



## Determinants of maternal mortality in Cagayan Valley Philippines

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### Abstract

Maternal mortality is one of the country's general health status indicators. This highly preventable phenomenon has been a long-time global health issue that remains high despite the various maternal health initiatives implemented in the country. With the unmet MMR target, this is reasonably included as one primary focus in Sustainable Development Goal No. 3 (SDG3) that focuses on the reduction of maternal mortality. The study aimed to explore the determinants of maternal mortality in Cagayan Valley, Philippines, for the past five years. The researchers used a convergent parallel mixed-methods research design. The quantitative and qualitative data were gathered using a semi-structured purposive sampling method through hybrid key informant interviews of the 104 immediate family members and 50 public health administrators from January 2020 to November 2021. Significant findings reveal that most maternal mortality cases were considered high-risk pregnancies and highly associated with the three-delay model validated through the qualitative results. While maternal mortality is a multifaceted factor, the researchers strongly suggest intensifying the implementation of the MNCHAN program through a holistic and collaborative maternal healthcare approach that engages, embraces, and empowers all women of reproductive ages.

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## Introduction

The World Health Organization reported approximately 810 maternal death cases every day from preventable causes related to pregnancy and childbirth in 2017 (WHO, 2019). Most of these maternal mortality cases occur in Low and Lower Middle-Income Countries (LMICs), including the Philippines. Data from the internationally comparable MMR estimates by the Maternal Mortality Estimation Inter-Agency Group (MMEIG), which comprises the WHO, UNICEF, UNFPA, World Bank Group, and the United Nations Population Division, reveal that there was a worldwide reduction in maternal mortality cases in the last two decades. It is the same in the context of the Philippines, one of the nations that have been battling to achieve the Millennium Development Goal of improving maternal health by reaching at least 54 death cases per 100,000 live births. (WHO, 2019).

There are many causes of the high maternal death rate. According to World Health Organization research from 2014, direct obstetric reasons include hemorrhage, infection, unsafe abortion, hypertensive disorders of pregnancy, and obstructed labor account for about three-quarters of maternal deaths in underdeveloped countries. Additionally, women in rural and low-income communities have disadvantages. In the poorest quintile, around 75% of pregnant women lack a trained birth attendant to assist them. Rural places have their own greater incidence of maternal mortality because many rural women give birth to children at an early age. Adolescent moms frequently experience issues during and after pregnancy since they are typically not developed enough to give birth, which contributes to the high maternal death rate.

Health professionals such as physicians, nurses, or midwives with formal training who are present during birth can decrease maternal mortality. Yet, according to surveys, barely 60% of births in the Philippines are under the supervision of these trained birth attendants. Others continue to rely on conventional birth attendants, who have no official training but are

frequently able to handle difficulties. The woman's condition is yet another issue that leads to the high maternal mortality rate in the Philippines. Habits, lifestyle, and practices towards health, especially those who engage in vices like alcohol consumption, smoking, and poor nutritional habits, putting them at risk of developing complications during pregnancy, labor, and delivery. Further studies have also shown that delays in health-seeking, health services, and health facilities impact said phenomena.

Maternal death cases could have a great degree of impact on the family, especially on children's health and well-being. They are more susceptible to long-term health issues and social issues connected to abuse, early unions, pregnancy, education, and work. Children who were female were particularly affected because they were frequently required to handle the majority of home duties. Many participants were not aware of the programs available to help them raise orphaned children or how to obtain these services, which they said prevented them from receiving high-quality child health care or support services.

In response to this scenario, the Department of Health (2011) has initiated key health reforms for the rapid reduction of maternal and neonatal mortality through the DOH Administrative Order (AO) No. 2008-0029 on implementing Health Reforms for the Rapid Reduction of Maternal and Neonatal Mortality (DOH, 20011). It mandates the implementation of an integrated Maternal Newborn Child Health and Nutrition (MNCHN) strategy. Under this, all pregnancy is considered at risk, and it considers the three central pillars in reducing maternal mortality and morbidity: emergency obstetric care, skilled birth attendants, and family planning. It aims to address service delivery, regulation, financing, and governance of the Philippines' health system. Furthermore, the Integrated MNCHN strategy implemented in all provinces and cities encourages increasing skilled birth attendance and facility-based births by 80 percent. However, despite the numerous and rigorous implementation of the maternal health service program by the Department of Health (DOH)

in Region 02, the struggle with maternal mortality remains a significant problem as it ranks, hence, identifying the factors contributing to the maternal mortality case is critical but significant to improve the existing maternal health program policy further.

Specifically, it sought to answer the following questions:

1. What were the profiles of the maternal death cases in region 02 in the year 2014 to 2018 in terms of the following:
  - A. Demographic Profile
    - a.1. Age
    - a.2. Marital Status
    - a.3. Municipality class
    - a.4. Number of pregnancies at the time of death
  - B. Socio-economic Profile
    - b.1. Educational Attainment
    - b.2. Religion
    - b.3. Ethnicity
    - b.4. Occupation
    - b.5. Place of delivery
    - b.6. Gross monthly income of the family
  - C. Health Status
    - c.1. Presence of obstetric risk
    - c.2. Current medical issues
2. What were the associated factors that caused maternal mortality using the three-delay model?
  - A. Delay in deciding to seek medical advice
  - B. Delay in identifying and reaching appropriate facility
  - C. Delay in receiving appropriate and adequate care
3. What were the contributing factors of the maternal mortality cases as perceived by the concerned health administrators?
4. How does the three-delay model explain with the perceived factors of maternal mortality cases in Cagayan Valley by the health administrators?

#### *Objectives of the study*

Generally, this study aimed to identify the determinants of maternal mortality cases in Cagayan Valley, Philippines, for the past five (5) years.

## **Materials and methods**

### *Study design and study setting*

This study utilized a convergent parallel mixed-method approach to explore the determinants of maternal death cases in the Cagayan Valley region through an in-depth key informant interview and document review. Using the triangulation process, the demographic, socioeconomic, maternal health status, and three distinct phases of delays that contribute to maternal death were gathered and quantitatively analyzed. In contrast, the determinant factors that cause maternal mortality cases were collected, thematically analyzed, and interpreted. The study locale was in Region 02, also known as the Cagayan Valley, which lies within the northeastern tip of the Philippines and is bounded by significant mountain ranges, the Cordillera to the west, the Caraballo to the south, and the Sierra Madre to the east. To the north lie the Babuyan Channel and the North China Sea. It comprises five (5) island groups: Batanes, the provinces of Cagayan and Isabela, and the generally mountainous provinces of Quirino and Nueva Vizcaya. The region has a total land area of 2,683,762 sq. km., with 89 municipalities and 2,311 barangays. It is the fourth largest region, with one independent component city (Santiago) and three dependent cities (Tuguegarao, Ilagan, and Cauayan). Three of these cities are in Isabela (Santiago, Ilagan, and Cauayan) and one in Cagayan (Tuguegarao) (DAR, 2022) The area has a total population of 3,685,744, and the Province of Isabela had an enormous population in 2020 with 1,697,050 people, followed by Cagayan with 1,268,603. The province of Batanes had the smallest population with 18,831 people (PSA, 2020). Cagayan Valley was chosen as the region of interest because it registered 44 maternal death cases in 2015 and 33 in 2018. The total number of facilities available in the region includes barangay health stations (1469); RHUs (97); infirmary (36); birthing homes (135); and hospitals (72).

### *Study population*

Participants in the in-depth interview and document reviews were the 104 immediate family members of the deceased mother and the 50 health administrators, comprising the 4 Provincial Health

Officers (PHOs), 43 Municipal Health Officers (MHOs), and the 4 Medical Center Directors/Chief of Hospitals. They all consented to participate in this study; the participants' knowledge and perception of maternal death cases served as a basis for choosing them. This combined type of respondents gave the study a multifaceted perspective both from the recipient and implementer of the MNCHN program, eliciting the issues that contributed to the mother's untimely demise.

#### *Conceptual framework*

The study utilized two (2) frameworks to analyze the factors associated with maternal death cases. This framework provides an insight that would effectively understand the causes of maternal mortality and morbidity formulated by McCarthy and Maine in 2006. The most important factors affecting the outcomes for maternal health are covered by this framework. This model provides a more thorough understanding of the relationship between determinants and maternal mortality by incorporating the roles of socioeconomic, cultural, behavioral, and biological factors. It has also been widely utilized in studies to direct assessments of the determinants of maternal mortality and morbidity. For instance, the McCarthy and Maine framework is used to analyze factors influencing childbirth in health facilities in Kenya, Tanzania, and Zambia (Phiri et al., 2014) and to evaluate skilled birth attendants' proficiency in managing obstetric complications in five high-mortality settings (Harvey, S.A., et al., 2007). Also, the WHO has seen this as a valuable tool for analyzing avoidable factors of maternal death (Say, L. et al. 2014). Hence, this framework was helpful in conducting the study.

Also, the "three delays models" have helped the researchers understand the most common associated factors in maternal mortality in the Cagayan Valley. This model guides research by focusing on the well-established causes that include the delay in seeking care, the delay in arrival at a health care facility, and the delay in providing care following the onset of complications as the main determinants of maternal

mortality (Thaddeus and Maine, 1994). Between the onset of obstetric difficulties and the results (mortality or morbidity), it examines the gaps that hinder women from obtaining care. According to its underlying tenet, the majority of difficulties that are emergencies or unanticipated by their very nature are handled right away, improving the outcomes for the mother (Gelato, 2018).

#### *Research instruments*

The study utilized the modified Maternal Mortality Survey Questionnaire by the Department of Health. The questionnaire modification was made and anchored to the study's objective, and it was tested for face validity by the experts. The instrument is a semi-structured open- and closed-ended questionnaire designed to collect information from the immediate family member of the deceased mother and the health administrators to determine the associated factors contributing to maternal death cases. The in-depth interview required 30-45 minutes to complete. The instrument for the immediate family member consists of four (4) sections: 1) personal profile of the deceased mother; 2) socioeconomic profile of the deceased mother; 3) health risk factors; 4) the three distinct phases of delays in maternal mortality. The questionnaire for the health administrators consists of four (4) questions as follows: 1) the perceived factors that contribute to the maternal death cases in their area of responsibility 2) the preventive actions; 3) issues and concerns regarding the implementation of the MNCHN program; and 4) the participant's recommendation. Most questions are open-ended to allow the participants to freely express their thoughts about the phenomenon in their own words.

#### *Data collection*

The primary investigator and the research team conducted the in-depth interview with the immediate family member of the deceased mother and the health administrators from January 2020 to November 30, 2021. The primary investigator used a top-to-bottom approach to gathering data. The PI secured an endorsement letter from the regional director of the Department of Health RO2, and it was coordinated

with the office of the Provincial Health Officer for further approval to conduct the study on its target participants. The researchers conducted an in-depth interview session with the provincial health officers, medical center director/chief of the hospital, and municipal/city health officers in the privacy of their own offices. The health administrators' absence or unavailability have been represented by the In-Charge Program Manager of Maternal Neonatal Child Health and Nutrition (MNCHN). On the other hand, the researchers interviewed the immediate family member in a private space within their compound to maintain privacy and confidentiality. The interview period took approximately 30-45 minutes to complete.

The researchers documented the healthcare provider's interaction and overall workflow, including patient interaction, documentation, reporting, and utilization of the healthcare facility.

#### *Study population and sampling technique*

There were 137 maternal death cases recorded from the five provinces of the Cagayan Valley Region from 2014–2018, retrieved from the DOH records. The researchers set the confidence level at 95% with a margin of error of 5%. Thus, a minimum of 102 respondents will be more likely to give an accurate answer to the set objective of this research study.

Participants in the study were the immediate family members of the deceased mother who wilfully consented to share their knowledge and awareness about the 102 maternal death cases in the four provinces. Fifty (50) health service providers were recruited purposefully for the in-depth interview conducted face-to-face and online using social media platforms. They were selected and consented to share their knowledge and expertise as supervisors in the implementation of the maternal health program and their involvement in the conduct of the maternal death review for the 102 maternal mortality cases in the Cagayan Valley, Philippines. The primary investigators wanted to extract information from the respondents about the demographic, socioeconomic,

and health status of the maternal death cases and their perception of the associated factors that contributed to the maternal mortality cases in Cagayan Valley—how these factors affect the death of the mother—and also to explore their experiences with the said phenomenon. This study will provide insights on the issues occurring in the pregnant mother's family, community, and healthcare system that directly affect the mother's health outcome.

#### *Data processing*

The quantitative and qualitative data were independently analyzed and interpreted together (Creswell and Pablo-Clark, 2011).

#### *Quantitative data analysis*

All data were entered and tabulated using Microsoft Excel (2016) for the quantitative data. The quantitative data, including the demographic and health profiles of all the deceased maternal mortality cases, were processed through SPSS version 20. Two people validated and checked both the completed data collection forms and the collated tables to ensure data completeness. SPSS version 20 was used to encode, review, and verify data.

#### *Qualitative data analysis*

With participant permission, all interviews for qualitative data were audio recorded. As soon as the interviews were finished, Microsoft Word (2016) was used to create verbatim transcriptions of the interviews. The researcher can better comprehend the underlying meanings of the interviewee's voice by independently transcribing the data. Playing the interview's audio files while simultaneously typing the transcript in a word document was the transcribing procedure. By listening to the audio recording of the interview again and again, the researcher double-checked the transcription. Misheard words or phrases are verified by listening to the audio files again while reading the transcript and taking interview notes.

After the verbatim interview transcriptions in the local dialect, the researchers translated the verbatim transcriptions from the local dialect to English since

they were familiar with the local language used by the participants. The accuracy of the translated interview was validated, checked, and edited by a language expert. Also, back translation of the English transcripts to the local dialect was done to ensure the accuracy of the audio transcriptions.

Based on memory of the actual interview that was performed, the primary investigator chose which transcription to use for congruence. Microsoft Word 16 was used to code the themes from the interview transcripts and observation notes. The interview transcripts and observation notes were independently coded by the principal investigator and the assistant investigator. Discussion among the study's researchers led to agreement on the themes that had been identified.

#### *Mixed method integration analysis*

Quantitative data were entered and analyzed using IBM SPSS version 20 for descriptive statistics. The deceased mother's demographic, socioeconomic, and reproductive health status were analyzed descriptively using frequencies, percentages, and bar graphs. Also, the researchers used descriptive statistics to analyze the researcher-administered questionnaire on three different delays in maternal mortality. Other analyses involved testing the correlation between the three delays on maternal mortality, and Pearson's  $r$  test was used to check whether there was an apparent relationship between these three variables.

The data collection and ongoing comparison analysis were conducted simultaneously. The foundations of this study's use of ongoing comparative analysis include memo writing, attentive reading, rereading, coding, and diagramming (Boeje, 2002). To recognize the similarities and differences in the data, the coding procedure included ongoing comparison as ideas and categories (Bluff, 2005). It made it possible to create the plot using the generated data rather than the researcher's perspective. By labeling each distinct episode, passage, or event that best exemplifies the phenomena, the researchers used open coding to label the data (Starauss and Corbi, 1990). The

researcher first listened to the audio recordings of the interviews, which were then each transcribed in a Microsoft Word document and printed out..

#### *Ethics clearance*

The study received ethical clearance from the Veterans Regional Hospital Institutional Review Board (VRH-IRB) before its conduct (VRH-IRB2019:003).

This section presents the analysis and interpretation of the study on the determinants of maternal mortality in Cagayan Valley, Philippines, following the convergent parallel mixed method. The content of this section is the responses of the respondents gathered through key informant interviews and document reviews. There were 104 maternal mortality cases that were included in this study. The first three tables show the demographic (Table 1), socioeconomic (Table 2), and health status (Table 3) characteristics of the maternal mortality cases in the four (4) provinces of Cagayan Valley, Philippines, in the years 2014–2018.

## **Results**

### *The profile of maternal mortality in Cagayan Valley, Philippines*

Table 1 displays the comparison of the demographic profile of maternal death cases in the four provinces of the Cagayan Valley from 2014 to 2018. It was observed that a huge number of maternal mortalities occurred among women of Reproductive Age (WRA), which includes young or teenage women and women 35 years and older, which accounts for 49% of the total maternal mortality cases in the Cagayan Valley and remains a high-risk group. Among the provinces in Cagayan Valley, the province of Cagayan has the most vulnerable, high-risk group with 53%, not far from the case of the province of Isabela, with 48% of the total maternal mortality cases. This is consistent with the claim of the National Institute of Child Health and Human Development (2017) that pregnancy in teens and women aged 35 years or older increases the risk of pre-eclampsia and gestational high blood pressure.



**Table 1.** The demographic profile of the maternal mortality cases in Cagayan Valley, Philippines

| Characteristics                       | Region 2<br>(n=104) |     | Cagayan<br>(n=34) |     | Isabela<br>(n=48) |     | Nueva<br>Vizcaya<br>(n=18) |     | Quirino<br>(n=4) |     |
|---------------------------------------|---------------------|-----|-------------------|-----|-------------------|-----|----------------------------|-----|------------------|-----|
|                                       | f                   | %   | f                 | %   | F                 | %   | f                          | %   | f                | %   |
| Age                                   |                     |     |                   |     |                   |     |                            |     |                  |     |
| 15-19                                 | 15                  | 15% | 3                 | 9%  | 8                 | 17% | 4                          | 22% | 0                | 0%  |
| 20-24                                 | 19                  | 18% | 6                 | 18% | 9                 | 19% | 4                          | 22% | 0                | 0%  |
| 25-29                                 | 22                  | 22% | 5                 | 15% | 11                | 23% | 5                          | 28% | 1                | 25% |
| 30-34                                 | 13                  | 13% | 5                 | 15% | 5                 | 10% | 2                          | 11% | 1                | 25% |
| 35-39                                 | 27                  | 26% | 10                | 29% | 14                | 29% | 1                          | 6%  | 2                | 50% |
| 40-49                                 | 8                   | 8%  | 5                 | 15% | 1                 | 2%  | 2                          | 11% | 0                | 0%  |
| Marital Status                        |                     |     |                   |     |                   |     |                            |     |                  |     |
| Single                                | 35                  | 34% | 10                | 29% | 17                | 37% | 7                          | 39% | 1                | 25% |
| Married                               | 69                  | 66% | 24                | 71% | 29                | 63% | 11                         | 61% | 3                | 75% |
| Municipality Class                    |                     |     |                   |     |                   |     |                            |     |                  |     |
| Component City                        | 21                  | 20% | 7                 | 21% | 14                | 29% | 0                          | 0%  | 0                | 0%  |
| First Class                           | 38                  | 37% | 11                | 32% | 19                | 40% | 6                          | 33% | 2                | 50% |
| Second Class                          | 13                  | 13% | 3                 | 9%  | 1                 | 2%  | 8                          | 44% | 1                | 25% |
| Third Class                           | 15                  | 14% | 10                | 29% | 3                 | 6%  | 1                          | 6%  | 1                | 25% |
| Fourth Class                          | 15                  | 14% | 3                 | 9%  | 11                | 23% | 1                          | 6%  | 0                | 0%  |
| Fifth Class                           | 2                   | 2%  | 0                 | 0%  | 0                 | 0%  | 2                          | 11% | 0                | 0%  |
| No. Of Pregnancy at the time of death |                     |     |                   |     |                   |     |                            |     |                  |     |
| First                                 | 31                  | 30% | 9                 | 26% | 14                | 29% | 7                          | 39% | 1                | 25% |
| Second                                | 21                  | 20% | 5                 | 15% | 10                | 21% | 5                          | 28% | 1                | 25% |
| Third                                 | 28                  | 27% | 9                 | 26% | 16                | 33% | 2                          | 11% | 1                | 25% |
| Fourth                                | 8                   | 8%  | 4                 | 12% | 3                 | 6%  | 1                          | 6%  | 0                | 0%  |
| Fifth                                 | 10                  | 10% | 5                 | 15% | 4                 | 8%  | 1                          | 6%  | 0                | 0%  |
| Sixth                                 | 6                   | 6%  | 2                 | 6%  | 1                 | 2%  | 2                          | 11% | 1                | 25% |

The WHO (2019) strongly agreed with the study of Ganchimea *et al.* (2014) that maternal mortality is highest for adolescent girls under 15 years old and complications in pregnancy and childbirth are higher among adolescent girls aged 10–19 compared to women aged 20–24. For the marital status of the pregnant mother, which was consistent across all the provinces, most of the maternal mortality cases were married. However, a significant number of maternal deaths are single. Based on the key informant interview, some were teenage, and a few were solo parent students. This is aligned with the POPCOM-Region 02 (2014) report that there were alarming statistics on the cases of adolescent girls who began childbearing. The province of Isabela recorded the highest Teenage Pregnancy Rate (TPR) in 2020 at 2.3, while the city of Ilagan ranked first.

Regarding the class municipality, most maternal mortality was found in the first-class municipality and component cities. The researchers have noted that the classification of municipalities and cities is based on their total population, revenue, and land area. In terms of why there are numerous maternal mortalities in the area, some of these are from

depressed and far-flung areas. Like in the case of Baggao Cagayan, it is considered a first-class municipality; however, the maternal mortality cases were located in far-flung places. This could be different from the expected finding since most tertiary health care facilities and training hospitals were located in cities and first-class municipalities. The same is true of San Mariano, Isabela, which is considered a first-class municipality, had numerous cases of maternal mortality, and these cases were located in depressed, deprived, and underserved areas. For the component cities, like in the case of Ilagan, the subjects were from far-flung areas. There is also a mother who gave birth to their 5th and 6th child, which makes them vulnerable since they are more prone to developing uterine atony or uterine rupture that eventually leads to postpartum bleeding.

Whereas, in Table 2, the study revealed that many of these maternal mortality cases were unemployed. There were 67 of the 104 respondents who were cases of maternal deaths who were unemployed. However, a significant number are self-employed. As much as they are unemployed, they lack financial capacity.

**Table 2.** The socio-economic profile of the maternal mortality cases in Cagayan Valley, Philippines

| Characteristics                          | Region 2<br>(n=104) |     | Cagayan<br>(n=34) |     | Isabela<br>(n=48) |     | Nueva Vizcaya<br>(n=18) |     | Quirino<br>(n=4) |      |
|--|---------------------|-----|-------------------|-----|-------------------|-----|-------------------------|-----|------------------|------|
|  | f                   | %   | f                 | %   | F                 | f   | %                       | f   | %                |      |
| Occupation                               |                     |     |                   |     |                   |     |                         |     |                  |      |
| Farming                                  | 10                  | 10% | 7                 | 21% | 3                 | 6%  | 0                       | 0%  | 0                | 0%   |
| Market Vendor                            | 4                   | 4%  | 3                 | 9%  | 1                 | 2%  | 0                       | 0%  | 0                | 0%   |
| Laundry Woman                            | 6                   | 6%  | 1                 | 3%  | 4                 | 8%  | 1                       | 6%  | 0                | 0%   |
| Government Employee                      | 5                   | 5%  | 2                 | 6%  | 2                 | 4%  | 1                       | 6%  | 0                | 0%   |
| Private Employee                         | 12                  | 12% | 6                 | 18% | 1                 | 2%  | 5                       | 28% | 0                | 0%   |
| Housewife                                | 63                  | 61% | 14                | 41% | 35                | 73% | 10                      | 56% | 4                | 100% |
| Others (Student)                         | 4                   | 4%  | 1                 | 3%  | 2                 | 4%  | 1                       | 6%  | 0                | 0%   |
| Gross Monthly Income of the Family       |                     |     |                   |     |                   |     |                         |     |                  |      |
| <10,957                                  | 64                  | 74% | 25                | 81% | 29                | 76% | 8                       | 57% | 2                | 50%  |
| 10,957 to 21,914                         | 13                  | 15% | 4                 | 13% | 5                 | 13% | 3                       | 21% | 1                | 25%  |
| 21,914 to 43,828                         | 5                   | 6%  | 0                 | 0%  | 2                 | 5%  | 3                       | 21% | 0                | 0%   |
| 43,828 to 76,699                         | 4                   | 5%  | 2                 | 6%  | 2                 | 5%  | 0                       | 0%  | 0                | 0%   |
| >76,699                                  | 1                   | 1%  | 0                 | 0%  | 0                 | 0%  | 0                       | 0%  | 1                | 25%  |
| Educational Attainment                   |                     |     |                   |     |                   |     |                         |     |                  |      |
| No Formal Education                      | 2                   | 2%  | 2                 | 6%  | 0                 | 0%  | 0                       | 0%  | 0                | 0%   |
| Primary                                  | 21                  | 21% | 6                 | 18% | 11                | 23% | 4                       | 22% | 0                | 0%   |
| Secondary                                | 47                  | 45% | 14                | 41% | 24                | 50% | 8                       | 44% | 1                | 25%  |
| Tertiary                                 | 34                  | 33% | 12                | 35% | 13                | 27% | 6                       | 33% | 3                | 75%  |
| Place of Delivery                        |                     |     |                   |     |                   |     |                         |     |                  |      |
| Hospital                                 | 87                  | 85% | 27                | 79% | 39                | 46% | 17                      | 53% | 4                | 50%  |
| Birthing Center                          | 7                   | 7%  | 3                 | 9%  | 4                 | 5%  | 0                       | 0%  | 0                | 0%   |
| Home                                     | 8                   | 8%  | 4                 | 12% | 3                 | 4%  | 1                       | 3%  | 0                | 0%   |
| Religion                                 |                     |     |                   |     |                   |     |                         |     |                  |      |
| Roman Catholic                           | 74                  | 71% | 24                | 71% | 36                | 75% | 14                      | 78% | 0                | 0%   |
| Iglesia ni Cristo                        | 5                   | 5%  | 2                 | 6%  | 1                 | 2%  | 1                       | 6%  | 1                | 25%  |
| Church of Jesus Christ Latter Day Saints | 1                   | 1%  | 1                 | 3%  | 0                 | 0%  | 0                       | 0%  | 0                | 0%   |
| Born Again                               | 16                  | 16% | 3                 | 9%  | 7                 | 15% | 3                       | 17% | 3                | 75%  |
| Islam                                    | 1                   | 1%  | 1                 | 3%  | 0                 | 0%  | 0                       | 0%  | 0                | 0%   |
| Ispiritista                              | 4                   | 4%  | 2                 | 6%  | 2                 | 4%  | 0                       | 0%  | 0                | 0%   |
| Baptist                                  | 1                   | 1%  | 0                 | 0%  | 1                 | 2%  | 0                       | 0%  | 0                | 0%   |
| Methodist                                | 1                   | 1%  | 0                 | 0%  | 1                 | 2%  | 0                       | 0%  | 0                | 0%   |
| None                                     | 1                   | 1%  | 1                 | 3%  | 0                 | 0%  | 0                       | 0%  | 0                | 0%   |
| Ethnicity                                |                     |     |                   |     |                   |     |                         |     |                  |      |
| Ilocano                                  | 73                  | 72% | 26                | 76% | 39                | 81% | 9                       | 50% | 1                | 25%  |
| Ibanag                                   | 6                   | 6%  | 1                 | 3%  | 5                 | 11% | 0                       | 0%  | 0                | 0%   |
| Gaddang                                  | 1                   | 1%  | 0                 | 0%  | 0                 | 0%  | 1                       | 6%  | 0                | 0%   |
| Tagalog                                  | 5                   | 5%  | 2                 | 6%  | 1                 | 2%  | 2                       | 11% | 0                | 0%   |
| Itawes                                   | 5                   | 5%  | 4                 | 12% | 1                 | 2%  | 0                       | 0%  | 0                | 0%   |
| Others                                   | 11                  | 11% | 1                 | 3%  | 2                 | 4%  | 6                       | 33% | 3                | 75%  |

**Table 3.** The health status of maternal mortality cases in Cagayan Valley, Philippines

| Characteristics             | Region 2<br>(n=104) |     | Cagayan<br>(n=34) |     | Isabela<br>(n=48) |     | Nueva Vizcaya<br>(n=18) |     | Quirino<br>(n=4) |     |
|-----------------------------|---------------------|-----|-------------------|-----|-------------------|-----|-------------------------|-----|------------------|-----|
|                             | f                   | %   | f                 | %   | f                 | f   | %                       | F   | %                |     |
| Presence of obstetric-risk  |                     |     |                   |     |                   |     |                         |     |                  |     |
| With                        | 40                  | 38% | 12                | 35% | 19                | 40% | 6                       | 33% | 3                | 75% |
| Without                     | 64                  | 62% | 22                | 65% | 29                | 60% | 12                      | 67% | 1                | 25% |
| Presence of Medical Problem |                     |     |                   |     |                   |     |                         |     |                  |     |
| With                        | 77                  | 74% | 20                | 59% | 41                | 85% | 14                      | 78% | 2                | 50% |
| Without                     | 27                  | 26% | 14                | 41% | 7                 | 15% | 4                       | 22% | 2                | 50% |

This study supports the claim of Raatikamen *et al.* (2006), where the outcome of the pregnancy and maternal health condition is affected by the employment status because it affects meeting the needs, especially in terms of the nutrition of the

mother and especially in availing of important and required services such as laboratories and prenatal check-ups. While most of the maternal deaths were able to finish their tertiary education, it was observed that most of them were unemployed.



This is supported by the study findings that most of the maternal mortality cases were under the poor income classification, amounting to less than 10,957 (Philippine Institute of Development Studies, 2019). In terms of educational attainment, while the study of Wassihun *et al.* (2020) reiterates that those with lower education levels are more susceptible, the result of the study reveals otherwise. Some of these were college graduates and landed good jobs, which is most likely associated with stress-related factors. In the case of maternal mortality in Nueva Viscaya, a teacher who was then working in the GIDA area could not immediately seek a medical care consultation because of the long distance of travel with poor terrain and no available transportation. In terms of the place of delivery, the study reveals that most maternal mortality cases gave birth in the hospital; this shows that they need intensive medical obstetric interventions due to the complications developed during labor, delivery, and postpartum. However, it has been noted that there were still cases of home deliveries despite the "No Home Delivery" policy.

On the other hand, most maternal mortality cases were Roman catholic. This is true in the case of Cagayan Valley since the majority of the population in the region was Roman Catholic (PSA, 2003). However, in the study by Paul (2021), He posited that religion and other socio-cultural factors constitute a significant deterrent in the acceptance of reproduction health care services resulting in the high incidence of maternal mortality among low-income developing countries. One cause of maternal mortality in Isabela, whose religion then was Pentecost, was noted that religious affiliation influenced her compliance with prenatal check-ups. In terms of the ethnic background, it was noted that the maternal mortality cases, mostly were Ilocano. However, the ethnic affiliation doesn't necessarily show any relationship that justifies as determining factor. This supports the report of the Philippine Statistics Authority (2013) that Ilocanos were the most prominent ethnic group in Cagayan Valley, totaling 68.57%.

#### *The medical health status of maternal death cases in Cagayan Valley Philippines*

Table 3 shows the health status of maternal mortality in Cagayan Valley, Philippines. As observed in the table, most maternal mortality cases present obstetric medical problems such as hypertension, diabetes mellitus, and hyperthyroidism, which are indeed high and are directly associated with maternal death. During the in-depth interview, the family members were not aware of the obstetric condition of the maternal deaths. They became cognizant of the mother's case upon reviewing the death certificates and health records of the maternal mortality cases. It was found that most of them had medical problems that were life-threatening to pregnancy conditions. These include hypertension, renal problem, Diabetes Mellitus, Seizure disorders, and heart problems, accounting for 77% of the total maternal mortality cases in the region. Most maternal mortality cases were highly associated with medical-related risk factors, accounting for nearly 75% of the maternal death cases in the region. Maternal death from Isabela Province has the highest incidence with a total percentage of 85%, followed by the Province of Nueva Vizcaya with 78%; Cagayan with 59%, and Quirino with 50% of the total population. These medical risk factors include preexisting maternal disorders such as Chronic Hypertension, Diabetes Mellitus, Cardiopulmonary problems, respiratory disease, and renal problems. Moreover, most of the family members recognized the existence of danger signs as just but normal in pregnancy until such time it becomes severe and thus requires emergency hospitalization.

#### *The associated factors of maternal mortality in cagayan valley assessed through the three-delay model*

As gleaned in Table 4-5, consistent with the provinces of Cagayan, Isabela, and Nueva Vizcaya, the indicator "failure to recognize the danger signs" was the most common reason that caused delay in deciding to seek medical care, which contributed to the maternal mortality cases having a total frequency of 69, or 26%, from the total participants. Specifically, the Province

of Isabela has the highest number of responses from the said predictors with a total frequency of 39 or 30% of its total population; Cagayan has 19 or 20%; Nueva Vizcaya has 9 or 27%. However, this is different in the case of Quirino Province, where the most common cause of pregnancy is unplanned or unwanted.

Amenu *et al.* (2016) observed an association between mothers who are unaware of obstetric risk indicators and variables like educational status, location of most recent birth, and antenatal follow-up. The presence of obstetric danger sign counseling, facility ownership, gravidity, and the frequency of ANC visits among pregnant women are other variables that were determined to be significant (Teshoma *et al.*, 2020).

The *second most significant* perceived determinant was the lack of money to pay medical expenses and the cost of transportation, accounting for 52 or 51% of the total respondents. In developing nations like the Philippines, the maternal mortality ratio is significantly correlated with socioeconomic characteristics, according to a 2017 study by Girus and Wasie. Jeong *et al.* (2020) adds more support for this. According to research by Jeong *et al.* (2020), socioeconomic status, particularly income level, is strongly correlated with all-cause maternal mortality. With a score of 43, or 42%, "pregnancy is planned or unwanted," was the third most important perceived determinant. Every year, 74 million women in low- and middle-income countries fall pregnant inadvertently, according to the World Health Organization (WHO, 2019). Every year, this leads to 25 million unsafe abortions and 47,000 maternal mortality.

The "poor quality of obstetric care" was the fourth most frequently reported cause of maternal death. This was connected to the knowledge and disposition of the healthcare professionals caring for pregnant moms. According to Mudifa *et al.* (2018) study, hospitals' lack of readiness to handle patients who were deteriorating was one of the core causes of maternal mortality's continually high rates. Poor standard operating procedure adoption in hospitals

was a result of underdeveloped abilities, a lack of forethought, bad communication, and the absence of necessary resources. Root reasons were identified in primary care and included poor risk management, referrals to locations where necessary services were unavailable, and a lack of cooperation between basic healthcare and hospitals.

#### *The contributing factors of the maternal mortality cases as perceived by the concerned health administrators*

The resulting themes that evolved based on analysis were classified into: mothers considered at high-risk of pregnancy; poverty as a root cause; socio-cultural barriers and influences; competence of health workers; improvement of the maternal healthcare delivery system; and less access for the Geographically Isolated and Disadvantage Area (GIDA) community; high-risk pregnancies; behavioral compliance and support systems.

#### *Theme 1: Mothers considered at high-risk pregnancy*

A high-risk pregnancy threatens the health or life of the mother and fetus due to the occurrence of different potential complications. Mothers with high-risk pregnancies should receive special healthcare attention to ensure the best possible outcome. Risk factors include the woman's age when she is too young or old; the mother had multiple pregnancies and is too ill. Most of the maternal death cases in the region have existing high-risk conditions that led to their untimely demise. Unfortunately, they were not adequately cared for by themselves or by others.

#### *Existing co-morbidity*

While most of the maternal death cases in Cagayan Valley have had medical and obstetric disorders, the pregnant women did not recognize the possible sequelae that could threaten their lives. In Isabela, there was a case of thyrotoxic heart disease, hypertensive disorder, hyperthyroidism, diabetes mellitus, blood dyscrasia, and mental illness that predisposed to the deaths of these mothers. Four of the participants said that "*maternal death cases are due to the presence of co-morbidity.*" (IPM1, IMHO7, IMHO9, IMHO3, NVMHO4)

**Table 4.** Delay in deciding to seek medical care

| Indicators   | REGION 2<br>(N=104) |             | CAGAYAN<br>(N=34) |             | ISABELA<br>(N=48) |             | NUEVA<br>VIZCAYA(N=18) |             | QUIRINO<br>(N=4) |             |
|--|---------------------|-------------|-------------------|-------------|-------------------|-------------|------------------------|-------------|------------------|-------------|
|  | f                   | %           | f                 | %           | f                 | %           | f                      | %           | f                | %           |
| Failure to recognize danger signs  | 69                  | 26%         | 19                | 20%         | 39                | 30%         | 10                     | 29%         | 1                | 12.5%       |
| Absence of skilled attendants  | 13                  | 5%          | 3                 | 3%          | 6                 | 5%          | 3                      | 9%          | 1                | 12.5%       |
| Lack of money to pay for medical expenses and cost of transportation         | 52                  | 20%         | 16                | 17%         | 28                | 22%         | 7                      | 21%         | 1                | 12.5%       |
| Pregnancy is unplanned or unwanted   | 43                  | 16%         | 17                | 18%         | 15                | 12%         | 9                      | 26%         | 2                | 25%         |
| Poor quality of obstetric care   | 21                  | 8%          | 9                 | 10%         | 8                 | 6%          | 3                      | 9%          | 1                | 12.5%       |
| Fear of being ill-treated in the health facility                             | 12                  | 5%          | 4                 | 4%          | 7                 | 5%          | -                      | 0%          | 1                | 12.5%       |
| Reluctance from the mother of the family due to cultural constraints         | 18                  | 7%          | 6                 | 6%          | 11                | 9%          | -                      | 0%          | 1                | 12.5%       |
| The woman or family member present at childbirth lack power to make decision | 17                  | 6%          | 8                 | 9%          | 8                 | 6%          | 1                      | 3%          | -                | 0%          |
| Lack of encouragement from relatives and community members to seek care      | 7                   | 3%          | 4                 | 4%          | 3                 | 2%          | -                      | 0%          | -                | 0%          |
| No available person to take care of the children, the home and livestock     | 6                   | 2%          | 4                 | 4%          | 1                 | 1%          | 1                      | 3%          | -                | 0%          |
| Lack of companion in going to the health facility                            | 6                   | 2%          | 4                 | 4%          | 2                 | 2%          | -                      | 0%          | -                | 0%          |
| <b>Total</b>   | <b>264</b>          | <b>100%</b> | <b>94</b>         | <b>100%</b> | <b>128</b>        | <b>100%</b> | <b>34</b>              | <b>100%</b> | <b>8</b>         | <b>100%</b> |

**Table 5.** Delay in identifying and reaching the appropriate facility

| Indicators   | REGION 2<br>(N=104) |             | CAGAYAN<br>(N=34) |             | ISABELA<br>(N=48) |             | NUEVA VIZCAYA<br>(N=18) |             | QUIRINO<br>(N=4) |            |
|--|---------------------|-------------|-------------------|-------------|-------------------|-------------|-------------------------|-------------|------------------|------------|
|  | f                   | %           | f                 | %           | f                 | %           | f                       | %           | f                | %          |
| Distance from a woman's home to a facility or provider   | 42                  | 27%         | 16                | 26%         | 18                | 25%         | 7                       | 28%         | 1                | 14%        |
| Lack of roads or poor condition of roads   | 26                  | 17%         | 10                | 16%         | 9                 | 19%         | 7                       | 28%         | -                | 0%         |
| Lack of emergency transportation whether by land or water  | 23                  | 15%         | 10                | 16%         | 10                | 21%         | 3                       | 12%         | -                | 0%         |
| Lack of awareness of existing services   | 15                  | 10%         | 6                 | 10%         | 7                 | 15%         | 1                       | 4%          | 1                | 14%        |
| Lack of referral system  | 10                  | 6%          | 4                 | 6%          | 3                 | 6%          | 1                       | 4%          | 2                | 29%        |
| Lack of communication with referral facility   | 9                   | 6%          | 3                 | 5%          | 2                 | 4%          | 2                       | 8%          | 2                | 29%        |
| Lack of moral, financial and logistical support from neighbors, the barangay captain and barangay officials or the mayor | 30                  | 19%         | 13                | 21%         | 12                | 20%         | 4                       | 16%         | 1                | 14%        |
| <b>Total</b>   | <b>155</b>          | <b>100%</b> | <b>62</b>         | <b>100%</b> | <b>61</b>         | <b>100%</b> | <b>25</b>               | <b>100%</b> | <b>7</b>         | <b>100</b> |

*Primigravida and multigravida*

It has been noted that 46% of the maternal death cases in Cagayan Valley were high-risk for complications because of their number of pregnancies. This is specifically among primiparity and multiparity mothers who give birth and develop uterine atony and postpartum hemorrhage. For multigravida mothers with more than five pregnancies, they are at high risk of developing uterine rupture or uterine atony that causes hemorrhage. A maternal death case happened to a multigravida mother because of poor health-seeking behavior. She did not undergo a prenatal checkup and did not comply with the advice of the health worker to

deliver at the hospital because of her experience having a successful home delivery in her past pregnancies. The doctor said, "She was advised to deliver at the hospital because she was identified as a high-risk mother." However, she was confident to deliver at home because she had a home birth history." (NVMHO5) A case grand-multigravida mother on her 13<sup>th</sup> pregnancy, living in a far-flung area, did not undergo a prenatal care visit and died of complications. The doctor said, "The midwife was surprised when she was approached by the husband of the mother seeking help to manage the condition of the mother at home." (CMHO9) Another multigravid mother also chooses to give birth at home with

a traditional birth attendant since her previous delivery was also delivered at home. (IMHO13, CMHO7, CMHO10). The other physician said that *"the multigravid mother, aside from being high-risk, also has co-morbidity"* (IMHO5).

#### *Teenage pregnancy*

Most of the teen-aged maternal mortality had developed complications during pregnancy, labor, and delivery. While it is considered high-risk, there are a significant number of these teen-age pregnancies in the Cagayan Valley. Most of them were reluctant to seek obstetric consultation because of their feeling of social rejection; thus, they preferred to hide and would only seek consultation when complications had already occurred. Two of the participants said, *"The teen-age mothers were ashamed to undergo check-ups"* (IPM1, IMHO12). The other physician added that in her case in 2017, *"the mother is very young and it was very late when she underwent a prenatal check-up; it was during her third trimester when they had her first prenatal visit"* (IMHO 11), and the other doctor said that the teen-age pregnant woman hides her pregnancy because they are ashamed about it (CPHN7). This means that aside from being unable to be immediately tracked, they would come to seek advice from a professional health worker at the late stage of pregnancy, where complications have already occurred since they hid the pregnancy. One of the participants said, *"This teenage pregnancy has kidney failure."* - (NVMHO6) This was agreed upon by another doctor, where another teenage maternal death case had happened because she had never had a prenatal checkup accidentally tracked by a midwife. It seems that this teenage maternal death had poor seeking behavior because they intentionally hid the pregnancy. *"The case was teen-age pregnancy; they hide it because they are ashamed of it"* (NVMHO6).

#### *Poor awareness of maternal health risks*

Poor awareness of maternal health risk is the inability of the mother to recognize the presence of a medical or obstetric health-risk condition that increases the risk of complications during pregnancy, childbirth,

and delivery. One doctor said that the maternal death case, who was suspected of having a disease called blood dyscrasia, had undergone diagnostic procedures before her pregnancy. However, said woman forgot to follow up when she got pregnant. Hence, she had experienced massive blood loss. *"In our case, if she had known that she had blood dyscrasia, she would not have gotten pregnant if she had known about it. Unfortunately, she did not follow-up, sir, and that is my worry with the patient."* (PHP1) A mother who has a preexisting medical condition, is of extreme age during pregnancy, or has had multiple pregnancies has a significant probability of causing maternal death. One of the participants said that she advised the mother to give birth at the hospital due to a complicated pregnancy, however, there was a delay in bringing the patient to the facility. *"They only brought the patient when they noticed that a complication during the delivery had occurred."* (NVMHO7) Another participant verbalized a story of one maternal death case in which the woman seemed unaware that vices threatened her life and the baby. *"She was an alcoholic mother who intentionally aborted her pregnancy, which caused sepsis and led to her death."* NVMHO4 One doctor said that *"poor nutrition is also a factor that puts the mother at high risk."* IMHO7. She believes that sometimes the mother experiences, if not being hypertensive, being anemic, and this might aggravate the condition, especially when the patient has a high chance of bleeding. The more it decreases the hemoglobin, the more it affects the health of both the mother and the baby.

#### *Theme 2: Poverty as a root cause*

The lack of money to avail and access maternal healthcare services during the prenatal check-up and emergency obstetric situations may significantly delay seeking health consultation until complications arise that have resulted in the mother's untimely demise. One of the participants verbalized about the case of a mother who was not able to bring immediately to the hospital due to financial concerns. *"The mother had felt a problem in the morning, but the husband, who*

is a tricycle driver, still went to work and arrived late in the afternoon." *IMHO1* By that time, the mother is having difficulty breathing and is eventually declared dead on arrival upon reaching the facility. In addition, some families failed to save money for this cause.

#### *No savings for childbirth*

Saving money is a usual practice that one must do to prepare for a foreseen situation. *Pregnancy* is a foreseeable crisis that leads to adjustment for the mother and the whole family. The mother, who seems financially incapacitated, could not save for the expense. One participant said, "*Perhaps, the financial capability; it was March, and most probably they do not have savings.*" "*The amount is not enough; when you leave here and go to Main Isabela, that is expensive; that is what other people think.*"- *IMHO3* Saving money is a practical solution to address the expected expenses during pregnancy and childbirth. However, one still fails because of poor financial status, probably meeting the family's demand first.

#### *Financial struggle to pay for transportation and medical expenses*

The family's financial struggle directly affects the delay in the accessibility of maternal healthcare services. The financial status impacts their confidence to seek medical advice in the healthcare facility. They thought that availing of health services in the facility required a considerable amount that the family could not provide. Hence, they will resort to cheaper health services, like dwelling on traditional birth attendants for home delivery. Two of the health administrators said that the patient was preoccupied with the hospital expenses that have caused the delay in seeking consultation. "*They do not want to go to the hospital simply because of the bills they need to pay for*" (*IMHO3, CMHO1*). This was agreed upon by other MHOs who said that "*financial problems are common among these maternal death cases*" (*IMHO1, IMHO2, IMHO5, CMHO4, QMHO1, NVPHO, NVPM*). The same happened to patients who

were referred to the hospital due to complications. Despite the doctor's advice on the need to be admitted to the hospital for further management, the couple did not proceed due to financial concerns. On the other hand, one maternal death case was then in the hospital facility but still decided to go home due to financial constraints. Unfortunately, the situation became more complicated, leading to her death. It was too late when they decided to get admitted to the hospital. Also, some of the maternal death cases were noted to have had a problem with the accessibility of transportation due to financial incapacity, especially those from far-flung areas. The physician said that "*one reason is the "fare," especially for the poor ones*" (*IMHO 4*).

#### *Theme 3: Socio-cultural barriers and influences*

The culture that displays the customs, traditions, beliefs, and ways of life profoundly affects the mother's health. Despite the efforts of the health workers to provide education on the promotion of health, the culture-driven group would still dwell on the practices that have been passed down through generations. One of the participants said that it is their *culture* that affects the outcome of their pregnancy. Most of them are from the mountainous area; they are indigenous people (IP) who prefer to give birth at home. The participant said, "*Though we encouraged them to deliver in the facility, they would tell us that it was imminently delivered at home.*" "*It is up to us to figure out if that was the real thing that had happened or if they really do not like to bring in the facility.*" (*NVMHO1*) Two of the participants agreed and said, "*They (Indigenous People) do not want us to intervene (during delivery) even if they have been struggling already.*" (*QMHO2, NVMHO1*). This shows that culture plays a role in the pregnancy outcome of the mother. Allowing the tribal culture, beliefs, and practices is essential to showing respect and dignity among this group of Filipinos. However, this is a challenge in the health care sector, which has been taking all the initiatives to decrease the problem of maternal mortality.



**Table 6.** Delay in receiving appropriate and adequate care in the facility

| Indicators  | REGION 2<br>(N=104) |            | CAGAYAN<br>(N=34) |            | ISABELA<br>(N=48) |            | NUEVA VIZCAYA<br>(N=18) |            | QUIRINO<br>(N=4) |            |
|---|---------------------|------------|-------------------|------------|-------------------|------------|-------------------------|------------|------------------|------------|
|   | F                   | %          | f                 | %          | f                 | %          | f                       | %          | f                | %          |
| Lack of healthcare personnel  | 14                  | 13         | 3                 | 9          | 6                 | 13         | 3                       | 17         | 2                | 33         |
| Unprofessional attitudes of healthcare providers                        | 9                   | 8          | 3                 | 9          | 3                 | 6          | 2                       | 11         | 1                | 17         |
| Shortages of supplies (i.e., emergency medicines or blood)              | 30                  | 28         | 9                 | 26         | 13                | 27         | 6                       | 33         | 2                | 33         |
| Lack of basic equipment (e.g., for cesarian section, blood transfusion) | 22                  | 21         | 7                 | 20         | 12                | 25         | 2                       | 11         | 1                | 17         |
| Poor skills of health care providers                                    | 16                  | 15         | 5                 | 15         | 8                 | 17         | 3                       | 17         | -                | 0          |
| Health is not prioritized by the barangay and municipal officials       | 8                   | 8          | 4                 | 12         | 3                 | 6          | 1                       | 5.5        | -                | 0          |
| Lack of budget from the lgu   | 7                   | 7          | 3                 | 9          | 3                 | 6          | 1                       | 5.5        | -                | 0          |
| <b>Total</b>  | <b>106</b>          | <b>100</b> | <b>34</b>         | <b>100</b> | <b>48</b>         | <b>100</b> | <b>18</b>               | <b>100</b> | <b>6</b>         | <b>100</b> |

*Traditional birth practices*

A typical birth attendant is someone who helps women give birth and who first learned their trade by either giving birth to children themselves or by training under other traditional birth attendants.. One participant said that they still have cases of *hilots* despite having an ordinance prohibiting home deliveries. "We already have an ordinance, but they still exist, because they say that it is cheaper, and they are being cared for." (IMHO10). This was agreed upon by the other participants, who said that "they would choose to spend money seeking care with the traditional birth attendant rather than going to a health center because sometimes they do not want to come out of their comfort zones." (CMHO3, CMHO8). This happened especially to those who are from far-flung areas.

*Superstitious belief*

A superstitious belief is a falsely conceived, irrational attitude towards perceptions of health and illness in an individual. The occurrence of untoward signs and symptoms during pregnancy, labor, delivery, and postpartum is often associated with supernatural energies, resulting from delaying seeking proper health care services. One doctor said that "one factor contributing to maternal mortality is their belief, their old belief" (IMHO 2). The family first consulted the quack doctors, which caused a delay in bringing the severely ill mother to seek consultation with health professionals. It was found that the mother had eclampsia, and the blood pressure increased. "They thought the patient's seizure was caused by

possession of spirits, so they went to the quack doctor. They put on black clothes like that before they rushed her to the hospital, so that was the cause." (IMHO2), the physician added. One doctor agreed that because of their superstitious beliefs, their health-seeking behavior seems affected. "Their health-seeking behavior is the usual problem because the mother has superstitious beliefs." (NVMHO5)

*Religious belief*

The profound effect of religion on the mother's health manifests between life-and-death situations, and this condition affects the sound judgment of the mother and family. One of the participants said, "They have done everything because of the contradicting religious beliefs; they brought a lawyer to force her to undergo a blood transfusion." By the time it was okay, it was already too late. "Much time is lost, and that also includes the blood, isn't it?" – (BMHO)

*Poor comprehension of information and lack of information dissemination*

The poor understanding of the mother's health situation by the family members and the mother herself resulted in the delay in seeking emergency healthcare management. One physician said that they did not lack in giving IEC but in the capacity of the mother to comprehend information. "Perhaps the level of understanding is either that they do not understand the counseling of IEC or maybe because of their educational attainment" (IMHO3, CMHO5, NVPM6). The physician added that in terms of their socioeconomic status, the mother would either have a



high educational degree and assume that she is in a normal state of pregnancy, even if it is the other way around, causing delay in seeking medical advice, or she would have had no education at all and could not understand the instruction. (IMHO3)

#### *Theme 4: Competence of healthcare workers*

The competence of healthcare workers directly influences mothers' healthcare compliance. Both hospital- and community-based facilities have been manned by professional doctors, nurses, and midwives to deliver quality maternal health care services. Efficient and effective health workers are equipped with appropriate knowledge, skills, and attitudes to meet the mother's expected healthcare demands. Showing empathy, kindness, and belonging establishes good rapport and the mother's confidence to seek care. Ineffective performance of the skills and procedures by the patient may put the patient at risk. Also, performing procedures effectively may prevent injury to the patients; hence, careful judgment and assessment prevent death and disability.

#### *Upgrading the skills of the health care provider*

The skills of the healthcare provider in performing medical, obstetrical, and surgical procedures rely primarily on the knowledge and skills of the doctors in a healthcare facility. Unfortunately, there was suspicion towards healthcare workers regarding the outcome of the mother's delivery. Seemingly, there is incompetence in the performance of their duties and responsibilities of care, especially in the correct assessment and management of pregnant women, that may have resulted in the mother's death. One of the participants said, "No. 1 is the assessment of the patient." *Initial assessment really during pregnancy can be seen for those high-risk patients, and proper management of the patient really.*" (NVPHO) This was agreed upon by another doctor, who said, "Sometimes doctors do not do a physical assessment; it is not complete; it has already become a routine, they do not know that every patient is unique." - (ICOH1). This was seconded by another doctor, who said, "This is already beyond our control because she was already in the hospital facility." *So most likely, there were lapses in the assessment*

*when the patient was in the hospital. "Despite the mere fact that the patient was already complaining that she could no longer tolerate it, she was not assessed thoroughly."* (CMHO11) Another doctor believed that the management in the hospital was the problem since all maternal death cases occurred in the hospital. Basically, all high-risk mothers, once assessed, were referred to the CEMONC facility. "We referred all high-risk mothers; all maternal deaths were hospital cases, perhaps it has to do with how they manage the patient." CMHO4 This was validated further by another participant, who said that "it was neglected in the hospital; I remember the husband's complaint that the bed mattress and blanket were soaked with blood, but the hospital denied it." (QMHO3) A doctor also attested that "it is in the procedure; we have already sent a letter to them; they do not want to show any data. So maybe there is a problem with the procedure (smiling). With that post-partum (maternal death), we lack nothing because we visited the patient." - IMHO4

#### *Intimidated mother at health facility*

A mother who seeks medical consultation in the health facility is an opportune time to cater to the needs of the healthcare worker. Services are provided with passion and commitment to meet both the expectations of the provider and the recipient of care. It was observed that some healthcare facilities do not properly treat the clients and might have uttered intimidating and discouraging words; hence, they feel rejected. It may have resulted in the hesitation of the Primary Health Care facility to refer patients, especially high-risk patients, to the higher facility. One doctor stated, "We have primigravida mothers, we advised them to give birth in the hospital. In their third trimester, she should be monitored at the hospital with an ultrasound, and when she went to the hospital at the reception or accommodation of the health worker, there were times that these health workers were a bit different. The primigravida mother will return and report to us about their negative experience, including doctors' complaints. They are asking the patient, "Why are they not capable of RHU?" "Why did you come here?" "It

looks like that." Maybe that should be improved; it is frustrating; we expected better or leveled-up treatment there, but it was not! (NVMHO4). The attitude of the health workers towards the patient from the referral hospital seems to have been untoward to the pregnant mother, who was advised by the doctor from the referring facility. Hence, the patient did not go to the hospital, even though she is a high-risk mother. As a result, the health provider in the infirmary hospital performed an imminent delivery.

#### *A Call to Enhance Strategies for Postpartum Care*

The postpartum visit is the period of care after the baby's delivery and placenta, and it is the most critical period where most postpartum deaths occur. The healthcare professionals must closely monitor this pregnant mother for 42 days after delivery. It was noted that most of the maternal deaths did not receive "home visits" from the midwife throughout pregnancy. Home visiting is a strategy to build strong relationships and gain trust and confidence from the family, eventually resulting in voluntary use of the health services available in the facility. Unfortunately, there were identified cases of maternal mortality that were not visited and monitored by the Barangay Health Worker or midwife responsible for that postpartum mother. One respondent said, "We have cases where women died at home because they were not monitored during postpartum." (CMHO8, IMHO16, IMHO11) It was seconded by another respondent, who said, "After delivery, there are essential things to look at; our maternal death case happened not during delivery but during postpartum. They should do postpartum visits, " IMHO7." It was observed that there are patients who do not want to go to RHU, especially those who came from the hospital. This calls for the initiative of the Barangay Health Workers (BHWs) and midwives to spare time to visit all the postpartum mothers. However, there were cases where the midwife could not perform this function since she was catering to other barangays. They would only visit their catchment areas once a week. One respondent said,

"Sometimes mothers who are pregnant will not go to the barangay even if they have felt sick because the midwife is not around, the midwife is a factor" (IMHO 11).

#### *Theme 5: Improvement of the maternal healthcare service delivery system*

The maternal health care delivery system refers to the different services that a mother receives during pregnancy, childbirth, and postpartum. These include the Maternal and Newborn Child and Nutrition (MNCHN) program components, including the core package of services, service delivery network (SDN), and health systems instrument specifically intended for maternal health.

#### *Rationalized implementation of the service delivery network*

The implementation of a service delivery network must efficiently and effectively meet the healthcare needs of all childbearing women by ensuring a continuum of care from different levels of facilities, which include community-level providers, BEmONC and CEmONC-capable facilities, or a network of facilities. Service delivery policies and human resources comprise this area. Unfortunately, there were observed lapses in the implementation of the said program, especially the referral system and the monitoring and evaluation of the said program. One participant said that the Service Delivery Network (SDN) is very important. If other health care facilities would only know how to follow protocols and refer immediately all high-risk and complicated medical cases with proper networking and a proper referral system, there would be no problem since this would be the outlook of the referral facility as the end referral institution. He said, "What we get here are the late referrals, and it is difficult for us because when they bring the patient here, they are already dying at the ER or Dead-on-Arrival." Many are like that; if only we will be able to implement the SDN properly, we will minimize deaths." (ICOH2) He elaborated further, saying that there are health care institutions like birthing centers that would manage

high-risk, complicated mothers. "They would be staying there for a long period of time and only refer to the hospital when complications had arisen." "That is another factor that may cause complications of maternal death." (ICOH<sub>2</sub>) This was validated by the indirect statement of the other respondent, who said that "the primary facility is not allowed to accommodate multipara and 35-year-olds and above, they will not be catered by the philhealth; they cannot reimburse." (NVCOH)

#### *Inadequate healthcare personnel in the facility*

The staffing shortages are barriers to implementing maternal health services in the community. Issues in the study delve into the lack of healthcare workers in the workplace to monitor the expectant mother during pregnancy, childbirth, and the postpartum period. There was also an observation that there are more contract-of-service healthcare workers in the facility than permanent health workers. One of the participants said that the deployed HRH staff in the health facility left the area at that time for the renewal of the contract at DOH, and no one was present in the facility. *So, the patient might have thought, why should she be going into the facility when nobody is there? So, what happened was she delivered at home, and from there complications like sepsis arose, and there was an infection.* – BMHO Most RHUs are understaffed. A lack of RHMs and public health nurses profoundly affects the quality of maternal and child health programs. This understaffing resulted in the midwives' dual functions as barangay midwives and birthing home midwives. As a result, they have neglected the clients in the community, especially those who need their service the most. According to one of the respondents, "We have inadequate BHWs." *We only have 10 BHWs for 60,000 clients, and we cannot track them all. We only have four (4) permanent midwives for the 60,000 to 68,000 clients in the municipality. Super understaff... We have 25 barangays and only four permanent midwives. Yes, we have 5–6 contractual. The ideal ratio is one to 5000 people.* This was agreed upon by another respondent, who said that "Indeed,

*the number of midwives is still inadequate."* (NVMHO<sub>1</sub>, CMHO<sub>8</sub>) However, with the recent program of the Department of Health on the deployment of additional healthcare workers in the different localities in the region, it was a great help because it lessened the workload of the midwives, but it is still not adequate. One respondent said that "the HRH has been a big help because they can go daily to the barangay." *They are the ones doing the checkups in the absence of the midwife. Nevertheless, the problem is that not all barangays have an HRH. Before, there was a problem, and each midwife had four (4) catchment areas. "She can only visit the barangay once a week."* (NVMHO<sub>1</sub>) This was agreed upon by another participant, who said that understaffing is a factor in the scenario for the time being. However, having the DOH program for the deployment of nurses and midwives in the barangay has been a great help. She said, "The manpower is still insufficient, but we have already assigned NDPs and we have a health center." (NVMHO<sub>2</sub>)

#### *Over fatigue staff*

The overworked staff performed their duties and responsibilities beyond their expected performance, and they did this in the exigency of service, resulting in low productivity performance. One of the participants verbalized, "I think we have enough human resources per population." *But my problem here is that I am on duty at the BEMOC for 24 hours. They are rendering their duties more than the paid hours, so it seems like they have volunteer work of 16 hours per week.* – NVMHO<sub>4</sub> One participant supported this statement by saying, "But of course, there will be one assigned per barangay. Actually, I mentioned a while ago that there will be no more Rural Health Midwives assigned there. All will be HRH from DOH, nurses, NDP, and RHMPP. So now that they already have a shift of work, and of course we have 25 barangays, they will not stay in one area regularly. Example: "One of them will handle two (barangays)." - This was agreed upon by another participant, who said that "the ratio of midwife and catchment area was 1:3 or 4."

*Poor partnership with the private obstetrician*

There were several cases of maternal mortality among the private obstetricians who sought prenatal care checkups. Oftentimes, the public health care facilities were not informed since these women may go directly to the private clinic for consultation. Thus, they are usually not tracked immediately by the concerned midwives. The Public-Private Partnership (PPP) was established to provide quality general management and clinical management services to provincial hospitals, especially maternal and child health services. (ADB, 2013) Moreover, both public and private obstetricians must actively coordinate and communicate with each other to facilitate the proper recording and reporting of pregnancies. As such, the midwife or nurse of the BHS or RHU shall monitor the Target Client List (TCL) to easily track collaborative management. However, this seems unimplemented in the healthcare system, even at the primary healthcare facilities. One of the participants said, *"We neglected to track that maternal death case because she had her prenatal in private."* (NVMHO8), the other participant stated that they never had an idea about the maternal death case of postpartum hypertension unless the hospital that catered the maternal death informed them. The mother seems hesitant to deal with the public health provider since she is seeking a prenatal checkup with a private obstetrician. The participant said, *"She had a prenatal checkup in the private clinic; she did not entertain the midwife when they visited her."* NVMHO1

*Poor pregnancy tracking*

Pregnancy tracking is an important activity for health care providers in the community. This allows the community health workers to identify the expectant mothers who need to be monitored for safe delivery. Some of the maternal deaths have been caused by neglect to seek prenatal care checkups. This will help the healthcare workers appraise the condition of the pregnant woman and the pregnancy outcome. For the maternal mortality cases, some were observed to intentionally hide their pregnancy. One of the participants said that the midwives must be able to

track all pregnant women, especially during the first trimester. She said that *"it was not tracked by the midwife; that woman was seen during her third trimester."* (IPM1), they were not able to track these maternal death cases themselves for prenatal care despite the persistence of the BHW, who convinced them to visit the facility for ANC. They only came to know that the mother was already dead. One participant said that the midwife did not track the pregnant mother during the first trimester, which is very essential to the health of the mother and the baby. She said, *"[The maternal death cases] come out that they were not tracked. After all, these women are seen during their second trimester, not caught during the first trimester, which is the most important."* (IPM1)

*Poor family planning*

The success of implementing the family planning program reflects the healthcare implementer's performance and the receptor's willingness. Most of the maternal deaths of multigravida women were not acceptors of family planning. Seemingly, on the part of the midwives, there is a lack of family planning assessment and counseling for the deceased woman.

*Theme 6: Less Access for Geographically Isolated and Disadvantaged Areas (GIDA) Communities*

The DOH defined the GIDA area as the community that is specifically disadvantaged due to the presence of both physical and socioeconomic factors, with the criteria for classification being that at least 25% of sitios and puroks have no access to an RHU or a hospital within 60 minutes of travel in any form of transport, including walking, and at least 10% of its population are Indigenous People (IP), 10% of the total population are affected by armed conflict or are internally displaced, or at least 50% of the total population are enrolled in 4Ps and the like. They reside in mountainous or coastal areas of the region with poor accessibility to roads and transportation. Their location affects the travel distance needed to transport the mother to the facility and access immediate or emergency healthcare needs. The distance of the referring facility and the availability of

the transportation facility to bring the mother to the nearest health facility are factors in the mother's death. One of the participants said, *"The patient would die along the way; after we have reached the tip of Luzon, you need to travel for an additional 3 hours prior to reaching the hospital (referring hospital)." BMHO*

#### *Lack of supplies and health care resources*

The absence or insufficiency of healthcare resources impedes the accessibility and availability of health services for women who need them. It may be human or facility resources in the GIDA area that resulted in the delay in providing immediate maternal care that resulted in poor access to maternal healthcare services, including the concern over the distance of the PHC to the referral facility. One of the participants said that for the past five (5) years, one of the reasons for maternal mortality has been that the pregnant woman was not being monitored since there was no doctor available in the area. The participant said that *"it was only during the labor process when they detected that the mother had high blood pressure."* IPM3 She further elaborates on the concern in terms of the performance of the healthcare facility in the GIDA area. *"We are in GIDA; the capacity of our health facility here is insufficient. First, we only have one hospital, which is an infirmary and a primary hospital with limited bed capacity. Resources and facilities are limited."* IPM3

#### *Late referral from a far-flung area due to long-distance travel, poor terrain, and a lack of available transportation*

The location of the mother's house is far from the health facility. This requires a long distance of travel before reaching the health care facility. The families of these maternal death cases from far flung mountainous areas often resort to a home delivery method. They would only bring the patient to the hospital when complications arose. One participant said that *"the number one (1) concern is our location." Our geographical location, since we are from the coastal region, our referral facility is Santiago City, and it takes 7 hours to travel."* IPM3 Other participants agreed that the distance from the

mother's house to the health facility is a factor. *"Aside from the transportation, the distance from the house to the health facility is a factor" (IMHO2, IMHO13, CMHO4, CMHO13).* Some participants also agreed and have said that the house of the mother was very far away, the road then was not concrete, and the availability of transportation is also a concern. Hence, the distance of travel would require much time before reaching the health care facility. Several participants said that *"the cause of delay was the rough roads and transportation that is difficult to access."* (CMHO1, CMHO10, QMHO1, QMHO2, NVMHO5, CMHO12, IMHO2, IMHO9, IMHO13, IPM3), while the other participant said that the poor terrain is a factor. *"We needed to pass through one municipality before we reached our other barangay. We need to pass by the town of Nueva Vizcaya. Road accessibility is also one factor."* (NVMHO6) On the other hand, ambulances could not even be used as transportation vehicles due to the struggle on poor terrain; hence, they utilized *"bangka" or "kuliglig" or motorcycle* which could be stressful on the part of the mother. In addition, while one participant said that *"there was no available ambulance to transport the patient to the referring hospital" (CMHO4),* the other said that *"it was a good strategy that we already have MDRRM" (CMHO8).* However, one participant stated that *"despite the presence of a transport vehicle, they arrived late during the labor process and that complications have already occurred."* (CMHO10) that eventually caused the death of the mother.

#### *Theme 7: Behavioral compliance*

The mother's willingness to comply with the standard maternal health care provided by the health professionals is a significant factor in a woman's successful pregnancy, labor, and delivery. The attitude of the mother towards prenatal care visits and their compliance with the advice of the health care providers towards a safe motherhood program determine the outcomes of pregnancy.

#### *Poor prenatal care compliance*

A prenatal care visit is vital. All forms of diseases that occur during pregnancy, which may lead to complications, can be detected and managed early.



The expectant mother will also be informed and educated on the different warning signs of pregnancy, the preparation for childbirth, and what to do if complications arise. Unfortunately, expectant mothers have poor behavior when seeking healthcare advice. Some mothers did not religiously go to the healthcare facility to undergo a prenatal check-up. One of the participants emphasized that the behavior of the clients is a factor. She said that *"they have so many reasons to tell, besides the fact that the services are given for free." Perhaps it's laziness; they knew that they had a prenatal check-up but were not able to complete it.*" (IMHO4) a case of maternal death whose house is almost adjacent to the hospital but never had a prenatal check-up despite encouragement from the midwife who visited her several times. One of the participants stated that *"when the pregnant woman was about to give birth, she mentioned that she has asthma but still insisted on giving birth at home. It was late when they brought the patient to the hospital. She was DOA (dead on arrival) at DH (District Hospital).*" - NVMHO3 Two participants believed that it was the attitude of the pregnant mother that caused the death. Despite intensive health education campaigns, they still do not go for prenatal visits and give birth at home. They reiterated that *"the cause is more in the attitude; they are stubborn"* (NVMHO4, QMHO4). This was also agreed upon by another participant, who said that *"it was really on their attitude despite all the effort made by the midwife, such as house-to-house visits and barangay assembly." There will still be deliveries at home, and I will not undergo a prenatal visit.*" (NVMHO4), said the participant.

#### *Negative attitude of the mother towards ANC*

These findings were noted as reasons for the maternal deaths that did not receive ANC; first, the health care worker's availability. Most often, the midwife has two or more catchment areas to handle. Second, the midwife is out for an unknown reason—the third, behavioral factor of the client. Fourth, traditional beliefs This was attested to by one of the participants, who said, *"She was stubborn, and she did not like to*

*go to the hospital; she wanted to give birth there (at home). She was rushed to the hospital, but it was too late. I was not around then. "No co-morbidity, no medical problem"* (IMHO 13).

#### *Unwanted/Unplanned pregnancy*

This unwanted or unplanned pregnancy results from a forbidden marital relationship, victims of sexual abuse, or a teenage pregnancy that affects both the physical and psychological health of the mother, which causes stress for her. Their attitude towards seeking healthcare services is affected because they fear rejection, resulting in a missed-track pregnancy with complications. One of the participants remembers the case of a 40-year-old pregnant woman who had an affair, separated from her husband, and got pregnant by one of her distant relatives in the barangay. It sounds like the mother hid because of the social notion of rejection. *"... and she did not have prenatal check-ups." "When she was in labor, she was not conducted at the hospital, so she had zero prenatal check-ups."* NVP1 Another case was told by the participant that *a maternal death case was a victim of incest that happened somewhere in upland areas. She said, "The family hides the pregnancy because they do not want others to know about the incident, especially their relatives. Thus, only the family knows about the home delivery."* - NVP1 She further elaborated that the family intentionally hid because the mother was a teenager. It was a coincidence that a midwife attended her, but that barangay was not really her catchment area.

#### *Transient pregnant women*

Transient pregnant women are residents of certain localities who move to another place during their pregnancy. They come home to their parents or relatives, usually a few days prior to their expected date of delivery. Some of these maternal death cases probably stayed in a particular locality because it was their place of work or the residence of their partners. Healthcare workers have difficulty tracking these individuals, especially when seeking prenatal consultation. Some had a previous prenatal visit from a health facility, but there is no continuity of said



prenatal care at the intended place to give birth. These expectant mothers have not undergone prenatal visits at healthcare facilities. Hence, complications have occurred, and no health care management has been provided by professional health workers. One participant said that the maternal mortality case has no prenatal record since she intentionally planned to give birth near her immediate family member. The woman is a Bonafede resident but had worked from another place. It was found that the mother had missed undergoing a prenatal check-up since the time she arrived. "She must inform us, of course, we are not the ones who did the previous check-up." (NVMHO1, NVMHO6, CMHO11, CMHO6). Two city doctors both encounter the same situation where the mother arrives home during the last trimester purposely to give birth only here in the city and does not have a prenatal visit. "They are from other towns or municipalities... they lack prenatal check-ups" (CMHO10, IMHO10) was emphasized by the participant.

#### *Theme 8: Support system*

The support system of the immediate family members from pre-pregnancy to postpartum is necessary to sustain the mother's needs in terms of physical, emotional, spiritual, social-psychological, and financial aspects. However, it was observed that pregnancy out of wedlock is likely to cause poor support for the mother's needs.

#### *Absence of husband due to illegal affair*

The presence of the husband during prenatal counseling is important since there must be active participation in decision-making on how to help improve the health of the mother. The maternal mortality case in one province was believed to have been neglected by the husband's responsibility to support the needs of the woman having an illegal affair. "The relationship was illegal; the husband has a legal wife" (NVP1).

#### *Uncooperative husband*

Most husbands are not sensitive to the needs of the expectant mother during pregnancy. While the woman is seeking attention and comfort from their

partner, the husband tends to be uncooperative. *One respondent said, "Pregnant women are quite sensitive; they seek the comfort and caress of their partner, and this is our challenge because sometimes the husband is not cooperative." - (NVMHOPM2, CMHO6)* This scenario had happened in the case of a maternal death in one province where the husband is a farmer. "The mother is alone; she does not have anyone to talk with; she might have postpartum depression then." (IMHO9) This was validated by a midwife, who reiterated that the mother did not have any complaints.

#### *Family problem*

The family plays an important role in a successful pregnancy outcome by meeting the needs of the mother all throughout, from pregnancy to delivery and postpartum. They provide the necessary care in coming up with sound decisions, especially in challenging situations. However, one of the participants courageously divulged that the maternal death case was a case of a physically abused woman, validated with her statement, "The cause of her death was a family problem" (QPM 4).

#### *Mixed-method integration*

During the interpretation step of this study, the findings from the quantitative and qualitative studies were combined to clarify the findings from the quantitative study. For side-by-side comparisons, a combined display of quantitative and qualitative findings was made.

#### *Mixed-method findings*

This Table 7-9 shows how the three-delay models are associated with the health administrators' perceived factors of maternal mortality cases in Cagayan Valley through the integration of the quantitative and qualitative data.

As shown in the above Table 7, the first most determinant factor that prevailed was "failure to recognize danger signs," which accounted for 69 or 66% of the total respondents.

**Table 7.** Delay in deciding to seek medical care and the generated thematic analysis

| Delay in deciding to seek medical care                                       | f  | Rank | Thematic analysis of the qualitative data   |
|--|----|------|---|
| Failure to recognize danger signs  | 69 | 1    | Mothers Considered at High-Risk Pregnancy<br>Existing co-morbidity<br>Teenage pregnancy<br>Primigravida and Multigravida<br>Poor awareness of maternal high-risk factor   |
| Lack of money to pay for medical expenses and cost of transportation         | 52 | 2    | Poverty as a Root Cause<br>No savings for giving birth<br>Financial struggle to pay for transportation and medical expenses<br>Behavioral Compliance<br>Unwanted/Unplanned pregnancy  |
| Pregnancy is unplanned or unwanted   | 43 | 3    | Negative attitude of the mother towards ANC<br>Poor prenatal care compliance<br>Improvement of Maternal Healthcare Service Delivery System<br>Low family planning acceptor<br>Competence of Healthcare Workers              |
| Poor quality of obstetric care   | 21 | 4    | Rationalized implementation of SDN<br>Upgrading of the skills of the healthcare workers<br>Intimidated Mother at health facility<br>A call to enhance strategies on postpartum care<br>Sociocultural Barriers and Influence |
| Reluctance from the mother of the family due to cultural constraints         | 18 | 5    | Traditional Birth practices<br>Superstitious Belief<br>Religious Belief<br>Poor Comprehension of Information<br>Poor support System   |
| The woman or family member present at childbirth lack power to make decision | 17 | 6    | Absence of husband due to illegal affair<br>Uncooperative husband<br>Family problem<br>Improvement of Maternal Healthcare Service Delivery System   |
| Absence of skilled attendants  | 13 | 7    | Inadequate Healthcare personnel in the facility<br>Under-staffing<br>Over Fatigue staff   |
| Fear of being ill-treated in the health facility                             | 12 | 8    | Not identified as factor that contributed to maternal death cases   |
| Lack of encouragement from relatives and community members to seek care      | 7  | 9    | Not identified as factor that contributed to maternal death cases   |
| No available person to take care of the children, the home and livestock     | 6  | 10   | Not identified as factor that contributed to maternal death cases<br>Poor Support System  |
| Lack of companion in going to the health facility                            | 6  | 10   | Absence of husband during prenatal visits due to illegal affair<br>Uncooperative husband<br>Family Problem  |

This was validated through the qualitative data sub-themed as "poor awareness of maternal high-risk factors," "presence of preexisting co-morbidity," "teenage pregnancy," and "multiparity." Not being able to recognize the existence of danger signs has led to delays in seeking medical care. Most postpartum maternal deaths occurred because women did not recognize the signs and symptoms that endangered their lives. Most of these were postpartum bleeding, hypertension, and sepsis. Others include obstetric

and medical conditions such as primipara and teenage pregnancy, as well as preexisting co-morbidities. This is similar to the study of Wassihun *et al.* (2020), where 59.5% of the respondents were found to have poor knowledge of obstetric danger signs. These were significantly associated with the antenatal care attendance and place of delivery, which means that, the more often the antenatal care visit, the less likely you are to recognize the danger signs, and respondents who gave birth at a health institution

were 5.7 times more likely to have good knowledge of obstetric danger signs than those who gave birth at home.

The second most significant perceived determinant was the lack of money to pay medical expenses and the cost of transportation, accounting for 52 or 51% of the total respondents. This was validated by the qualitative data sub-themed as "financial struggle to pay for medical expenses," "lack of money for transportation," "unavailing maternal healthcare service due to financial constraint," and "no savings for giving birth." The study by Girum and Wasie (2017) shows a remarkable and significant relationship between the maternal mortality ratio and socioeconomic factors in developing countries like the

Philippines. This is further supported by Jeong W. *et al.* (2020), in which the study findings suggest that socioeconomic status—especially income level—is highly associated with all-cause maternal mortality. The third most significant perceived determinant was "pregnancy is planned or unwanted," with a total of 43, or 42%. This was validated by the qualitative data sub-themed "unwanted or unplanned pregnancy" and "low family planning acceptor." According to (WHO, 2019), 74 million women in low- and middle-income countries become pregnant unintentionally each year. 25 million unsafe abortions and 47,000 maternal fatalities result from this every year. It was reported that over 600,000 unsafe abortions and nearly 2 million unplanned pregnancies are thought to occur annually in the Philippines alone.

**Table 8.** Delay in identifying and reaching the appropriate facility and the generated thematic analysis

| Delay in identifying and reaching the appropriate facility   | f  | Rank | Thematic analysis of the qualitative data  |
|--|----|------|--|
| Distance from a woman’s home to a facility or provider   | 42 | 1    | Less Access of Geographical Isolated and Disadvantage Area community<br>Limited access to services for pregnant mother<br>Lack of health care resources/facility<br>Late referral due to long distance travel and poor terrain |
| Lack of moral, financial and logistical support from neighbors, the barangay captain and barangay officials or the mayor | 30 | 2    | Not identified as factor that contributed to maternal death cases  |
| Lack of roads or poor condition of roads   | 26 | 3    | Less Access of Geographical Isolated and Disadvantage Area community<br>Limited access to services for pregnant mother<br>Lack of health care resources/facility<br>Late referral due to long distance travel and poor terrain |
| Lack of emergency transportation whether by land or water  | 23 | 4    | Less Access of Geographical Isolated and Disadvantage Area community<br>Limited access to services for pregnant mother<br>Lack of health care resources/facility<br>Late referral due to long distance travel and poor terrain |
| Lack of awareness of existing services   | 15 | 5    | Not identified as factor that contributed to maternal death cases  |
| Lack of referral system  | 10 | 6    | Improvement of Maternal Healthcare Service Delivery System<br>Poor implementation of Service Delivery Network<br>Poor partnership with the Private OB<br>Late referral from birthing to hospital facility                      |
| Lack of communication with referral facility   | 9  | 7    | Improvement of Maternal Healthcare Service Delivery System<br>Poor implementation of Service Delivery Network<br>Poor partnership with the Private OB  |

As shown in Table 8, the indicator "the distance from a woman’s home to a facility provider" was the most identified determinant factor (f = 42 or 41%) in this

category. This was validated through the qualitative data sub-themed as poor accessibility to the pregnant mother, lack of healthcare resources and facilities,

late referral due to long-distance travel, and poor terrain. All other indicators were associated with the issues and concerns in GIDA areas. The indicator, lack of companions in going to the health facility (f = 6 or 6%), was validated through the qualitative data themed as a poor support system. This is associated with experiences where the husband is absent during prenatal visits due to having an illegal affair, an uncooperative husband, and family problems. The *third most significant* perceived determinant was the lack of roads or poor condition of roads, with a total of 26 or 25%. This was validated by the qualitative data sub-themed as late referral due to long-distance travel and poor terrain. In the study, the first-class municipalities were responsible for most of the occurrences of maternal mortality. The researchers have observed that despite the municipality class, some of the addresses of the maternal death cases were found in far-flung or GIDA areas with poor roads and terrain. In the qualitative study of Atuoye (2015), one of the identified themes was the rural geographies [of the study locale] described as hard-to-reach communities.

The poor road network was identified as one of the main characteristics of the rural landscape

The study further posits that the challenge becomes dire when rural dwellers with low incomes are challenged with availability and high transport costs when seeking health care. *It was noted that "an individual can only go through a footpath, and a car cannot use the road." "There is also a big valley on the way, and it is not passable during the rainy season."*

Additionally, the mortality rate for deaths resulting from direct causes of maternal mortality was strongly correlated with distance, rising from 111 per 100,000 live births for women living within 5 km to 422 per 100,000 live births for those living more than 35 km from a hospital (Hanson. *et al.* , 2015). The above claims are similar to those experienced by the study participants in the Cagayan Valley Region. This is validated and observed by the researchers, as they have integrated themselves into the actual places of incidence.

**Table 9.** Delay in receiving appropriate and adequate care from facility and the generated thematic analysis

| Delay in receiving appropriate and adequate care from facility        | f  | Rank | Thematic analysis of the qualitative data  |
|---|----|------|--|
| Shortages of supplies (i.e. Emergency medicines or blood)             | 30 | 1    | Less Access of Geographical Isolated and Disadvantage Area community<br>Limited access to services for pregnant mother<br>Lack of health care resources/facility |
| Lack of basic equipment (e.g.for cesarian section, blood transfusion) | 22 | 2    | Less Access of Geographical Isolated and Disadvantage Area community<br>Limited access to services for pregnant mother<br>Lack of health care resources/facility |
| Poor skills of health care providers                                  | 16 | 3    | Competence Of Healthcare Workers<br><i>Inadequate skills of the healthcare provider</i><br><i>Poor postpartum home visit</i>                                     |
| Lack of healthcare personnel  | 14 | 4    | Improvement of Maternal Healthcare Service Delivery System<br><i>Lack of healthcare personnel in the facility</i><br><i>Under-staffing</i>                       |
| Unprofessional attitudes of healthcare providers                      | 9  | 5    | Competence Of Healthcare Workers<br><i>Intimidated Mother at the healthcare facility</i>   |
| Health is not prioritized by the barangay and municipal officials     | 8  | 6    | Not identified as factor that contributed to maternal death cases  |
| Lack of budget from the lgu   | 7  | 7    | Not identified as factor that contributed to maternal death cases  |

The Table 9 displays the results of the identified indicators under the delay in receiving appropriate and adequate care. It shows that shortages of supplies

and the lack of basic equipment were the most recognized indicators under this category, with 30 or 21%. This was validated with the qualitative data sub-

themed "lack of healthcare resources and facilities," which are commonly situated in GIDA areas. The third most identified indicator was the "poor skills of healthcare providers," validated by the qualitative data on the competence of healthcare workers. According to Mudifa *et al.* (2018) study, hospitals' lack of readiness to handle patients who were deteriorating was one of the core causes of maternal mortality's continually high rates. Poor standard operating procedure adoption in hospitals was a result of underdeveloped abilities, a lack of forethought, bad communication, and the absence of necessary resources. Root reasons were identified in primary care and included poor risk management, referrals to locations where necessary services were unavailable, and a lack of cooperation between basic healthcare and hospitals.

### Conclusion

This study offers insight into the determinants of maternal mortality cases in Cagayan Valley. It reveals a multifaceted factor that can be address with an efficient and effective healthcare management system approach. The demographic, socioeconomic statuses of the maternal mortality cases are important factors that must be considered to avoid complicated and unsuccessful outcomes of pregnancy. Specific indicators from the three delay models are as well necessary to be aware of on its potential effect. However, it has been noted that the most significant determinant still lies on the presence of medical health problem that aggravated further during labor, delivery and postpartum stage. This means, effective and efficient assessment and complicated emergency management is crucial that requires special skills in managing complicated pregnancy although the health sector has implemented various strategies to address related issues.

### Recommendations

Most of the identified determinants of maternal mortality are highly preventable. The Department of Health through the policymakers and implementer have been doing specific actions that addresses most of the associated factors that were identified in this

study. The programs, projects and activities provided for maternal and child health addresses the six (6) pillars of the healthcare system that includes the governance, finances, service delivery, human resources, information system and the medicines and supplies. One specific recommendation that anchors to the trend of the modern world is to further establish the Information Communication Technology for Maternal Health. These include the use of use of digital infographics, mobile texting and social media as a well-advanced and innovative platform for recording, monitoring and disseminating Information Education Campaign for the population. The researchers believe that most of the population, including the couples of every family have good access and are familiar to this trending systems.

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