendants, local leaders, local schoolteachers and other well-informed member of the community. New names were then added to the list. Finally, when the list was completed, verification was started through actual visits and preliminary interviews of households that have reported a death of a woman in her reproductive age. These actual visits and preliminary interviews allowed us to verify the real maternal death cases and to exclude deaths that are not pregnancy or childbirth related. All deaths of women occurring during pregnancy, during childbirth, and during the six weeks of postpartum period were classified as maternal death cases.

The control groups are composed of all deliveries that did not result in maternal deaths. The initial list of control groups is taken from the birth certificates in the local civil registrar for the period 1990 to 1994. These births were then matched the cases (maternal deaths) using the barangay where they resided and the date of birth or delivery as matching criteria. After matching, a list of 'qualified' women for the control group was finalised. A ratio of 3 control women to 1 maternal death was drawn by simple random sampling from the list of 'qualified' women. There are 300 control women interviewed regarding their marital and pregnancy history, maternal care during pregnancy, delivery, and after delivery, social, economic and demographic characteristics as well as the circumstances surrounding her pregnancy, birth, and the six weeks period after her birth of the control pregnancy. Control pregnancy is the pregnancy of the control women that matches the place of residence and the date of delivery of cases (maternal deaths).

Data Analysis

This study analyses the data in two ways. Firstly, the analysis of the case control design presents the odds ratio of maternal deaths when exposure factors are present versus when the exposure factors are absent. The logistic regression coefficients are estimated presenting the relative odds of maternal deaths when various exposure variables are examined simultaneously and separately. Secondly, it examines the control women through their pregnancy history data and looking at the incidence of maternal ailments during their entire reproductive period. Ailments and complications during pregnancy, childbirth, and during the postpartum period were examined in the light of various explanatory factors such as age of mother at childbirth, the interval in years between this pregnancy and the last pregnancy, parity, prenatal care, prenatal care provider, education of mother, family income, occupation of father, place of residence of mother, birth attendant and training of birth attendant, place of delivery, and distance to the nearest health facility.

The study also includes several analysis using data coming from the Safe Motherhood Survey of the 1993 National Demographic Survey. This additional information allowed comparative analysis between the provincial and the national data.

Findings and Interpretation

Characteristics of Cases and Control

Maternal death cases and control women have many characteristics in common (see Table 1). The majority is 25 years old and over, have been married at least four years, attained some high school education and experienced more than four pregnancies. Many of these women are extremely poor with many of them (70 percent) reporting a monthly income of less than 4,000 pesos or approximately $153.00. While the majority of women underwent prenatal care during pregnancy, many of them choose the Traditional Birth Attendant (Hilots) as prenatal care providers rather than a health professional. A great number of them (43.5 percent and 43 percent of cases and control respectively), have prenatal care only after their fourth month of pregnancy.   Hilots were also the most popular attendant during childbirth and as a consequence, a majority of these deliveries occurred at home.

While there are similarities between these two groups of women, there are also many noticeable differences. For example, examination of cases and control according to the age of the woman at childbirth or delivery showed that while a majority of maternal deaths occurred among younger women (less than 25 years of age) than among older women (above 40 years of age), the opposite is true for control women. Our findings show that a great number of them (73.7%) gave birth between 25 and 39 years of age. Control women also show a somewhat higher education with 61.67% attaining high school or a higher educational level. In contrast, only 52% of women who died have reached high school or higher. Household income is also another area of difference. The control group has fewer women (29.7%) in the very low-income category whereas the maternal death cases have a higher figure at 36%.

Surprisingly, more women who died in pregnancy or childbirth had prenatal care (84 percent) than of control women (78.7%), although there are indications that more control women had prenatal care from health care professionals rather than from Hilots. Likewise, in childbirth, more control women than maternal death cases were assisted by health professionals and trained Hilots instead of the untrained Hilots.

Birth Attendants

In the 70's, more than 70% of all births in the Philippines were attended by the traditional birth attendants (Hilots) and only a few were assisted by health professionals such as physicians or midwives (Opilas, 1977). These Hilots did not receive any formal training on health or midwifery nor on maternal and child health attendance. Many of them learned their skill and techniques from their mothers or grandmothers and in turn taught these skills to their daughters.

The Department of Health. in recognition of the importance of a competent birth attendant in reducing maternal mortality and morbidity, initiated a training program to equip Hilots with the rudiments of maternal and child health attendance before, during, and after delivery. This training, which later on was extended to cover more than 50% of all practising Hilots in the rural and urban Philippines, became an on-going project of the Department of Health. Nowadays, while Hilots still assist most pregnant women, particularly in the countryside, many of them have been trained by the Department of Health.

Table 1 also includes the categorisation of maternal death cases and control women according to the birth attendant assisting during delivery. Fifty five percent of maternal death cases were attended by the traditional birth attendants (Hilots), 69.1 percent were trained by the Department of Health while the remaining 30.9 percent were not trained.

On the other hand, 55.7% of control births were attended by the traditional birth attendants, 77% of which were trained while 22.8% did not get any training from the Department of Health.

Clearly, these findings support the national figure shown by the Safe Motherhood Survey of 1993 (Pagtolun-an and Badoles, 1995) which reported that 62.6 percent of births in the Philippines were assisted by Hilots. Most of these women (69.9%) delivered at home.

There are 296 trained and 65 untrained traditional birth attendants in Cagayan de Oro City and the neighbouring municipalities. The majority (87%) of untrained traditional birth attendants is practising in the hinterland areas thereby multiplying the risk of delivery. Among this study's coverage, 17 maternal deaths and 38 control births were assisted by the 65 untrained traditional birth attendants. Again, this happens because there are no birth attendants other than the untrained ones in the hinterland areas.

The majority of the traditional birth attendants interviewed was above 45 years old, female, and has been attending birth for over 15 years. Many were elementary graduates and a few have high school education. When interviewed about their usual procedure in the event of complications or abnormal occurrences during childbirth, 98% claimed that they normally refer the case to the nearest hospital or health facility. This response however, was not supported by many respondents with maternal death cases.

The Risk of Childbearing

Every pregnancy presents a certain risk and women with many pregnancies experience multiple risks. The danger may even become greater as other factors, or the combination of these factors, compound the problem faced by women during of their pregnancies. The following discussion is an attempt to elucidate this point.

Maternal Deaths

Death is probably the ultimate risk a woman is exposed to during pregnancy. The data in Table 1 present odd ratios of maternal death cases and control by various selected exposure variables. These exposure variables including attendant at birth, training of birth attendant, the age of the woman, education, family income, the woman's and her spouse's occupations, place of birth, prenatal care, prenatal provider, first prenatal visit, frequency of prenatal care, distance and travel time to the nearest health facility, duration of marriage, birth weight, pregnancy interval, status of pregnancy, status of delivery, and total number of pregnancies.

Table 1 shows that traditional birth attendant training, while not statistically significant, is quite important. For example, maternal death is 1.52 times higher among women assisted by untrained traditional birth attendant compared to those assisted by trained ones. Similarly, young mothers have 2.24 times more maternal deaths than older mothers and death for those with shorter duration of marriage is 2.53 times higher than women who had been married longer. Women with less education had 1.48 times more maternal deaths than those with high school or higher education and women with family income less than 2,000 pesos have 1.71 times more maternal deaths than those mothers with higher income.

As expected, very high odd ratios of maternal deaths are shown by women who suffered complications during pregnancy (OR=2.41) and during delivery (OR=3.42).These findings support the contention that maternal health problems usually begin at the early stage of pregnancy.

Surprisingly, the absence of prenatal care during pregnancy shows a very low odd maternal death ratio of 0.70, deliveries assisted by a traditional birth attendant has an odd ratio of 0.91, and home deliveries with an odd ratio of only 0.72.This finding is quite similar to the results of the Safe Motherhood Survey (see Table 3) where births at home, the use of traditional birth

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attendants, absence of prenatal and postnatal care did not show any substantial odd ratios. In fact, these findings lead the authors (Pagtolun-an & Badoles, 1995) to conclude that while the majority of women have prenatal care, this practice is seen by most of them as a response to a problem in pregnancy rather than as a preventive measure to avoid complications.

Table 1. Odds Ratio of Maternal Death Cases and Control Birth By Selected Exposure Variables, Misamis Oriental Philippines, 1994

Exposure Variables		Maternal Deaths	Control Women	Odds Ratio	Chi-Square	P
Attendant at Birth	Traditional	55	167	0.91	0.17	0.70
	Health Prof.	45	124			
Traditional Birth Attendants	Trained	17	38	1.52	1.48	0.23
	Untrained	38	129			
Age of Women	Young (<25)	32	52	2.24	9.72	0.00
	Older (>25)	68	248			
Education of Women	Elem. or lower	48	115	1.48	3.31	0.07
	HS or higher	52	185			
Family Income	Low (<2,000)	36	89	1.71	4.47	0.04
	High (>2,000)	50	211			
Husband's Occupation	Unskilled	24	78	0.91	0.12	0.72
	Skilled	75	222			
Women's Occupation	Housewife	65	198	0.96	0.03	0.97
	Employed	35	102			
Place of Birth	Home	73	237	0.72	1.55	0.22
	Hospital	27	63			
Prenatal Care	None	16	64	0.70	1.33	0.25
	At Least Once	84	236			
Prenatal Provider	Traditional	56	139	1.35	1.44	0.24
	Health Prof.	29	97			
First Prenatal Visit	After 4th Mo.	37	101	1.05	0.04	0.92
	Before 4th Mo.	47	135			
Prenatal Care Frequency	0 to 3 times	36	153	0.54	6.77	0.01
	more than 3	64	147			
Distance	Far (>3 kms.)	75	217	1.15	0.26	0.60
	Near (<3 kms.)	25	83			
Travel Time	Far (>1 hour)	29	82	1.09	0.12	0.72
	Near (<1 hour)	71	218			
Duration of Marriage	<6 Years	65	127	2.53	15.44	0.00
	>= 6 years	35	173			
Birthweight	Low (<4 Lbs.)	5	17	1.22	1.98	0.15
	Normal(> 4 Lbs)	68	283			
Pregnancy Interval	<3 Years	90	250	1.81	2.61	0.09
	>3 Years	10	50			
Status of Pregnancy	Complications	48	83	2.41	14.10	0.00
	Normal	52	217			
Status of Delivery	Complications	52	72	3.42	27.49	0.00
	Normal	48	228			
Total Number of Pregnancies	More than 3	50	170	0.76	1.34	0.26
	3 Preg. or Less	50	130			

Multivariate Analysis of Maternal Deaths

The purpose of this analysis is to examine the influence of various exposure variables on maternal mortality. The analysis begins with the examination of a few contingency tables and correlation matrices to check the association between various exposure variables. Exposure variables that are found to have strong and significant zero-order correlation coefficients were prenatal care and prenatal care provider (Yules Q=-0.9899), pregnancy and delivery complications (Yules Q=0.7722), training of traditional birth attendant and delivery complications (Yules Q=0.70 18), and training of traditional birth attendant and complications

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during pregnancy (Yules Q=0.8896). One of the variable in a pair with zero-order correlation coefficients greater than or equal to 0.7000 (Yules Q or r> 0.7000) was excluded in the multivariate regression analysis. These include the variable prenatal care provider, complications during pregnancy and complications during delivery.

The binary nature of the dependent variable, namely: pregnancy that resulted in maternal death (cases) and pregnancies that did not result in maternal deaths (control), calls for a logistic regression analysis. The independent variables entered into the model are: age of the mother, duration of marriage, interval in years between this pregnancy and the last pregnancy, parity, prenatal care, training of the prenatal care provider, education of mother, household income, occupation of father, place of residence of mother, birth attendant and training of birth attendant, place of delivery, and distance to the nearest health facility.

Table 2 presents the results of this regression analysis. The table revealed that the increase in the relative odds of maternal death is explained by only three factors: the age of the woman, the education of woman, and family income. Other explanatory factors such as duration of marriage, occupation, place of birth, attendant at birth and training of birth attendant, prenatal care and training of prenatal care provider, number of pregnancies, and distance of residence to the nearest health facility were found not statistically significant.

Table 2. Multivariate Regression, Log Odds of Maternal Death by Selected Exposure Variables, Misamis Oriental, 1994.

Independent Variable		Coefficient	Standard Error
Hilot Training	Untrained Hilot	-0.0068	0.1476
Attendant at Birth	Hilot	-0.0291	0.0310
Age of Women	35 years and younger	-0.0118**	0.0025
Education of Women	Elem. or lower	0.0554**	0.0198
Family Income	Less than 2,000 pesos	0.0252*	0.0127
Occupation of Husband	Low Skilled	-0.0382	0.0276
Place of Birth	Home	-0.0156	0.0391
Prenatal Care	None	0.2562	0.2272
Prenatal Care Provider	Hilot	-0.0189	0.0305
Parity	6 or Higher	-0.0004	0.0040
Distance	Far	0.2469	0.5476
Duration of Marriage	6 years or longer	0.0313	0.0285
Log Likelihood		-178.48**	
Percent Correctly Predicted		83.5	

Again, it is worth noting that maternal care variables, represented by attendant at birth, training of birth attendant, and prenatal care do not show any significant influence in reducing maternal deaths. This is very similar to the findings of the Safe Motherhood Survey (Pagtolun-an & Badoles,1995) where variables like Hilot as birth attendant, absence of prenatal and postnatal care show the opposite effect, that is, 'lowering' the odds of maternal death. This is probably because many women who avail of prenatal and postnatal care do so whenever they feel there is something wrong with their pregnancy or childbirth. Likewise, prenatal care provider may contribute to the increase in reporting of complications when they officially diagnose these ailments. Unreported undiagnosed ones are those brought to traditional birth attendants.

In their study entitled, 'Issues in Measuring Maternal Morbidity: Lessons from the Philippine Safe Motherhood Survey Project,' Stewart, et al. (1996) pointed out the potential bias of self-reported illnesses. "... in settings where diagnostic service are unavailable or under-utilised, a large proportion of women who may have suffered from disease may never have been diagnosed. In such cases, data on diagnosed disease will be biased toward the unrepresentative experience of those who are more likely than others to seek medical care. Those who seek may have a severe form of disease, they may have a greater propensity to

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use that available services, or they may have easier access to a facility because of its proximity to their homes." (pp 76-81)

Maternal Morbidity

Table 3 shows the different symptoms of maternal ailments in past pregnancies reported by women in the Misamis Oriental study and by women in the Philippine Safe Motherhood Survey (SMS). About 27.7% of women in Misamis Oriental and about 26.3% in the Philippine sample reported experiencing maternal ailments during their past pregnancies. Misamis Oriental women also mentioned symptoms that women in the national survey did not report. These symptoms include edema (bloating of body, face and legs), painful urination, anaemia, high blood pressure, jaundice, lower abdominal pain, vomiting and loss of appetite.

Table 3. Percentage of Respondents with Maternal Ailments During Pregnancy, Data from Control Women of Misamis Oriental (1994) and the Philippine Safe Motherhood Survey (1993).

Pregnancy Complications	Misamis Oriental n=300	Philippines n=8426
Vaginal Bleeding	6.4	21.8
Convulsions (Eclampsia)	0.3	2.0
High Fever	6.6	6.1
Edema	25.1	*
Painful Urination	8.8	*
High Blood Pressure	1.9	*
Anaemia	17.5	*
Others (abdominal pain, etc.)	14.8	*
Total % With Complications	27.7	26.3

*Not mentioned by women

Note: Percent of each ailment will not add up to total percent because some women reported more than one symptom.

Among all the symptoms reported by Misamis Oriental Women, edema showed the highest frequency with 25.1 percent of women claiming this ailment, followed by anaemia with

7.5%, abdominal pain, vomiting, and loss of appetite with 14.8%, painful urination with 8.8%, high fever with 6.6%, vaginal bleeding with 6.4% and convulsions with 0.30%. On the other hand, the Philippine sample showed vaginal bleeding with the highest frequency of 21.8% of women, followed by high fever with 6.1 percent and then by convulsions or eclampsia with 2.0%.

Complications and ailments during past childbirth, as reported by Misamis Oriental and Philippine women, are also presented in Table 4. The Philippine data is showing a higher percentage of women with complications or ailments during pregnancy (33.8%) while Misamis Oriental women is showing a lower percentage at 20.7%. This is true despite the inclusion of more symptoms in the Misamis Oriental questionnaire such as edema, red eyes, vaginal laceration, body pains, backache, breast swelling, relapse (Bughat), skin diseases, varicose, anaemia and cramps. It is possible that women in both samples may have mistakenly reported delivery complications as postpartum complications and vice versa.

Table 4. Percentage of Respondents with Maternal Ailments, During Childbirth, Data from Control Women of Misamis Oriental (1994) and the Philippine Safe Motherhood Survey (1993).

Delivery Complications	Misamis Oriental n=300	Philippines n=8426
Massive Bleeding	3.2	8.3
Convulsions	1.2	1.7
Labour More than 12 Hours	10.3	14.5
Abnormal Position of the Baby	4.2	7.8
Baby's Sick (Foetal Distress)	2.2	3.5
Retained Placenta	2.4	6.8
Very High Fever	0.5	1.8
Placenta Previa	0.0	1.1
Caesarean Section	*	5.3
Vaginal Laceration	20.0	*
Others (Cramps, lack of appetite)	0.5	*
Total % With Complications	20.7	33.8

*Not mentioned by women

Note: Percent of each ailment will not add up to total percent because some women reported more than one symptom.

A higher proportion of women in both samples reported prolonged labour as one of their symptoms. In the Philippine sample, this is followed by massive bleeding (8.3%), abnormal position of the baby with 7.8%, retained placenta with 6.8%, caesarean section with 5.3 %, foetal distress with 3.5%, high fever with 1.8%, convulsions with 1.7%, and last by placenta previa with 1.1%. In Misamis Oriental sample, vaginal laceration (20.0%) and prolonged labour (10.3%) were followed by abnormal position of the baby (4.7%), then by massive bleeding (3.2%), retained placenta (2.4%), foetal distress (2.2%), convulsions (1.2%), and last by high fever, weakness and cramps (0.5%).

Postpartum complications (see Table 5) were reported by 33.0% of respondents in Misamis Oriental and by 19.1% of respondents in the Safe Motherhood Survey. The difference is mainly due to the number of symptoms reported by Misamis Oriental women, 14 symptoms versus 7 reported by the national Philippine sample. In addition, while lower abdominal pain was experienced by a very high proportion of women with 31.1% in Misamis Oriental and 11.8% of women in the Philippine sample claimed to have experienced this ailment. Foul discharge, high fever, vaginal bleeding, and painful urination were also reported by quite a few women in both samples. However, quite a number of Misamis Oriental women reported body pains and backache (21.7%), breast swelling (23.2%), relapsed or 'bughat' (15.7%) and skin disease, varicose, cramps, and anaemia (4.2%).

It is quite interesting to note that 'bughat' (relapse) is mentioned by quite a number of women in Misamis Oriental. 'Bughat' is a non-medical term commonly used by women to described their ailments after childbirth. These term covers a lot of illness or complaints from women. There are headache, dizziness, fainting spell, tiredness, weak, nervousness, lack of appetite, stomach ache, fear, and vomiting, to name a few.

Table 5. Percentage of Respondents with Maternal Ailments during Postpartum period, Data from Control Women of Misamis Oriental (1994) and the Philippine Safe Motherhood Survey (1993).

Postpartum Complications	Misamis Oriental n=300	Philippines n=8426
Vaginal Bleeding	1.3	3.3
Very High Fever	4.6	3.6
Convulsions	1.0	1.2
Foul Discharge	3.5	6.0
Lower Abdominal Pain	31.1	11.8
Painful Urination	2.7	3.3
Retained Placenta	0.0	1.0
Edema	1.3	*
Body Aches/Backache	21.7	*
Breast Swelling	23.2	*
Relapsed (Bughat)	15.7	*
Others (Skin disease, anaemia, etc.)	5.2	*
Total % With Complications	33.0	19.1

* Not mentioned by women

Note: Percent of each ailment will not add up to total percent because some women reported more than one symptom.

Bivariate Analysis of Maternal Morbidity

The odd ratios of pregnancy, delivery, and postpartum complications were estimated for Misamis Oriental women and compared to the odd ratios estimated for the Philippine sample women based on the data of the Safe Motherhood Survey. Both surveys covered complications occurring in the women's past pregnancies.

Odd ratios of pregnancy complications for Misamis Oriental and Philippine women show that while longer duration of marriage (OR=1.42), older women (OR=1.24), and higher number of pregnancies (OR=2.623 are showing significant and higher odd ratio of pregnancy complications for the Philippine sample, the opposite is true for Misamis Oriental sample. The odd ratios of pregnancy complications shown in Table 8 are all lower than I except for husbands working in low skilled occupation with an odd ratio of 1.48. This odd ratio, however, is not significant at =0.05.

Variables showing significant odd ratio, but in the low direction, are traditional birth attendant (OR=0.73), 35 years old or older mothers (OR=0.22), family income less than 2,000 pesos (OR=0.57), absence of prenatal care (OR=0.57), and 3 or more pregnancies (OR=0.69).

As in the previous tables (particularly Table 1), the impact of maternal care variables on maternal complications and maternal mortality is somewhat inverse. Similarly, the higher odd ratio among younger women, among those who have shorter duration of marriage, and among lower parity women is also consistent with the findings of the previous tables.

Odd ratios of delivery complications for the Misamis Oriental sample and the Philippine sample show noticeable differences between these two tables while odd ratios for older mothers (OR=1.26), those with low education (OR= 1. 14), those with higher number of children (OR=1.31), those who live in rural places (OR=I.11), and those with pregnancy complications (OR=2.34) are shown to be significant among women in the Philippine sample, the opposite is true in the Misamis Oriental sample. The only substantial and significant odd ratio in the Misamis Oriental sample is shown by women who experienced pregnancy complications

(OR=2. 16). The remaining odd ratios, while statistically significant, are all lower than 1 This finding is also found consistent with the maternal death data presented in Table 2.

Postpartum complications estimated for the Misamis Oriental sample and the Philippine sample show that as in the previous tables, maternal care variables (e.g. traditional birth attendant, and absence of prenatal and postnatal care) show odd ratios that indicate somewhat 'lower risk' of postpartum complications. Again the similarity between the national and provincial samples strengthen the presumptions that many women who underwent prenatal and postnatal care and those were attended by health professionals during childbirth are the very high risk women who had initial 'problems' with their pregnancy and/or delivery. As a matter of fact, the data shows very high odd ratios of delivery and postpartum complications among women with pregnancy complications. Furthermore, the correlation coefficients between pregnancy and delivery complications (r=0.6628) and between delivery and postpartum complications (r=0.7891) are quite substantial and significant.

Multivariate Analysis of Maternal Morbidity

This section of the paper will examine the various determinants of maternal morbidity through the multivariate regression technique. Maternal morbidity is represented by three measures, namely, number of pregnancy, delivery, and postpartum complications experienced by a woman throughout her reproductive period. The independent variables are age of the woman when she gave birth, duration of marriage, rural and urban place of residence, occupation of husband, family income, education of woman, number of pregnancies, birth attendant, prenatal and postnatal care.

As in the previous section of this chapter, this analysis will compare the Misamis Oriental and the national Philippine sample of women. Both samples measured the number of pregnancy complications, delivery complications, and number of postpartum complications experienced by women throughout their reproductive period. The continuous and interval nature of the data allows for the ordinary least squares estimation. No pair of independent variables shows correlation coefficients greater than $r>0.69$. The highest correlation coefficients was shown by age and duration of marriage with a zero-order correlation coefficients of $r=0.65$. The rest of the correlations range from $r=0.48$ (between income and education) to $r=-0.11$ (between traditional birth attendant and duration of marriage).

Used here are regression coefficients of three models, namely, the regression model of the number of pregnancy complications, the regression model of the number of delivery complications, and the regression model of the number of postpartum complications. The first regression model examined the determinants of pregnancy complications by entering in to the model the following independent variables: number of pregnancies, place of residence, age of mother, duration of marriage, occupation of husband, education of woman, family income, birth attendant, and prenatal care. Except for the number of pregnancies which shows a significant but negative regression coefficient, all the other variables were deleted in the equation because their coefficients did not reach the minimum tolerance level set for inclusion.

The number of pregnancies alone explained about 6% (R=0.0592) of the variance in the number of pregnancy complications. However, the negative regression coefficient indicates that fewer pregnancies are likely to lead to pregnancy complications.

This finding is consistent with maternal death data as well as the odd ratios of maternal morbidity presented in the previous tables. For example, Table 2 shows the same negative regression coefficients between maternal deaths and number of pregnancy as well as between maternal deaths and older mothers. The most likely explanation would be that maternal care is sought by pregnant women only when they begin to have problems with their pregnancy. However, another likely explanation of high symptoms reporting is that physicians or other health professionals during prenatal care can detect more symptoms than the traditional birth attendants can.

The second regression equation presents the determinants of the number of delivery complications. It reveals only three significant predictors of delivery complications and these are number of pregnancies, family income and pregnancy complications. Number of pregnancy showed a negative impact while family income shows a positive effect. Number of pregnancy complications houses a strong and significant impact on the number of delivery complications. This fact reiterates the strong correlation between these two maternal ailments.

Just like in the previous model, the other selected independent variables are too weak to be entered into the model. Most noticeable is the weak importance played by traditional birth attendants and prenatal care in these analysis.

The third set of regression equations looks the number of postpartum complications and examines the effects of several selected determinants. Among the eleven determinants, only three variables are found to be statistically significant. These variables are rural place of residence, number of pregnancy complications and number of delivery complications. Other variables were again found to have very low coefficients to pass the minimum tolerance level set for the model.

The negative effect of rural place of residence to the number of postpartum complications supports the previous findings that complications are possibly diagnosed more in women residing in urban areas than in women from the rural areas. This is consistent with the findings that more maternal deaths occur in health facilities than at home and more maternal deaths occur under the care of health professionals than traditional birth attendants. This is a very important finding in as much as it seem to highlight the possibility that high risk pregnancies, i.e., pregnancies that have higher chance of complications or bad outcome, are brought to health facilities and are cared for by health professionals. It may therefore mean that most traditional birth attendants are doing what they are supposed to do which is assisting low risk pregnancies. However, one should not underestimate the possibility that many of these high risk pregnancies begin labour at home under the care of traditional birth attendants and many of them reach the hospital only when it is too late to save them.

The Misamis Oriental multivariate regression analysis and the Philippine sample show many similar outcome. They show that in general, prenatal care and training of birth attendants are not consistent predictors of pregnancy, delivery and postpartum complications. In fact, the absence of prenatal care shows a positive regression coefficients in all three models.

Unlike the Misamis Oriental data, the Philippines national survey revealed more statistically significant determinants of maternal morbidity. These determinants include age at birth, low education, number of prenatal care visits, social and economic status, rural place of residence, duration of marriage, weight and height ratio of the mother and the current marital status of the mother. Significant and positive effects are shown by age of women when they gave birth, low education, and number of prenatal care visits while negative results were traced to the social and economic status, rural place of residence, duration of marriage, weight and height ratio of the mother, and the current marital status of the mother.

Conclusion

The Misamis Oriental data show that the relative odds of maternal death is higher among young mothers versus older mothers, among women of shorter marital duration, among low educated mothers, among those with family income less than 2,000 pesos, among mothers who received prenatal and postnatal care, among mothers whose birth occurred in health facilities, and among urban women.

The combination of low education, low income, and shorter period of marriage results in a higher risk of maternal mortality. It is therefore quite unfortunate that many of the women in the study belong to this high-risk group.

The data further reveals that traditional birth attendants, just like 40 years ago, are the most sought maternal care provider by the majority of Misamis Oriental and Philippine women. The data further revealed that while the training of these traditional birth attendants is very important, the odds ratio of maternal deaths shown by untrained birth attendant versus the trained ones while high, was not significant. However, it is still worth noting that the training of birth attendants the rigors of maternal care is very important and must be strongly and consistently pursued by the Department of Health. The fact that many traditional birth attendants recognise the symptoms of an abnormal situation and know when to call for professional help indicates that the program is making a significant headway. If the traditional birth attendant can become a safe alternative to hospital birth, especially for very low risk pregnancies, then hospitals will have space to admit more serious cases. The problem of timing or of exactly knowing and recognising the signs of abnormal or higher risk pregnancy becomes the key factor in training traditional birth attendants.

More than half of the women in the sample reported at least one complication. The complication occurred mostly during postpartum period and the most frequently reported ailment was lower abdominal pain. Similarly, the Philippine sample reported that the majority of women experienced at least one complication during their childbearing period. However, in contrast to the Misamis Oriental sample, the complications occurred mostly during childbirth and the most frequently reported ailment was prolonged labour (Pagtolun-an and Badoles, 1995).

These complications occurred despite widespread practice of prenatal care among women and despite their receiving care from a trained health professional. It seems that the practice of prenatal care is seen by some women not as something to prevent complications but rather as a response to a problem during the pregnancy. This also explains why most complications occur in health facilities and during times when the health care provider is a trained health professional.

This is a very important finding for it points out to the need for proper health education or training of women of reproductive age emphasising the preventive aspect of prenatal care.

The majority of the women claimed to have suffered at least one complication either during pregnancy, during delivery, and/or during the six weeks of postpartum period. Therefore, to the majority of the women, the risk of complications appears to be quite high. This negative perception can be utilised by health planners in convincing women to practice better health preventive measures during pregnancy and to have prenatal care earlier than the fourth month of pregnancy.

One thing which this study is not able to examine is the possibility of differential access to better maternal care among various types of women. This unequal access may be due to various reasons such as personal finances, availability of maternal care services, distance and location of services, and ignorance of women regarding the availability and purpose of such services.

On the other hand unequal access to better and early maternal care could depend on a number of other issues such as the quality of services between the private and government health institutions, health education especially of women and their husbands, health practices of women in reproductive ages, and the women's personal beliefs.

The inverse impact of prenatal, delivery and postnatal care on maternal mortality and morbidity is indicative of the bulk of work that is yet to be done in the area of reproductive health. It is imperative that health education for women and their husbands on the preventive aspect of pre- and postnatal care be provided by the various agencies of the Department of Health. Likewise, the quality of maternal care provided to many indigent women of reproductive ages must at least be equal to the quality of care received by middle and upper class women of the same age. Otherwise, the inequality of access and the inequality of care become a two-punch combination that will most likely knock down many of our pregnant women. The practice of

adequate and quality maternal care is an important aspect in the prevention of pregnancy complications and death. However, as the study seems to indicate, women have prenatal and postnatal care only when there is a problem in pregnancy and delivery.

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