

Regional Differences in Maternal Mortality in the Philippines

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Abstract - *This research was launched in order to determine the differences in the access to health services and rate of maternal mortality between the 17 regions of the Philippines over a period of almost 40 years. Two different publications – the Philippine Health Statistics (PHS) and the Philippine Demographic and Health Surveys (DHS) – were used as sources of secondary data. The study found that regions in Luzon, especially the National Capital Region, generally have lower rates of maternal mortality than the regions in Visayas and Mindanao. This may be because of a large disparity between the women residing in Luzon, particularly in NCR, and those residing in Visayas and Mindanao in their access to health care services. However, it must be noted that even regions in Luzon, except for NCR, generally suffer low rates of access to health facilities during childbirth and access to skilled delivery care. This leads to the observation that there is a large disparity in development in the Philippines in terms of health care, with much of the development being centralized in NCR while the rest of the 16 regions of the Philippines are left behind. The study also found that there is a large difference in access to health care services among the women in the country, with the highly educated and wealthy enjoying greater access to health care services than the poor and uneducated. Recommendations for further research on the matter are provided.*

Keywords – Inequality, Maternal Mortality, Philippines, Healthcare

INTRODUCTION

Central to the survival of the human species is the process of reproduction wherein the species replaces its new members with new ones. No species is immortal and its members eventually die over the course of time. New members of the species must be born in order to replace those who have died. Human beings are not exempt from this. Though the

populations of human societies grow through a combination of both fertility and migration, it is only through reproduction that human civilization as a whole replaces its lost members. It is ironic that it is also within this process that the mother is in great risks of dying. From gestation to parturition, the life of the mother is constantly in danger. As it is often said in the Tagalog regions of the Philippines, “When you are giving birth, it’s almost as if one of your foot is already under the grave” – a proverb brought about by the shared experiences of women from on how much peril a mother faces every time she gives birth. Thanks to developments in medical knowledge and technology, it is possible to lessen the risk of dying for the mother. The question, however, is whether women from all parts of the country are able to take advantage of these health care services.

At the onset of the new millennium, a convention at the United Nations headquarters in New York was held. It was attended by 147 world leaders representing 189 member countries of the United Nations with the intention of reducing the gap in the pace of development between the member countries. This convention resulted in the formulation of the eight priorities which the convention believed would serve as an effective ‘blueprint’ for social and economic progress. They named these eight priorities as the Millennium Development Goals (MDG). One of these goals is MDG 5: Improve Maternal Health. The fifth MDG is aimed at reducing the number of women who die due to pregnancy-related causes. The primary method by which the member countries would proceed in achieving this goal is by increasing the accessibility of health services that cater to the needs of the mother. These health services include obstetrical care during pregnancy and during parturition such as access to health facilities during childbirth and skilled assistance during childbirth. It must be noted that an improvement in the access to health care for mothers is also beneficial for the children. It has been observed in empirical studies that

improving mothers' access to health care is an effective way to reduce the rate of mothers dying due to pregnancy-related causes as well as infant mortality. Furthermore, it has been observed that a considerable proportion of children who die are motherless [1]. In addition, children who are motherless have also been found to be shorter in height and tend to have less years of schooling and lower economic success [2]. Therefore, an improvement in mothers' access to health care can be crucial for the welfare of both the mother and the child.

Maternal death is one of the widely utilized bases of ascertaining three pertinent elements of social development: (1) the overall health of a society, (2) the status of women in a particular society, and (3) the quality of health systems in a particular society [3]. Its usefulness in describing the welfare of society as a whole and in terms of the health of half of society's constituents, as well as the health-related social structures of a society, make maternal deaths a phenomenon of interest in sociology and social demography. The social scientific importance of inquiries into maternal mortality is even more pronounced because it serves not only as an indicator of public health but also of social inequality. Described as an "avoidable crisis" [4], many cases of maternal death could have been prevented if only the mothers have quality and accessible emergency obstetric care. Unfortunately, women of differing nationalities, educational attainment, economic class, race, and age differ in their chances of safe pregnancy and childbirth due to their differing degrees of access to necessary obstetric care – resulting in this unequal access to reproductive health being regarded by some sectors as a human rights violation [5]. The inequality, however, is not limited to socio-economic differences but also has a spatial element. Given the nature of maternal mortality as a macro-phenomenon related to public health, the experience of maternity can also differ from one place to another due to spatial differences in the degree of development of public health institutions. The experience of an expectant mother from a highly developed urban area, for example, can be vastly different from that of an expectant mother in a rural area. This urban-rural difference in maternal experience can even be made more complicated when taking into account the differences in infrastructural development among regions. In the last Philippine presidential elections, the eventual-victorious candidate Rodrigo Roa Duterte

spoke of "Imperial Manila" as part of his rhetoric in favor of federalism and change in the country. According to the rhetoric on Imperial Manila, much of the funds, and consequently, the development in the country are limited to Manila and its surrounding areas which goes against the interest of the rest of the country. This now begs the question: Is there veracity to this claim as far as maternal health is concerned?

This study aims to compare the rates of maternal death among the 17 regions of the country from the 1970s when the political/administrative regions were first established by President Ferdinand Marcos to the present. This is done not only to see how much progress the Philippines has gone through in the past four decades but also to see whether the regions are benefitting equally in terms of improvements to maternal health. Specifically, this study shall aim to describe the trend in maternal mortality rate from the 1970s to the present for the Philippines as a whole and determine if there are salient regional disparities in maternal health.

Data Source

The study is conducted through secondary data analysis. Two different series of publications were utilized in order to obtain secondary data on specific mortality rates and mother's access to health care. The first publication is the Philippine Health Statistics or the PHS annual reports. The PHS reports are statistical reports published by the Department of Health (DOH) through the National Epidemiology Center. It provides statistical data on various aspects of health, with particular attention being given to statistical data on births and deaths. It is from the PHS reports that the data utilized in this paper for the rates of maternal death were obtained. PHS gathers its data through the use of vital registers – primarily in the form of birth and death certificates - provided by the Vital Statistics Division of the Philippine Statistics Authority (PSA). The statistical data found in PHS reports only account for registered live births and deaths. It may suffer from under-reporting or under-registration and it cannot account for live births and deaths which have not been reported to the PSA by the parties concerned.

A caveat should be noted at this point: vital Statistics on deaths may be prone to under-registration. For example, in a study by Kao, Chen, Shi, and Weinrich [6] on the problem of under-reporting and misclassification of maternal mortality in Taiwan, they concluded that it would be incorrect to depend only on death certificates as there is a

substantial amount of under-reporting that is happening, especially on maternal, stillbirth and fetal deaths. In the Philippines, the issue of under-registration is especially problematic in areas where civil unrest is frequent such as the Autonomous Region of Muslim Mindanao (ARMM). For this reason, data from ARMM must be appreciated with caution. There are several reasons why under-reporting happens. Chief among these reasons is neglect and inadequate training on the part of the health worker. Under-reporting happens when the health worker tasked with accomplishing the death certificate neglects to provide an accurate classification of the death or simply fail to provide an accurate classification due to lack of training. For example, when it comes to maternal and fetal deaths, the health worker may miss certain indicators that would classify the deaths as pregnancy-related [7]. Despite the potential limitation of publications based on vital statistics like the PHS, it remains to be a more preferable data source due to its attempt to be a complete enumeration of vital events in the country as opposed to its alternative: the Field Health Service Information System. Just like the PHS, the FHSIS reports are also published by the DOH. The main purpose of FHSIS reports is to provide statistical data on the status of public health programs. Its data are obtained from the reports of local field health personnel in public health facilities through the regional and provincial health offices. The reports are then consolidated at the Central Office. Just like the PHS, FHSIS also have its own limitations. The main limitation suffered by the FHSIS reports when used as a secondary resource for studies of this nature is that its data are obtained only from public health facilities. Statistical data reflected in the FHSIS reports are only those obtained from clients availing of health services from public health facilities and it does not include information which may be derived from clients availing of health services from private health sectors.

The second source of secondary information utilized by this study is the five reports on the Philippines published by the Demographic and Health Surveys or DHS. These are the 1993, 1998, 2003, 2008, and 2013 Philippine DHS. These reports are based on data collected from a nationwide survey of women aged 15-49 in the Philippines and are designed to give access to policy-makers and researchers to up-to-date information on various demographic topics such as fertility rates, mortality rates, family planning, and health. It is from these five DHS reports that this

study obtained the data for the percentage of women residing in the various regions of the Philippines who have access to various health services. It must be noted that DHS reports on access to health services span the period of five years each. For example, the percentage of women who have access to a specific health service included in the 1993 DHS report represented the 1988 to 1993 time period.

RESULTS AND DISCUSSION

The data obtained from the PHS annual reports show that the rate of maternal death in the country improved from 1976 to the latest available report, 2012, with 140 women dying due to pregnancy-related causes per 100,000 live births in 1976 to just 80 women dying per 100,000 live births in 2012. The trend from 1976 to 2012 is not a steady decline but is instead mired by fluctuations. For example, the Maternal Mortality Ratio for 1988 was 110 mothers dying per 100,000 live births, which declined to 100 by 1989, further down to 80 by 1990 and 70 by 1991. However, this increased again to 90 by 1993 and 110 by 1994. Regardless of these fluctuations, the MMR for the country has declined by 60 deaths from 1976 to 2012. It can therefore be said that there are improvements in maternal health in the Philippines. In order to provide a better analysis of the differences in the trends of maternal mortality per 100,000 live births of each region from 1976 to 2012, a tabular summary of the 1976-2012 reports of the PHS is provided in Table 1.

Table 1 is constructed in such a way that important sections are already emphasized. The bolded values highest reported MMRs for each specific year. All values in shaded cells are values of MMR which are above the national average – or the values reported for the Philippines – during a specific year. The last column, *Change*, is an indicator of how much the mortality rate of the region has changed from 1976 to 2012. The values under this columns are obtained by subtracting the value under the column 2012 from the value under the column 1976. In cases whereupon the region has no value for 1976, the minuend becomes the value under the year when the region first reported mortality rates. Analysis of the contents of Table 1 yielded the following findings:

From 1976 to 2012, Region V-Bicol and the rest of the regions in Visayas and Mindanao generally had MMRs higher than the national average. This is especially true for regions V-Bicol, VI-Western Visayas, VII-Central Visayas, VIII-Eastern Visayas

and IX-Zamboanga Peninsula which had MMRs higher or equal to the national average for more than 90% of the time. This is indicative of a huge disparity between the regions of Luzon and the regions of Visayas and Mindanao in terms of the security that women's lives have during pregnancy and childbirth. While it cannot be categorically said that women's lives during pregnancy and childbirth are safe in the regions in Luzon, there is basis to say that childbearing women of Luzon, except for those from the Bicol region, enjoy relative security for their lives during the reproductive process as compared to their fellow Filipino women living in Visayas and Mindanao. Second, the National Capital Region has some of the lowest rates of Maternal Mortality. In fact, it has the least maternal deaths per 100,000 live births from 1976 to 1995. After 1995, it competes with the Cordillera Administrative Region as the region with the lowest MMR. Furthermore, its MMR are always below the national average. Region III-Central Luzon also consistently had MMRs lower than the national average while CAR and Region IVA-CALABARZON could follow suit, though these two regions also have at least one year in their history when the regional MMR is higher than the national average. Meanwhile, Region VIII-Eastern Visayas has the highest MMR for 26 of the 36 years analyzed in the study.

Third, during 1976, NCR has the lowest MMR while Region VIII-Eastern Visayas had the highest. By 2012, CAR has the lowest MMR, with 10 less maternal deaths per 100,000 livebirths than NCR. Nevertheless, NCR reported the second lowest MMR during 2012. On the other hand, Region VIII-Eastern Visayas continues to hold the highest MMR in the country. More worrisome is the fact that while the region had an MMR of 110 during 2011, this once again increased to 160 by 2012. Fourth, on its first year of recognition as a region in 1993, ARMM reported the highest MMR ever among all regions from 1976 to 2012 with an MMR of 340 maternal deaths per 100,000 live births (though it should be noted that Region VIII-Eastern Visayas, also had an MMR of 340 in 1977 – its highest reported MMR in the years included in the study). This MMR is more than half of the usual respective MMR of the other regions. From the year 1993 onwards, further analysis of the table would show that the ARMM had the biggest improvement in terms of MMR – reducing the number of maternal deaths per 100,000 live births by 270 from 1993 to 2012. However, despite this huge

decrease in its MMR, it is possible that this is partially skewed by the data limitations brought about by vital registration problems experienced in ARMM.

Finally, the table would show that Region V-Bicol and the Visayan and Mindanao regions generally have the biggest decrease in MMR from 1976 to 2012. Most notable of these are the decrease in maternal deaths in Regions VIII-Eastern Visayas (less 170 maternal deaths per 100,000 livebirths), IX-Zamboanga Peninsula (less 110 maternal deaths per 100,000 livebirths), and ARMM (less 270 maternal deaths per 100,000 livebirths). Meanwhile, NCR and CAR had the least decrease in MMR, though these two regions have the lowest MMR among the regions. A quick look at the shaded cells of Table 1 would show the general pattern of the regional differences in maternal mortality in the Philippines from 1976 to 2012. It can be observed that the shaded cells – which denotes MMRs higher than the national average – are concentrated in the regions south of the Metro Manila area. This suggests a very Luzon-, and in particular, a Manila-centric advantage against maternal deaths.

Access to Antenatal Care

What could be a possible explanation for these substantial differences in the number of maternal deaths? A mother's access to health care during her gestation and parturition periods have been proven to have an influence on her chances of survival. Antenatal care has been found to be negatively associated with maternal mortality [8]-[12]. This is because many of the major causes of maternal death are preventable if they are immediately acted upon by skilled medical personnel. In their 2010 report, the United Nations Development Programme (UNDP) have observed that those areas with greater access to antenatal care from skilled health workers have lower rates of maternal mortality [13]. This study traced the access to antenatal care from various providers of the women of the 17 regions of the Philippines from 1988 to 2013 through the use of the 1993, 1998, 2003, 2008, and 2013 Philippine DHS reports. Table 2 summarizes the access to, and source of, antenatal care of pregnant women in the Philippines.

From the table, it can be observed that from 1988 to 2013, majority of women had access to antenatal care from skilled workers in all regions. In fact, by the 2008 DHS, roughly nine out of every ten women in all regions have access to skilled antenatal care.

Table 1. Maternal Mortality per 100,000 livebirths in the Philippines by Region from 1976 to 2012.

REGION	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	CHANGE	
Philippines	140	140	120	110	110	100	100	100	70	100	110	90	100	100	80	100	100	100	100	100	100	100	100	100	100	110	110	100	100	100	100	100	100	100	100	80	-60	
National Capital Region	80	60	60	40	40	40	40	40	40	60	50	70	60	40	40	40	50	60	40	40	40	60	50	70	60	80	70	80	70	80	70	70	70	90	70	60	60	-20
Cordillera Admin Region														70	60	60	100	90	70	30	70	50	50	70	70	60	50	60	50	50	30	60	50	40	50	40	50	-20
I - Ilocos	140	130	100	100	90	90	80	100	110	80	90	100	130	100	80	50	100	120	90	120	70	100	70	80	80	120	100	90	100	100	100	70	100	80	70	80	70	-70
II - Cagayan Valley	160	140	100	90	120	130	90	100	90	90	120	140	130	140	140	90	90	140	100	90	90	100	80	100	100	80	100	70	90	90	80	80	60	60	60	60	-100	
III - Central Luzon	90	80	70	80	80	60	50	70	70	100	70	90	80	90	50	40	50	80	60	60	70	70	60	60	80	70	80	80	80	70	80	70	70	70	70	60	-30	
IVA - CALABARZON	140	150	120	130	120	110	100	100	140	130	110	110	130	110	90	70	80	100	90	100	100	80	80	90	110	90	90	90	100	90	90	90	90	100	90	80	60	
IVB - MIMAROPA	140	150	120	130	120	110	100	100	140	130	110	110	130	110	90	70	80	100	90	100	100	80	80	90	110	90	130	110	140	120	120	130	130	100	90	110	90	-30
V - Bicol	190	200	210	180	180	160	170	150	120	160	190	160	180	180	130	100	150	170	150	160	160	160	130	160	130	150	160	140	120	170	140	130	120	120	110	110	80	
VI - Western Visayas	140	190	140	150	130	120	100	110	100	220	110	120	120	120	100	90	90	110	120	110	100	100	90	100	110	140	110	160	110	100	100	110	80	100	90	80	-60	
VII - Central Visayas	140	130	150	110	120	100	110	110	80	80	110	90	100	80	80	80	80	100	130	80	110	90	100	120	120	140	130	120	130	130	120	120	110	100	90	80	-60	
VIII - Eastern Visayas	330	340	260	250	260	230	230	180	200	230	200	170	170	180	150	140	190	230	200	200	220	150	140	160	200	200	230	180	150	140	130	130	120	110	160	160	-170	
IX - Zamboanga Peninsula	220	190	140	110	120	110	110	130	110	110	130	100	120	110	80	80	120	140	130	150	110	110	170	140	130	170	130	150	150	110	130	140	150	140	120	110	110	-110
X - Northern Mindanao	160	150	160	130	130	150	120	110	90	110	120	130	120	90	90	90	110	120	90	110	90	80	100	110	80	90	100	110	100	100	90	100	90	100	90	90	70	
XI - Davao	130	130	120	100	110	90	90	100	70	90	80	80	80	80	70	80	100	120	80	110	120	100	100	110	100	130	110	110	90	110	110	110	110	120	70	80	50	
XII - SOCCSKSARGEN	140	180	150	110	100	160	110	110	100	110	80	90	70	110	70	50	120	140	90	100	100	100	100	100	90	120	100	130	120	110	90	90	90	90	90	90	80	-60
XIII - Caraga																				190	170	130	150	130	130	130	140	130	160	140	170	150	120	150	110	120	70	-70
ARMM																	340	180	180	80	100	100	100	130	180	170	70	90	160	80	30	80	70	30	80	70	-270	

There is no data for 892 because the Philippine Health Statistics Annual Report 892 is not available. Some pages of PHS 898 are also missing, leading to loss of data

Source: Philippine Health Statistics Annual Reports 1976 to 2012

Table 2. Percentage of mothers receiving antenatal care by type of provider and by region.

REGION	PERCENTAGE OF WOMEN WITH ACCESS TO ANTENATAL CARE BY TYPE OF PROVIDER																													
	Doctor						Nurse/Midwife						Traditional/HiLot						No One						Skilled Worker					
	1993 DHS	1998 DHS	2003 DHS	2008 DHS	2013 DHS	Diff.	1993 DHS	1998 DHS	2003 DHS	2008 DHS	2013 DHS	Diff.	1993 DHS	1998 DHS	2003 DHS	2008 DHS	2013 DHS	Diff.	1993 DHS	1998 DHS	2003 DHS	2008 DHS	2013 DHS	Diff.	1993 DHS	1998 DHS	2003 DHS	2008 DHS	2013 DHS	Diff.
Philippines	38.3	38.5	38.1	39.1	38.9	0.6	44.8	47.2	49.5	52	56.6	11.8	9.1	6.3	6.5	5	0.7	-8.4	7.8	7.8	5.6	3.8	3.7	-4.1	83.1	85.7	87.6	91.1	95.4	12.3
National Capital Region	81.3	75.3	73	63.8	74	-7.3	9.9	19.7	19.1	30.6	24.7	14.8	2.1	1.4	3.1	1.5	0	-2.1	6.7	3.6	4.4	4.1	1.3	-5.4	91.2	95	92.1	94.4	98.7	7.5
Cordillera Admin Region	32.2	40.3	54.5	50.4	60	27.8	55.5	44.3	31.5	41.5	38.1	-17.4	3.5	0.7	2.9	1.1	0	-3.5	8.9	14.2	11.1	7.1	1.9	-7	87.7	84.6	86	91.9	98.1	10.4
I - Ilocos	33.7	43.2	37.3	48.3	49.2	15.5	52.7	42.9	54	41.7	48.2	-4.5	4.4	2.8	1.4	3.5	0	-4.4	9.2	10.7	6.9	6.4	2.6	-6.6	86.4	86.1	91.3	90	97.4	11
II - Cagayan Valley	25.2	31.1	29.6	27.8	30.6	5.4	58.4	41.5	60.5	67	66.6	8.2	2.7	6.6	3.3	2.7	0.4	-2.3	13.8	20.5	6.5	2.6	2.4	-11	83.6	72.6	90.1	94.8	97.2	13.6
III - Central Luzon	56.4	53.9	46.7	50.7	49.2	-7.2	37	38.8	45.7	45	48.5	11.5	2.8	2.1	2.2	0.5	0	-2.8	3.8	5	4.2	3.6	2.3	-1.5	93.4	92.7	92.4	95.7	97.7	4.3
IVA - CALABARZON	36.7	43.7	46.7	55.7	47.4	10.7	46.9	42.5	44.3	39.7	49.7	2.8	5.5	5.1	1.7	1	0.4	-5.1	10.9	8.7	7.3	3.5	2.3	-8.6	83.6	86.2	91	95.4	97.1	13.5
IVB - MIMAROPA	36.7	43.7	19	28.8	23.9	-12.8	46.9	42.5	63	56.5	67.4	20.5	5.5	5.1	8.7	9.7	1	-4.5	10.9	8.7	8.8	4.9	6.2	-4.7	83.6	86.2	82	85.3	91.3	7.7
V - Bicol	19.7	20	30	29.5	26.3	6.6	53.4	60.8	55.6	62.5	70.7	17.3	15.3	10.2	8.6	5.2	1.3	-14	11.6	8.7	5.2	2.8	1.7	-9.9	73.1	80.8	85.6	92	97	23.9
VI - Western Visayas	30.3	38.1	34.6	33.7	31.3	1	52.3	54.7	58.8	60.8	66.6	14.3	7.9	2.6	1.5	1.8	0	-7.9	9.4	4.5	5.1	3.3	1.8	-7.6	82.6	92.8	93.4	94.5	97.9	15.3
VII - Central Visayas	36.5	24.2	31	21	25.5	-11	51.1	69.2	60.4	76.1	72.9	21.8	9.5	2.3	4.8	0.6	0	-9.5	2.9	4.1	3.5	2	1.6	-1.3	87.6	93.4	91.4	97.1	98.4	10.8
VIII - Eastern Visayas	33.5	19.8	19.1	29.2	37.4	3.9	45.7	57.6	60	61	58.1	12.4	11.4	7.7	17.9	4.1	0	-11.4	9.4	14.5	3	5.7	4.4	-5	79.2	77.4	79.1	90.2	95.6	16.4
IX - Zamboanga Peninsula	16.7	21.9	12.5	18.7	14.3	-2.4	50.8	51.8	64.6	67.2	79.8	29	29.4	19.2	11.7	9.4	0.3	-29.1	3.1	6.1	11.2	4.3	4.7	1.6	67.5	73.7	77.1	85.9	94	26.5
X - Northern Mindanao	24.3	21.3	20.7	26.2	23.2	-1.1	61.6	61.8	70.4	66.1	71.5	9.9	8.6	5	0.9	2.7	0.4	-8.2	5.5	11.9	7.6	5	3.7	-1.8	85.9	83.1	91.1	92.3	94.6	8.7
XI - Davao	26.9	31.7	30	25.9	23.9	-3	51.8	57.6	60.2	67.7	73.7	21.9	12.1	2.5	6	5.3	1	-11.1	9.1	8.3	3.4	0.8	1.3	-7.8	78.7	89.3	90.2	93.6	97.6	18.9
XII - SOCCSKSARGEN	24.4	20.8	16.4	13.5	12.1	-12.3	44.9	61.7	65.7	72.6	79.5	34.6	22	9.2	12.3	7.3	0	-22	8.7	7.8	5.7	6.6	8.4	-0.3	69.3	82.5	82.1	86.1	91.6	22.3
XIII - Caraga	26.3	27.6	22.8	15	11.3	-11.3	63	62.9	73.7	82	19	4.5	5.8	1.3	0	-4.5	5.4	3.7	2.2	5.4	3.7	2.2	3	-2.4	89.3	90.5	96.5	97	7.7	
ARMM	11.6	15.6	21.5	12.4	12.4	0.8	30.7	34.2	25.2	40.4	9.7	48.2	45.3	48.9	11.9	-36.3	8.7	4.9	4.4	35	26.3	42.3	49.8	46.7	52.8	10.5				

The only exemption to this is the ARMM wherein less than majority of the women have access to skilled antenatal care (doctors and nurses/midwives) by 2008, which improved to a little over 50% of the pregnant population by 2013. Out of the 16 other regions which experienced an increase in their percentages of women receiving skilled antenatal care, Region IX-Zamboanga Peninsula reported the biggest improvement. However, the percentage of their maternal population who receives antenatal care from skilled workers is still below the national average from 1988 to 2013. The smallest improvement is in NCR, though it has the highest percentage of women receiving antenatal care from a skilled worker.

Another fact which can be observed from Table 2 is when it comes to antenatal care provided by skilled workers, only the National Capital Region (NCR) had a population of women whose majority had access to antenatal care from doctors during their last pregnancies during the period of 1988 to 2013. Region III-Central Luzon, the Cordillera Admin Region (CAR) and Region IVA-CALABARZON had also managed to provide majority of its maternal population with antenatal care from doctors during their last pregnancy but not for the whole 1988 to 2008 period. Region III-Central Luzon managed to do it in the 1993, 2003 and 2008 DHS while the Cordillera Admin Region managed it at the last three DHS and Region IVA-CALABARZON at the last DHS. Meanwhile, only one to three out of every ten women in many of the other regions was able to avail of antenatal care from doctors during the aforementioned period.

It can also be observed that while the other regions in Luzon do not have the same proportion of their maternal population having access to antenatal care from doctors during their last pregnancies as NCR, their percentages are still higher than regions in the Visayas and Mindanao. The only Luzon regions which are suffering from the same situation as Visayas and Mindanao are the two southernmost regions of Luzon, IVB-MIMAROPA and V-Bicol. Instead of receiving antenatal care from doctors, regions in Visayas and Mindanao, save for ARMM, have majority of their maternal population receiving antenatal care from nurses or professional midwives, though more frequently from the midwives than the nurses. As for the ARMM, almost half of their maternal population receives their antenatal care from traditional midwives or 'manhihilots'. By the 2013

DHS, however, only 11.9% of the mothers in ARMM reported that they received their antenatal care from manhihilots. This decrease was accompanied not by a dramatic increase of skilled antenatal care provision. Instead, many of the women (35%) reported that they did not receive any form of antenatal care.

Access to Skilled Delivery Care

A mother's access to skilled birth attendants during her childbirth have also been found to have a significant positive effect on stemming down rates of maternal, neonatal, infant, and child mortality [10],[14]. This is because skilled health workers have been properly trained on how to deliver babies safely and respond against complications that may be encountered during childbirth. Evidence from various countries have shown that mothers and newborns from areas with higher access to delivery care from skilled birth attendants tend to have lower probabilities of dying than those who are from areas with little to no access to skilled delivery care [9],[13]. In addition to that, Begum, Nisa and Begum [15], Buor and Bream [16], and Memon, Khowaja and Sohag [17] have stated in their respective studies of maternal mortality that a large proportion of maternal deaths are from causes which can be prevented if mothers have access to skilled assistance during their childbirth. A tabular summary of access to skilled delivery care by region is provided in Table 3.

The first thing that is immediately observable from the table is that almost half of the women in the country did not receive assistance from doctors, nurses or professional midwives during their last pregnancies from 1988 to 2008. While it is observable that there have been some improvements with the percentage of women in the country receiving skilled delivery care – from 52.8% of women receiving skilled delivery care during their last pregnancy in the period of 1988 to 1993 to 62.2% of women receiving skilled delivery care during their last pregnancy in the period of 2003 to 2008 – it is apparent that progress with regard to improving access to skilled delivery care has been slow. It should be noted, however, that there was substantial progress by 2013.

It can be seen that only the National Capital Region had majority of its maternal population give birth with the assistance from skilled workers from doctors though CAR was able to provide doctor's assistance to its women during 2013 as well.

Table 3. Percentage of women with access to skilled delivery care during their last pregnancy by region.

REGION	PERCENTAGE OF WOMEN WITH ACCESS TO DELIVERY CARE BY TYPE OF PROVIDER																																			
	Doctor				Nurse/Midwife				Traditional/Hiot				Relative/Other				No One				Skilled Worker															
	1993 DHS	1998 DHS	2003 DHS	2013 DHS	Diff.	1993 DHS	1998 DHS	2003 DHS	2013 DHS	Diff.	1993 DHS	1998 DHS	2003 DHS	2013 DHS	Diff.	1993 DHS	1998 DHS	2003 DHS	2013 DHS	Diff.	1993 DHS	1998 DHS	2003 DHS	2013 DHS	Diff.											
Philippines	26	30.9	33.6	35	39.9	13.9	26.8	25.5	26.2	27.2	32.8	6	45.3	41.3	37.1	36.4	25.5	-20	1.7	1.9	2.4	1.1	1	-0.7	0.2	0.2	0.2	0.1	-0.1	52.8	56.4	59.8	62.2	72.8	20	
National Capital Region	60.4	64.1	64.4	57.1	62.4	2	28.1	27.4	23.5	29.7	28.5	0.4	10.6	7.8	11.6	12.9	8.1	-2.5	0.5	0.7	0	0.3	0.4	-0.1	0	0.1	0	0	0	88.5	91.5	87.9	86.8	90.9	2.4	
Cordillera Admin Region	31.9	28.5	40.7	47.2	67.5	35.6	20.4	19.6	18.9	20.2	17.8	-2.6	21.8	16.3	14.1	19.1	8.6	-13	1.2	1.7	3.4	1.1	0	-1.2	52.3	48.1	59.6	67.4	85.4	33.1						
I - Ilocos	19	25.4	28.5	38	49.1	30.1	45.9	41	45.7	43.8	41	-4.9	34.6	33.3	24.6	17.8	9.1	-26	0.4	0	1	0.3	0.9	0.5	0	0	0	0	64.9	66.4	74.2	81.8	90	25.1		
II - Cagayan Valley	11.4	18.6	23.5	26.5	41.3	29.9	25.2	23.5	29.7	32.7	43.8	18.6	56.3	49.2	42.9	37.4	31.7	-25	5.3	8.5	3.5	2.7	3	-2.3	1.8	0	0	0	36.6	42.1	53.2	59.2	64.4	27.8		
III - Central Luzon	39	45.7	43.6	44.8	49.8	10.8	41.6	38.6	42.2	37.2	50.8	9.2	19.4	15.4	12	17.3	9.6	-9.8	0	0	0.4	0.4	0.7	0.7	0	0	0	0	80.6	84.3	85.8	82	87.8	7.2		
IVA - CALABARZON	21.9	33.1	40.4	43.1	42.1	20.2	33	26.7	34.3	31.4	48.7	15.7	44.5	39.9	24.4	24.5	14.3	-30	0.5	0.3	0.7	0.5	0.8	0.3	0	0	0	0	54.9	59.8	74.7	74.5	84.6	29.7		
IVB - MIMAROPA	21.9	33.1	13.7	20.3	19.7	-2.2	33	26.7	15.6	18.8	25.1	-7.9	44.5	39.9	66.3	54.5	55	10.5	0.5	0.3	2.8	5.5	3.3	2.8	0	0	0	0	54.9	59.8	29.3	39.1	41.3	-13.6		
V - Bicol	10.5	14.3	19.5	24.1	24.6	14.1	19.8	29.9	28.3	25.8	27.8	8	68.7	55.1	50.2	49	34.5	-34	0.8	0.4	1.2	0.9	0	-0.8	0	0.2	0.2	0.5	30.3	44.2	47.8	49.9	65	34.7		
VI - Western Visayas	23.8	28.7	30.9	36	41.2	17.4	24.5	19.4	16.5	24.4	43.8	19.3	49.5	50.8	49.7	38.3	30	-20	2.2	0.8	2.1	1	1.3	-0.9	0.1	0	0	0	48.3	48.1	47.4	60.4	67.8	19.5		
VII - Central Visayas	25.2	23.7	34.2	31	36.6	11.4	26	32	34.1	35.9	40.6	14.6	48.4	44	29	32.7	17.9	-31	0.4	0.2	1.7	0.5	0.5	0.1	0	0	0	0	51.2	55.7	68.3	66.9	80.9	29.7		
VIII - Eastern Visayas	18.4	16.1	16.4	26.7	34.7	16.3	14	11.6	19.6	16.4	38.3	24.3	67.4	70.3	62.3	56.9	31.5	-36	0.2	1.1	1.7	0	1.1	0.9	0	0.6	0	0	32.4	27.7	36	43.1	67.4	35		
IX - Zamboanga Peninsula	10.1	15.9	12.9	21.2	20.8	10.7	23.3	23.7	18.1	17.2	24.9	1.6	65.4	55.2	64.3	59.2	45.7	-20	0.9	4.3	4.4	1.9	0.9	0	0	0.2	0.3	0.3	0.5	33.4	39.6	31	38.4	52	18.6	
X - Northern Mindanao	17.7	20	24.6	25.8	34.6	16.9	20.7	14.6	16.4	21.9	38	17.3	60.3	61	49.4	51.9	32.7	-28	1	4.3	9	0.4	2.4	1.4	0.1	0.2	0	0	38.4	34.6	41	47.7	63.3	24.9		
XI - Davao	19.5	27.6	31	28.9	36.3	16.8	16.9	19.4	16.6	22.5	39.6	22.7	57.8	48.8	43.6	47.1	30.1	-28	5	3.3	8.8	0.6	1.5	-3.5	0.7	0.8	0	0.6	0.3	-0.4	36.4	47	47.6	51.4	67.7	31.3
XII - SOCCSKSARGEN	14.8	20.3	19.7	17.6	25.4	10.6	17.4	22.7	17.5	18	28.7	11.3	66.4	55.1	58.7	60.2	42.5	-24	0.9	0.9	3.5	2.9	1.2	0.3	0.5	0.5	0.8	1.3	0.3	-0.2	32.2	43	37.2	35.6	55.7	23.5
XIII - Caraga	21.8	23.4	24.4	30	8.2	18.4	19.1	25.5	37	18.6	58.5	55.4	49.8	36.3	-22	1.1	1.4	0.3	0.2	-0.9	0	0.3	0	0	0	0	0	0	40.2	42.5	49.9	63.2	23			
ARMM	3.4	8.5	11.5	9	5.6	12.1	13.2	7.8	9.5	-2.6	81.9	76.6	80.3	78.7	-3.2	0.7	0.7	0.3	0.4	-0.3	0.5	0.2	0.2	0	0	0.2	0.2	0	-0.5	15.5	21.7	19.3	20.4	4.9		

This is similar to the case in women's access to skilled antenatal care wherein only the National Capital Region consistently had majority of their maternal population receiving antenatal care from doctors. It is also observable that women from regions in Luzon generally enjoy greater access to skilled delivery care than women from regions in Visayas and Mindanao, though majority of the two major islands' pregnant women also received skilled delivery care except for ARMM. The case of ARMM must especially be given attention. It can be observed from Table 3 that roughly only one or two out of every ten women has access to delivery care in the region from 1988 to 2008 and only 1 out of every five in 2013.

Access to Health Facility during Childbirth

One of the most important aspects of health care which mothers must be able to avail during the course of the reproductive process is the access to a health

facility where they can stay during parturition. This is because aside from having skilled birth attendants during birth, it has also been observed that the place of delivery has an effect on the probability of dying for the mother and the child, with delivering in health facilities reducing the chances of death. This is mainly because health facilities are more sanitary and proper equipment for delivery and for responding to complications at birth are more readily available within health facilities.

In their 2010 report, UNDP observed that increased access to health care facilities during childbirth has a negative association with maternal and under-five mortality [13]. Conversely, delivering at home has been found to increase the chances of death. Table 4 shows the access to health facilities of pregnant mothers in the Philippines by region from 1988-2013.

Table 4. Percentage of women with access to health facility during childbirth.

REGION	PLACE OF DELIVERY DURING LAST PREGNANCY											
	Health Facility						At Home					
	1993 DHS	1998 DHS	2003 DHS	2008 DHS	2013 DHS	Diff.	1993 DHS	1998 DHS	2003 DHS	2008 DHS	2013 DHS	Diff.
Philippines	28.2	34.2	37.9	44.2	61.1	32.9	71.5	65.5	61.4	55.5	38	-34
National Capital Region	68.3	72.4	69.6	69.4	82.1	13.8	30.7	27.6	30	30.2	17.2	-14
Cordillera Admin Region	32.2	33	44.8	51.1	75	42.8	67.6	66.5	55.2	48	23.5	-44
I - Ilocos	18.1	26.8	29.1	42.1	67.2	49.1	81.7	72.9	70.2	57.9	32.8	-49
II - Cagayan Valley	10.7	19.7	25.7	28.9	50.6	39.9	89.3	80.1	73.9	70.4	47.9	-41
III - Central Luzon	40.3	49.1	49.4	56.3	68.3	28	59.6	50.7	49.3	43.3	30.1	-30
IVA - CALABARZON	24.1	34	45.8	53.2	65.7	41.6	75.7	66	53.5	46.3	33.7	-42
IVB - MIMAROPA	24.1	34	15.7	26.8	36.5	12.4	75.7	66	83	73.1	63.5	-12
V - Bicol	11.3	19.6	21.9	32.5	50.8	39.5	88.4	80	76.3	66.9	47.8	-41
VI - Western Visayas	26.2	32	33.4	46.4	61.2	35	73.6	67.8	65.9	53.4	38.1	-36
VII - Central Visayas	26.9	26.7	39.8	45.7	71.8	44.9	73.1	72.4	58.8	54.3	27.5	-46
VIII - Eastern Visayas	19.9	17	20.7	33.7	61.6	41.7	79.9	82.6	79.3	66.3	38.4	-42
IX - Zamboanga Peninsula	11.2	18.5	15.6	28.4	43.4	32.2	88.5	80.8	83.8	71.2	55	-34
X - Northern Mindanao	19.1	20	28.9	33.3	52.5	33.4	80.6	79.7	70.2	66.7	45.3	-35
XI - Davao	23.1	33.6	41	42.4	62.9	39.8	76.7	66.2	59	57.3	36.3	-40
XII - SOCCSKSARGEN	15.6	21.7	23.1	23.4	48.5	32.9	84.4	77.8	76.2	76.5	50.9	-34
XIII - Caraga		22	26.1	30.1	55.5	33.5		77.8	73.6	69.9	44	-34
ARMM		6.3	10.7	14.7	12.3	6		92.6	88.4	85.1	86.9	-5.7

Out of all the aspects of health care that is vital for maternal and infant survival discussed in this paper, the picture provided by the data regarding women's access to health facilities during childbirth is the most alarming. As can be observed from Table 4, less than half of the population of women in the Philippines from 1988 to 2008 was able to deliver their child inside a health facility. A substantial improvement in access to health facilities is observed in 2013, there are still regions such as IVB-MIMAROPA, IX-Zamboanga Peninsula, XII-SOCCSKSARGEN, and especially ARMM where less than half delivered inside a health facility. Many Filipino women had to deliver their babies at home, away from sanitary rooms and medical equipment. This is especially true during the period of 1988 to 1993 wherein approximately seven out of every ten women in the Philippines had to deliver their child at home instead of delivering them inside a health facility. Given the fact that majority of these women had to deliver at home, it stands to reason that most of them would also have to rely for assistance from people who are not properly trained in assisting childbirths since the doctors, nurses and professional midwives are usually found in health facilities. The low percentage of women receiving skilled delivery care in the previous subsection gives credence to this.

It can also be observed from Table 4 that there is a large difference in the percentages of women giving birth in a health facility during their last pregnancy between NCR and the other regions, especially in the first two DHSs conducted. NCR consistently had the highest percentages of women giving birth in a health facility during their last pregnancies. Consequently, they also have the least percentage of women giving birth at home during their last pregnancies. Conversely, the ARMM region consistently had the least proportion of their maternal population giving birth in a health facility during their last pregnancy and the highest percentage of women giving birth at home. On the other hand, it can be observed that in general, Visayan and Mindanao regions have lower percentages of their maternal population having access to a health facility during parturition. However, even in Luzon, regions such as Region I-Ilocos, Region II-Cagayan Valley, Region IVB-MIMAROPA and Region V-Bicol have consistently low percentages of women giving birth in a health facility during their last pregnancy. All in all, the percentage of women who were able to deliver their child inside a health facility has increased for all regions from 1988

to 2013. However, the development in this aspect of health care for childbearing women still demands further improvement.

Socio-demographic Differences in Access to Health Care

There are also variations in the access to health care and consequently, to the risk of dying for the women among the regions of the Philippines. This is because the women among each region differ in certain socio-economic characteristics which may influence their access to health care and their risk of dying. Four socio-economic characteristics of the mother were analyzed. These are the mother's age, place of residence, their level of education, and their wealth. The place of residence is categorized as either living in a rural or an urban area. The level of education is categorized into four levels – No Education, Elementary Education, High School Education, and College School Education or higher. Finally, the wealth is categorized into five levels – lowest, second, middle, fourth, and highest. This wealth classification is based on the DHS wealth index. This is based on the accumulated assets of the household. These accumulated assets may range from the ownership of items such as bicycles, radio and television to the type of housing/housing composition of the respondent's residence. A summary of the data for the data on access to health care by varying socio-economic characteristics is provided in Table 5.

Several patterns can be observed from Table 5. First, it can be observed that in all aspects of health care, women in urban areas consistently have higher percentages that have access to different forms of health care. The disparity between urban and rural mothers is especially pronounced during childbirth, while the difference is minimal when it comes to skilled antenatal care. Second, women with tertiary education tend to have greater access to health care than those with lesser educational attainment. It is also observable that there is a large difference in the access to health care of the uneducated and the educated (Elementary to Tertiary education). Furthermore, out of all the socio-demographic characteristics observed, it is clear that education has a well-defined association with greater access to health care. Finally, while there is limited data with regard to wealth differentials in access to health care, it is observable from the data obtained from the 2003 and 2013 DHS that those in the upper wealth quantiles have greater access to health care than those in the lower wealth quantiles, particularly in skilled delivery care and delivery in health facilities.

Table 5. Percentage of women with access to different elements of maternal health care by age, residence, education, and wealth.

Socio-economic Characteristics	Skilled Antenatal Care						Health Facility during Childbirth						Skilled Delivery Care						
	1993 DHS	1998 DHS	2003 DHS	2008 DHS	2013 DHS	Diff.	1993 DHS	1998 DHS	2003 DHS	2008 DHS	2013 DHS	Diff.	1993 DHS	1998 DHS	2003 DHS	2008 DHS	2013 DHS	Diff.	
Age																			
<20	80.4	82.3	88	90.9	96.1	15.7	25.5	29	34.4	37.6	63.4	37.9	48.7	51.1	55.7	59	74.8	26.1	
20-34	84.4	87	89.2	91.8	95.8	11.4	29.5	35.6	39.4	45.6	62.5	33	54	58.7	62	63.8	74	20	
35-49	78.7	80.9	81.5	88.7	93.6	14.9	23.6	30.3	32.7	41.8	54	30.4	49.5	47.9	52	57.2	66.2	16.7	
Residence																			
Urban	88.3	92.4	91.2	94.2	96.7	8.4	43.5	52.1	53.7	59.2	72.4	28.9	70.4	78.5	79	77.5	83.2	12.8	
Rural	78.2	79.9	83.8	88.1	94.2	16	13.8	19.2	22	29.8	51.3	37.5	36.1	37.7	40.9	47.7	63.6	27.5	
Education																			
No Education	33.5	27.2	33.2	44	61.5	28	3.9	4.7	3.7	6.3	10.9	7	9.3	9.4	10.9	10.9	16.9	7.6	
Elementary	74.1	75.5	75.6	80.6	90.5	16.4	12.3	12.6	15.7	17.1	36.5	24.2	34.5	30.3	34.8	33.7	48.5	14	
High School	89.2	91.3	92.2	94.2	96.8	7.6	29.3	33.3	35.3	43.5	61	31.7	59.5	63.4	63	65.2	75.6	16.1	
College	97.4	96.3	96.1	97.1	98.1	0.7	61.7	67.7	69.1	73.3	84.3	22.6	84	85.4	85.9	87	90.3	6.3	
Quintile																			
Lowest			72.4	77.1	88.5	16.1			10.4	13	32.8	22.4			25.1	25.7	42.2	17.1	
Second			88.1	91.4	96.3	8.2			24.8	34	55	30.2			51.4	55.6	71	19.6	
Middle			90.7	95.9	96.7	6			43.3	48.3	69	25.7			72.4	75.8	83.8	11.4	
Fourth			96.2	97.6	99.4	3.2			59.8	68.7	81.5	21.7			84.4	86	92.4	8	
Highest			96.6	98.3	98.6	2			77	83.9	91.2	14.2			92.4	94.4	96.2	3.8	
Total	83.1	85.7	87.6	91.1	95.4	12.3	28.2	34.2	37.9	44.2	61.1	32.9	52.8	56.4	59.8	62.2	72.8	20	

CONCLUSION

The study found that women residing in the southernmost regions of Luzon (IVB-MIMAROPA and V-Bicol), the Visayas, and Mindanao have greater risks of dying than women in the other regions from Luzon. This is especially true for the National Capital Region which consistently reported relatively low rates of mortality as compared to the other regions. This disparity between the regions situated in the three main islands of the Philippines may largely be due to the wide divide between the regions in terms of their access to health care. It will be observed that much of development is centralized in Luzon, particularly the NCR. What this resulted to is a situation wherein women and children residing in Luzon, particularly those in NCR, enjoy relatively greater access to health care services than their fellow Filipinos residing in the other regions of the Philippines. The demographic divide between regions is most felt when it comes to access to health facilities during childbirth and access to skilled delivery assistance. It is imperative that development not be centralized to NCR in particular and Luzon in general but instead, ensure that women

and children residing in the regions in Visayas and Mindanao enjoy the same degree of access to health care services that residents of Luzon do.

It must be noted that the divide is not only between regions but also within the regions. The women residing in each region vary in their socio-economic characteristics and these socio-economic characteristics influence their access to health care services which will, in turn, influence their risk of dying. It has been observed that there is a large disparity in the access to health care between the educated and the uneducated. While it is easy to say that it is only a matter of the poor and uneducated not being able to afford health care services, other reasons may exist such as being unaware of the importance and even the existence of these health care services or they may be socio-cultural factors that impede them from availing of the available health care services in their area. The challenge to the government in combatting maternal mortality is threefold. It must (1) undertake infrastructural projects that will increase the number of healthcare facilities in areas beyond the Metro Manila area in particular, and Luzon in general.

Furthermore, it must strengthen up its awareness campaigns on the necessity of obstetrical care during pregnancy and childbirth and (3) ease the difficulties of accessing health care, particularly for the uneducated and the poor who are not empowered to manifest health seeking behavior during pregnancy and childbirth.

RECOMMENDATION FOR FUTURE STUDIES

The study made salient a number of issues which can be potential research gaps that can be looked into in future studies. First, the scientific inquiry into the maternal mortality and health care relationship in the Philippines will benefit from richer data on access to health care that can be correlated with the annual regional maternal mortality rates. As it stands, this study had to make do with the limited data of the Demographic Health Surveys which, while capable of speaking for a sizable number of years, are inadequate for correlational analyses. Future studies will also benefit from taking into consideration other factors related to health care such as mothers' health-seeking behavior, knowledge of necessary pregnancy-related health care, knowledge of location of health care facilities, and distance of the mothers from the appropriate health care facilities. The inclusion of these factors will allow for a richer exploration of the relevance of health care as a proximate factor to maternal death. Second, it would be prudent to conduct a more in-depth exploration of the situation of maternal health in Eastern Visayas given the very noticeable high rates of maternal death in the area compared to the other regions of the Philippines. Aside from the availability and accessibility of health care, inquiry into the situation at the Eastern Visayas region can look into the quality of health care in the area as well as other possible proximate and distal antecedents of maternal death such as environmental exposure, gender relations, personal behaviors of mothers, and cultural factors that may not be conducive to optimal maternal health. And third, the data on ARMM in the study, given the nature by which PHS data are gathered and its vulnerability in the face of political turmoil and cultural practices in the region, cannot be wholly trusted. Future inquiries on ARMM's maternal health should attempt to make use either of other sources of secondary data or opt to acquire their own primary data from the region in order to avoid the data limitations that are inherent in studies using secondary data analyses. The interplay

of maternal health and the region's culture that is highly influenced by Islam should also be looked into.

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