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Child and Maternal Factors Related to Under-5 Mortality in the Philippines

Elias C. Olapane, PhD[1]*

Abstract

Child health is a crucial proxy and indicator of human development in a country. That is why reducing child deaths, specifically under-5 (U5) mortality, is the goal of all the member-states of the United Nations in the 2030 Agenda for Sustainable Development. Despite the gradual decrease of under-5 deaths, the Philippines lacks empirical evidence on the factors related to under-5 mortality. A descriptive analysis of the Kids Recode (KR) file contained in the 2017 Philippine Demographic and Health Survey (NDHS) was conducted using Stata version 14. From 9,908 women (weighted) of reproductive age 15-49 with at least one child younger than five years old, the study found that child deaths were higher among males and children who were born later in birth order. In terms of maternal factors, the U-5 mortality was prevalent among children whose mothers were in their 40s, had little/no education, lived in rural areas, and came from poor households. Similarly, child survival was lower among mothers who had high parity (more than 3 children), were employed, had short birth spacing (<4), gained family planning knowledge from media sources, and did not receive medical treatments from health facilities. The study further demonstrates that the child and maternal factors are related to U5 mortality in the Philippines.

Keywords: Child, Maternal, Philippines, Under-5 Mortality

INTRODUCTION

Child mortality, as an important indicator of human development, remains a major public health problem in developing countries, suchas as the Philippines (Lucas, Hilderink, Janssen, Samir, Van Vuuren, & Niessen, 2019). It essentially reflects the quality of health services that accessible to children, mothers, and other segments of society, including vaccination, disease treatment, and adequate nutrition (UNICEF, 2020).

In 2020, approximately 5 million deaths were recorded among children under the age of 5 worldwide, amounting to 13,800 under-5 deaths per day (World Health Organization & United Nations Children's Fund, 2020). Over the years, the Philippines has shown a declining trend in U-5 mortality, from 31 deaths per 1,000 live births in 2015 to 26 deaths

[1]*West Visayas State University Calinog Campus Brgy. Simsiman, Calinog, Iloilo, Philippines

per 1,000 live births in 2019. These U5 mortality figures are relatively lower compared to those of other countries in the Southeast Asian Region.

Child mortality is recognized as part of the 2030 Agenda for Sustainable Development particularly in target 3.2, which aims to reduce neonatal and child mortality rates to below 12 and 25 deaths per 1,000 live births, respectively. Achieving these goals poses a significant challenge for all developing countries. The Philippines did not achieve its under-5 mortality target under the Millennium Development Goals (MDGs) (World Health Organization Western Pacific Region, 2017).

Over the years, the Philippine government has instituted health reforms and initiatives to improve child survival, in consonance with the Philippine National Health Policy and SDG targets for child mortality.

Despite these efforts, the issue of child deaths in the Philippines continues to persist. A study by Aguilera, Delgado, Icaza, Apablaza, Villanueva, & Castillo-Laborde (2020) claimed that the government's effort in the healthcare system cannot fully effect change on child mortality until the determinants of child and maternal factors are unraveled through systematic studies. Additionally, there is limited literature available that comprehensively accounts for determinants and factors related to child mortality in the Philippines at the national level. Hence, this study aimed to ascertain the factors that affect under-5 mortality in the Philippines using data from 2017 National Demographic and Health Survey (NDHS). This dataset was chosen as it was recent available at the time of writing.

OBJECTIVES OF THE STUDY

This study aimed at determining which of the child and maternal factors affect the under-5 mortality in the country using data from the 2017 NDHS.

Specific Objectives:

1. Describe the profile of children who died and their mothers in terms of: sex of the child, birth order, maternal age, place of residence, maternal education, gained knowledge on family planning through media, household wealth index, total children ever born, marital status, employment status, maternal age at first birth, birth spacing, region, and visited health facilities; and
2. Examine which among these factors are related to child death.

DATA AND METHODS

A descriptive, cross-sectional, retrospective study was conducted using data from the 2017 Philippine National Demographic and Health Survey (NDHS). The dataset used in this study was requested and obtained from the DHS website which is based on survey data from the Philippine Demographic and Health Survey (DHS) undertaken by the Philippine Statistics Authority in collaboration with the worldwide DHS program. The survey was designed to be representative at the national, urban-rural, and regional levels, and followed multi-stage sampling designs.

The Kids Recode (KR) file was specifically used in this study as it contained data on under-5 mortality in the Philippines. In the 2017 NDHS, there survey covered 31,000 households and included more than 25,000 women age 15-49. After computing the weights, the sample size consisted of 9,908 women of reproductive age 15-49 years with at least one child younger than five years at the time of the survey. Survey weights were calculated, added to the data file, and applied to ensure that the weighted results represented estimates of indicators at the regional and national levels. The analysis were conducted following the guidelines provided in the NDHS Standard Recode Manual, Guide to DHS Statistics, and the 2017 Philippine NDHS Report. Frequency distributions and crosstabulations were performed using Stata version 14. Furthermore, the unit of analysis in this study was children age 0-5.

Table 1. Percentage distribution of children under age 5 by selected background characteristics: Philippines, NDHS 2017

Selected Background Characteristics	Percent
Sex of the Child	
Male	52.5
Female	47.5
Birth Order	
1	30.9
2	26.9
3	17.8
4	9.9
5	6.0
6	3.5
7+	5.1
Number of Cases	9,908

*Weighted percentage.

RESULTS AND DISCUSSION

Table 1 shows that the majority (53%) of the women aged 15-49 had male children. When classified by birth order, three out of 10 women (75%) had given birth to their first three children, while few (25%) had given birth to their fourth child or more.

Table 2 reveals that regarding maternal age, almost half of the women (49%) with at least one child under age five in the Philippines were in their 20s. Four percent (4%) were below their 20s, 38% were in their 30s, and 10% were in their 40s. In terms of place of residence, a great majority (56%) of the women lived in rural areas. Concerning highest education attainment, 63% of them had completed secondary education or higher, while 37% had not completed education beyond secondary level. In terms of maternal exposure to media, most (82%) of the women had received family planning information through various media channels (radio, television, newspaper/magazine, and text messages). With regard to household wealth, 28 percent of women belonged to the poorest households, while 13% belonged to the richest households. Regarding the number of children ever born, most women (72%) had fewer than four (4) children. In terms of marital status, almost all (93%) of the women were currently married or living with a partner. As to employment status, the vast majority (63%) of women aged 15-49 were unemployed. Regarding maternal age at first childbirth, a great majority (64%) of the women had their first child between the ages of 20 and 35 years, while 35% were below 20, and 1% were 36 years old or older. When grouped according to birth spacing, 35% of the women had less than 3 years between births, 59% had a spacing of 4 years or more, and 6% did not declare or had unknown birth spacing. In terms of region, some (37%) of the women resided in Luzon (Calabarzon, National Capital Region, and Central Luzon), while the rest were from the Visayas and Mindanao. Finally, regarding mothers' visits to health facilities, seven out of 10 women had not visited health facilities.

Table 2. Percentage distribution of women age 15-49 by selected background characteristics: Philippines, NDHS 2017

Selected Background Characteristics	Percent
Maternal Age (years)	
15-19	4.0
20-24	21.5
25-29	27.3
30-34	21.7
35-39	15.9
40-44	8.0
45-49	1.7
Place of Residence	
Urban	44.1
Rural	55.9
Highest Education Attainment	
No education	1.1
Incomplete primary	9.7
Complete primary	8.4
Incomplete secondary	17.0
Complete secondary	34.3
Higher	29.4
Gained Information about Family Planning through Media	
Yes	82.0
No	18.0
Household Wealth Index	
Poorest	28.1
Poorer	22.2
Middle	19.7
Richer	16.6
Richest	13.4
Total Children Ever Born	
1	22.4
2	28.0
3	21.5
4	11.3
5+	16.8
Marital Status	
Not currently married	7.3
Currently married/ living with a partner	92.7
Employment Status	
Unemployed	62.5
Employed	37.5
Maternal age at first birth (years)	
below 20	35.3
20 to 35	63.7
36+	1.1
Birth Spacing	
less than 4 years	34.8
4 years and over	58.9
not declared	6.4
Region	
Ilocos	4.6
Cagayan Valley	3.8
Central Luzon	9.0
Calabarzon	16.0
Bicol	6.9
Western Visayas	6.7
Central Visayas	5.9
Eastern Visayas	4.6
Zamboanga Peninsula	4.1
Northern Mindanao	4.8
Davao	5.2
Soccsksargen	5.5
National Capital Region	12.0
Cordillera	1.5
Autonomous Region in Muslim Mindanao	3.6
Caraga	3.2
Mimaropa	2.6
Mother's Who Visited Health Facilities	
Yes	29.2
No	70.8
Number of Cases	9,908

*Weighted percentage.

Table 3. Child factors of under 5 mortalities in the Philippines

Variable	Percentage of Under-5 Children Who Died	Number of Mothers
Sex of the Child		
Male	2.5	5,199
Female	2.3	4,708
Birth Order		
1	2.1	3061
2	1.7	2661
3	2.4	1767
4	2.8	982
5	2.7	590
6	4.7	342
7+	5.1	505
Total	100	9,908

*Weighted percentage.

Table 3 shows that more male children (2.5%) had died compared to the female children (2.3%). This result supports the studies from Nigeria, and India that child mortality was higher among males than females. However, this result contradicts the results from India, Nepal, and Ghana that claim that females had a higher risk of U5 mortality than male children (Sarkodie, 2021; Patel & Olickal, 2021; Pal, Vijay, & Patel, 2020; Sohail & Neupane, 2018; Ezeh et al., 2015). The present findings further suggested that males have higher exposure to death as contained in the life table in the Philippines. When classified according to the child's birth order, results showed that as the birth order increases, so do the child's deaths (1st = 2% … 7th+ = 5%). This finding corroborates prior studies in Ghana and India that child survival decreased as the birth order increased. This means that the more children the mother has, the lesser the care and attention they could provide to their children (Sarkodie, 2021; Aheto 2019; Dwomoh, et al, 2019).

Table 4 shows that, as to maternal age, as the mothers get older, the higher the frequency of under-5 mortality (3% to mothers age 15-19 and 7% to those age 45-49). This result confirms the studies from Nigeria and India that child deaths were more pronounced among young (less than 20 years) and old (above 35 years) mothers who give births compared to those mothers aged 20 to 35 years (Patel & Olickal, 2021; Ayotunde, Mary, Melvin & Faniyi, 2009). This implies that old mothers have more biological and physiological issues compared to their counterparts.

As to the place of residence, mothers who lived in urban had lower child deaths than those in rural areas (2% vs 3%). This finding supports many studies from sub-Saharan Africa, India, Nigeria, Ghana, Afghanistan, Kenya, Bangladesh, and Vietnam that under-5 mortality

was more prominent in rural than urban areas (Patel & Olickal, 2021; Sarkodie, 2021; Pal, Vijay & Patel, 2020; Ayotunde, Mary, Melvin & Faniyi, 2009; Ekholuenetale, 2017). This may be due to the disparities between rural and urban areas. Urban areas tend to have more health care facilities, have better educational opportunities, and more improved social status compared to rural areas.

In terms of highest education attainment, there was a greater percentage of child deaths to mothers who had no education compared to those who attained higher education (5% vs 2%). This result supports the findings of studies from sub-Saharan Africa countries, India, Chile, Nigeria, and China that under-5 mortality reduces as the level of mother's education increases. Thus, mothers who had no or lower level of education have a higher risk of dying compared to those who had reached secondary and tertiary education (Balaj, York, Sripada, Besnier, Vonen, Aravkin, Friedman, Griswold, Jensen, Mohammad, Mullany, Solhaug, Sorensen, Stonkute, Tallaksen, Whisnant, Zheng, Gakidou & Eikemo; 2021; Patel & Olickal, 2021; Aguilera, Delgado, Icaza, Apablaza, Villanueva, & Castillo-Laborde, 2020; Ekholuenetale, Wegbom and Tudeme, 2020; Mandal, Paul & Chouhan, 2019; Keats, 2018; Andriano & Monden, 2017; Balogun, et al., 2017; Ayotunde, Adeolu, et al., 2016; Grepin & Bharadwaj, 2015; Mary, Melvin & Faniyi, 2009). This may be attributable to the mothers' capability to make appropriate decisions for their children which is associated with mothers who attained higher education.

As to the mother's exposure to media, child deaths were lower in mothers who received family planning through media (radio, television, newspaper/magazine, & text messages) compared to those who had not (3% vs 2%). When classified as to household wealth index, under-5 mortality was generally higher among mothers belonging to poorest households compared to those from richest households (3% vs 2%). This result confirms the studies from Ghana and India that children from poor households had a higher risk of under-5 deaths compared to those from rich households (Sarkodie, 2021; Patel & Olickal, 2021; Nyaaba, Tanle, Kobina, & Ayamga, 2020).

In terms of total children ever born, more child deaths were reported by mothers with high parity (4 children and more) than those with low parity (1-3 children). As to marital status, the mothers who were not married had more child deaths compared to those who were married and/or living with partners (3% vs 2%). In terms of employment status, employed mothers had more child deaths than unemployed mothers (3% vs 2%). As to maternal age, the older the age of the mother at first

birth, the greater the reported child deaths (36 y/o and above = 5%, 20 to 35 y/o = 3%, less than 20 y/o = 2%).

In terms of birth spacing, the shorter the birth spacing of the mothers after/from a previous birth, the higher the child deaths (>4 years = 6%, 4 years & over = 3%, not declared = 4%). This finding is consistent with studies from Afghanistan and India that more risks of under-5 mortality were experienced by mothers whose birth intervals were less than 2 years (Patel & Olickal, 2021; Pal, Vijay & Patel, 2020). This may be attributed to the mother's access and the decision to family planning methods. Besides, shorter birth interval poses risk to mothers who are not fully recovered from physiological capacities to bear another child.

As to region, four (4) percent of the mothers in the Ilocos, Soccsksargen, and Autonomous Region in Muslim Mindanao had reported child deaths, while 1% to mothers in Central Visayas, and National Capital Region. It means that child deaths are lower in areas where the health care system is mostly concentrated such as in Central Visayas and National Capital Region. This scenario affirmed the claim of (Lavado, 2010; in the Department of Health Report, 2010) that hospitals with higher service capabilities are highly concentrated in Region 3 and National Capital Region (NCR) while the rest of the regions had insufficient beds relative to the population, having the Autonomous Region for Muslim Mindanao (ARMM) as the lowest bed to population ration (0.17 beds per 1,000 population).

In terms of mothers who visited health facilities, mothers who had check-ups in health facilities had lower child deaths than those who had not (2% vs 3%). This result confirms some studies from Afghanistan and India that a higher risk of under-5 deaths was reported among mothers who had not received any antenatal care and/or had not visited health facilities (Rahmani & Brekke, 2013 & Patel & Olickal, 2021). This may be due to the mother's lack of access to maternal and antenatal care which is vital to the formation of the fetus and/or child.

Table 4. Mother factors of under 5 mortalities in the Philippines

Variable	Percentage of mothers who reported having a child death	Number of Mothers
Maternal Age (years)		
15-19	2.8	398
20-24	1.9	2,126
25-29	2.0	2,701
30-34	2.2	2,151
35-39	2.5	1,573
40-44	3.9	789
45-49	7.0	171
Place of Residence		
Urban	2.0	4,371
Rural	2.7	5,537
Highest Education Attainment		
No education	5.3	114
Incomplete primary	4.7	961
Complete primary	3.1	835
Incomplete secondary	2.1	1,688
Complete secondary	2.2	3,401
Higher	1.7	2,909
Gained Information about Family Planning through Media		
Yes	2.6	8,127
No	1.7	1,782
Household Wealth Index		
Poorest	2.8	2,786
Poorer	2.9	2,199
Middle	2.6	1,954
Richer	1.2	1,645
Richest	1.9	1,324
Total Children Ever Born		
1	1.2	2,221
2	2.2	2,778
3	2.4	2,126
4	2.8	1,116
5+	4.0	1,668
Marital Status		
Not currently married	2.9	722
Currently married/ living with a partner	2.4	9,186
Employment Status		
Unemployed	2.1	6,188
Employed	2.9	3,720
Maternal Age at First Birth (years)		
below 20	2.2	3,494
20 to 35	2.5	6,308
36+	4.8	105
Birth Spacing		
less than 4 years	5.5	1,068
4 years and over	2.5	1,810
not declared	3.6	196
Region		
Ilocos	4.0	453
Cagayan Valley	1.9	371
Central Luzon	1.7	889
Calabarzon	2.2	1,588
Bicol	2.9	689
Western Visayas	3.5	659
Central Visayas	1.4	580
Eastern Visayas	2.8	460
Zamboanga Peninsula	2.5	403
Northern Mindanao	2.5	472
Davao	2.5	520
Soccsksargen	3.7	543
National Capital Region	1.0	1,190
Cordillera		152
Autonomous Region in Muslim Mindanao	4.4	361
Caraga	2.8	319
Mimaropa	2.3	260
Mother's Who Visited Health Facilities		
Yes	2.1	7,018
No	3.1	2,890
Number of Cases	100	9,908

*Weighted percentage.

CONCLUSIONS

The study identified several significant determinants of under-5 mortality in the Philippines. Regarding child factors, it was found that child deaths were common among males and children born in higher birth orders.

In terms of maternal factors, U-5 mortality was prevalent among children whose mothers were older (in their 40s), had little/no education, lived in rural areas, and came from poor households. Additionally, child survival was lower among mothers with high parity (more than 3 children), employed, short birth spacing (<4), limited exposure to family planning through media, and those who had not received any medical treatments from health facilities.

In general, the gradual reduction of under-5 mortality in the Philippines can be attributed to government's investment in the health sector. However, addressing the disparities among the identified determinants of U-5 mortality requires coordinated and multifaceted approaches from various sectors of society. This necessitates political commitment to ensure adequate resources and interagency collaboration. Programs should prioritize the factors identified in this study that are related to child deaths.

Expanding the coverage of PhilHealth could target early child mortality, including detection and treatment of congenital abnormalities, providing free ultrasounds, and advanced diagnostic imaging, among other others.

The health system should establish a robust referral network system and optimal distances between communities to ensure efficient and equitable delivery of healthcare services.

The Kids Recode (KR) file should include other child-related variables, such as causes of under-5 deaths.

Regular studies on the determinants of U5 mortality are recommended to understand changes and develop strategies to mitigate their impact.

Further research should consider employing additional statistical tools, especially bivariate and multivariate analyses.

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