Trends in Regional Differences in Maternal Mortality in the Philippines in the Last Four Decades

Mark Anthony Mujer Quintos

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 for the study. 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. The main reason for this is 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, 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 demographic divide among the access to health care services among the women in the country, with the highly educated and wealthy enjoying greater access to health care services.

Keywords**—**Inequality, Maternal Mortality, Philippines, Healthcare.

I. Introduction

Central to the survival of the human species is the process of reproduction wherein the species replaces its new members with new ones. 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, however, ironic that it is also within this process that the mother is in great risks of dying. From the time when the mother carries the child in her womb to the time when she releases the child from her through parturition, the life of the mother is constantly in danger. As it is often said in the Tagalog regions of the Philippines, "Kapag nanganak ka, parang ang isang paa mo ay nasa hukay na" (When you are giving birth, it's almost as if one of your foot is already under the grave)" – an adage brought about by the shared experiences of women from different generations 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 or not women from all parts of the country are able to take advantage of these health care services. This study aims to compare the rates of maternal death among the 17 regions of the country from the 1970s when it was first established by then 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.

II. Data Source

Two different series of publications were considered 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 reports. The PHS reports are statistical reports published by the Department of Health through the National Epidemiology Center (NEC) since the middle of the 20th century. 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. The way that the PHS gathered its data is 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). Therefore, it should be noted that the statistical data found in PHS reports only account for registered live births and deaths. As such, 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 NSO by the parties concerned.

Vital Statistics on deaths are especially prone to under-registration. For example, in a study by Kao, Chen, Shi and Weinrich [1] 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-registraion is especially problematic in areas where civil unrest is frequent such as the 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

Mark Anthony Mujer Quintos, University of the Philippines Los Banos.

neglect and inadequate training on the part of the health worker [1]. 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 maternal or fetal deaths [2]. The second source of secondary information utilized by this study is the five final 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 final 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 topics 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 preceding years each. This means, for example, that 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.

III. 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. It should be noted that the trend from 1976 to 2012 is not a steady decline but is instead mired by fluctuations. For example, the MMR for 1988 was 110, which declined to 100 by 1989, further down to 80 by 1990 and 70 by 1991. However, this once again increased to 90 by 1993 and 110 by 1994. Regardless of these fluctuations, the MMR for the country has declined by 60 pregnancy-related deaths from 1976 to 2012. It can therefore be said that there are improvements in maternal health in the Philippines. Analysis of the data yielded the following observations:

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 Visyas, 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 of 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 varies with the Cordillera Administrative Region as the region with the lowest MMR. Furthermore, its rates of Maternal Mortality 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 rates of Maternal Mortality 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 – it's 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. Fifth, 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 final observation is that regions with 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 explain 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 [3]. 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 [4] have observed that those areas with greater access to antenatal care from skilled health workers have lower rates of maternal mortality.

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. The only exemption to this is the ARMM wherein less than majority of the women have access to skilled antenatal care by 2008, which improved to a little over 50% 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, it must be noted that 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 was be observed from the data 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 DHSs while the Cordillera Admin Region managed it at the last three DHSs 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 was also 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 those 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, IVA-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 Autonomous Region of Muslim Mindanao (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 parturition period have also been found to have a significant positive effect on stemming down rates of maternal, neonatal, infant, and child mortality [5]. 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 [3].

The first thing that is immediately observable from the data 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 was seen that only the National Capital Region has majority of its maternal population undergoing parturition with the assistance from skilled workers from doctors though CAR was able to provide doctor's assistance to its women during 2013 as well. 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, in general, 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 as it can be observed 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 while undergoing 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.

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. 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 was also observed that there is a large difference in the percentages of women giving birth in a health facility during their last pregnancy between the National Capital Region and the other regions, especially in the first two Demographic and Health Surveys conducted. As can be observed, the National Capital Region 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. Visayan and Mindanao regions generally 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.

Several patterns were observed from the data. First, in all aspects of health care, women in urban areas consistently have higher percentages that have access. 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 DHSs 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.

IV. Summary And 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 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 is largely due to the wide demographic 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 demographic 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. What must be done is to increase the average educational attainment of the women in the Philippines and also improve their economic well-being in order to ensure that they would be willing and able to access the necessary health care services.

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ABOUT THE AUTHOR

The author, Mark Anthony M. Quintos graduated cum laude from the University of the Philippines – Los Banos under the Bachelor of Arts in Sociology program in 2011. Following his attainment of a bachelor's degree, he immediately proceeded to enroll into the university's Master of Arts in Sociology program and graduated in January 2016. He is currently serving as a member of the university's college faculty.

Prof. Quintos' research interests revolve around matters pertaining to population and mortality, education, religion, deviance, and social psychology.