Measuring Maternal Mortality Using Civil Registration Data (Philippines)

Action Area B. Assuring quality and instilling trust in Statistics (SB1)

Session Title

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Background: Maternal Mortality

• About **810** women a day died in 2017 due to **maternal mortality** (WHO, 2019)

• MMR in 2017 is estimated at **211 deaths per 100,000 live births**, showing a **38% reduction** since 2000 (WHO, 2019)

• SDG Target 3.1 is to reduce global maternal mortality ratio (MMR) to **less than 70 per 100,000 live births by 2030**
Background: Maternal Mortality in the Philippines

• There is a discrepancy in MMR estimates in 2017:

  • World Health Organization (WHO):
    • 121 deaths per 100,000 live births
  
  • Philippine Statistics Authority (PSA):
    • 87.3 deaths per 100,000 live births
Background

• Challenge of PSA in CRVS MMR Estimation:
  • underreporting and the misclassification of maternal deaths

• These cause data quality problems and gravely affect the estimates PSA generates
Objectives of the Study

• The Philippine Statistical Research and Training Institute (PSRTI) aims to help improve the reliability and accuracy of the MMR in the Philippines by:
  1. reviewing the current methodology of its computation
  2. evaluating existing methodologies for estimation enhancement
  3. providing policy guidance for the MMR calculation of the PSA
Current MMR Estimation
Maternal Mortality Statistics

• **Maternal mortality ratio** (MMR)
  • frequency of maternal death relative to the **number of live births**

• **Maternal mortality rate** (MMRate)
  • number of maternal deaths divided by the **number of women of reproductive age** in a population

• **Proportion Maternal** (PM)
  • proportion of maternal deaths among **all deaths of women of reproductive age**
Maternal Mortality Data Sources

• Maternal Mortality has several data sources

  • Civil Registration System
  • Surveys, Sisterhood Method
  • Reproductive-age Mortality Studies (RAMOS)
  • Census
Maternal Mortality Estimation in the Philippines

- In the Philippines, the large under registration rates are found among indigenous population groups due to their religious and societal traditions and beliefs.

- However, civil registration practices are adaptive and respects various cultures in the Philippines.
UN Maternal Mortality Estimation Inter-Agency Group (UN MMEIG)

• There were two models used by UN MMEIG for different purposes:

1. **Bayesian CRVS adjustment model**
   • used to account for errors in reporting of maternal death in the CRVS to obtain the CRVS adjustment factors

2. **Bayesian maternal mortality estimation model (BMat Model)**
   • used to estimate the MMR for each country-year of interest
Enhancement in CRVS Adjustment
Enhancement in CRVS Adjustment for the Philippines

• The current initiative is to use the CRVS for MMR estimation

• The PSA has to address primarily the underreporting and misclassification of maternal death
Peterson et al. (2019) Framework

• The CRVS can be described as follows:

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CRVS maternal deaths  CRVS non-maternal deaths  Missed deaths  All female deaths
Peterson et al. (2019) Distribution of CRVS Counts

• Peterson et al. (2019) assumed that the distribution of the CRVS counts is multinomial:

\[ y_{ct} \sim \text{Multinom} \left( y_{ct}^{(tot)}, \rho_{ct} \right) \]

• From this specification, the authors developed a Bayesian analysis framework that uses specialized CRVS studies on misclassification and underreporting as prior information
Peterson et al. (2019) CRVS Adjustment

- Peterson, et al. (2019) defined the CRVS adjustment factor \( CRV S_{adj_{c,t}} \) based on estimates of sensitivity \( \lambda^{(+)}_{c,t} \) and specificity \( \lambda^{(-)}_{c,t} \) which varies with the true PM \( p^{true\text{mat}}_{c,t} \), as follows:

\[
CRV S_{adj_{c,t}} = \frac{p^{true\text{mat}}_{c,t}}{\lambda^{(+)}_{c,t} \cdot p^{true\text{mat}}_{c,t} + \left(1 - \lambda^{(-)}_{c,t}\right) \cdot \left(1 - p^{true\text{mat}}_{c,t}\right)}
\]

- For countries without specialized studies, the CRVS-adjustment factor uses the estimates of sensitivity, specificity, and true PM from the Bayesian analysis
Challenges in Localizing the Peterson et al. (2019) Approach

- Applying the methodology for the Philippines requires specialized CRVS study on misclassification and underreporting
  - Currently, there is no study of this nature
  - Prior information is needed for regional CRVS adjustments
- The methodology can only be applied in estimating the PM
- The next challenge is to estimate the denominator of the MMR
Discussion and Conclusion
Discussion

• Despite the several data sources for maternal mortality, several countries face the problem of underreporting and misclassification

• For the study to be successful, a specialized study on the CRVS is needed
  • Without it, this study can only do simulations on MMR values based on the Peterson et al. (2019) results
Discussion

• Moreover, there is also a need to enhance the estimation of the MMR’s denominator
  • One option is to explore the completeness of death registration (Adair & Lopez, 2018)
  • Already being explored by PSA to address underreporting of MMR
Conclusion

• Overall, the study explores a possible approach that can help improve the current methodology in computing the MMR

• Future studies may look into the validation of the Bayesian CRVS adjustment
Thank you