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Perspective

Strengthening Mortality Statistics for Health Programs in Malaysia: Lessons from the Field

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ABSTRACT

Reliable information on causes of death is essential for an evidence-based health policy. There is a challenge in ascertaining the cause for deaths occurring without medical attention. This has been a persistent problem for Malaysia, where 50% of deaths are registered as "nonmedically certified" deaths mostly with ill-defined causes. During 2014–2016, a research study was conducted in a nationally representative sample of 15,000 deaths in Malaysia, to verify their registered causes and develop cause-specific mortality estimates. Standard Verbal Autopsy (VA) methods were used to ascertain causes for the nonmedically certified deaths in the sample. VA methods were successful in assigning specific causes for most cases with ill-defined causes of death, resulting in plausible mortality patterns. The Malaysian government issued official instructions for routine implementation of VA methods for nonmedically certified deaths. Nationwide capacity development was implemented to improve data quality. These activities provide several lessons for strengthening the national mortality statistics programs.

1. INTRODUCTION

Malaysia is one of a few Asian countries with a longstanding history of vital registration systems. Yet, issues with data quality have limited the utility of available vital statistics for public health policy, program evaluation, and research [1,2]. Although death registration is complete for states located on Peninsular Malaysia, the problem of marginal underreporting of deaths still persists in the eastern states of Sabah and Sarawak [3]. However, initiatives have been recently launched by the Malaysian National Registration Department [Jabatan Pendaftaran Negara (JPN)] to resolve issues with registration rules and infrastructure in these states. The more significant concern lies with the poor quality of registered causes of death. About 50% of all deaths in Malaysia occur in hospitals and are registered with medically certified causes, which are of good quality. However, the remaining deaths that occur at home are registered with causes reported by family members. For statistical purposes, these are termed as "nonmedically certified deaths." Each year, only about a third of these deaths are reported to be from specific causes, and the remaining 65–70% of these deaths are registered annually with vague and ill-defined causes including "old age," "heart failure," and "sudden death" [3]. These limitations in vital registration data necessitated the use of generic model-based adjustments to fill these data gaps, while estimating national mortality and burden of disease estimation for the years 2000 and 2008 [4,5]. These persistently high proportions of ill-defined causes can still be observed even for the most recent period from 2009 to 2017 (Figure 1).

The problems with quality of data on causes of death in Malaysia were not unknown. A research study to examine the limitations in cause of death ascertainment for deaths outside hospitals had been conducted in Malaysia during 2000–2001 [6]. In that study, trained medical assistants conducted detailed inquiries to ascertain causes for nonmedically certified deaths by conducting household interviews with the deceased's relatives and also reviewing available hospital/medical records. Although the study results showed a marginal improvement in data quality, the researchers observed the need for formal standardized Verbal Autopsy (VA) methods along with trained physicians rather than medical assistants, to ascertain and attribute causes of death from such *post mortem* inquiries. A subsequent trend analysis of vital registration data over the period 1995–2010 identified an increase in the proportion of medically certified deaths, but also mentioned the need to improve the quality of registered causes for nonmedically certified deaths, using standardized VA methods [7]. More recently, a qualitative research study demonstrated community acceptance of VA methodology in Malaysia [8].

2. FIELD ACTIVITIES

Recognizing the need for improved data on causes of death, the Institute for Public Health [Institut Kesihatan Umum (IKU)]

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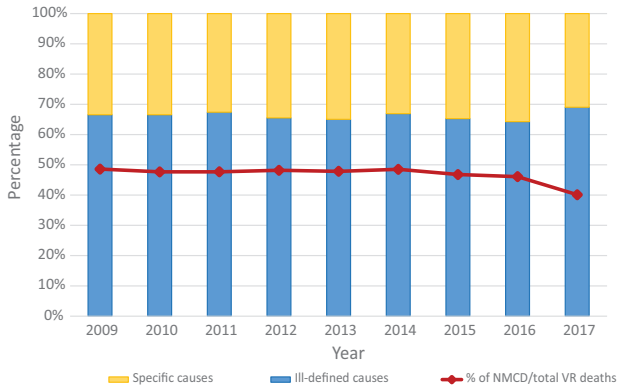

Figure 1 | Trends in proportions of deaths assigned specific and ill-defined causes among Nonmedically Certified Deaths (NMCD) in Malaysian vital registration data, 2009–2017.

Table 1 | Proportionate reallocation of deaths originally assigned ill-defined causes at registration to specific causes by verbal autopsy (VA) methods for a sample of nonmedically certified deaths in Malaysia, 2013

Cause of death	Males	Females
Ischemic heart disease	13.3	9.1
Cerebrovascular disease	11.8	14.0
Chronic lower respiratory disease	8.8	4.3
Pneumonia	5.5	7.6
Diabetes mellitus	4.7	5.0
Other heart diseases	2.2	2.2
Cancer of colon, rectum, and anus	2.0	1.3
Hypertensive diseases	1.8	1.9
Trachea, bronchus, and lung cancer	1.3	1.4
Other malignant neoplasms	1.2	1.7
Falls	1.2	1.8
Breast cancer		1.3
Symptoms and ill-defined conditions	30.2	35.8
Other specified causes	16.0	12.6
Total	100.0	100.0

within the Ministry of Health undertook a detailed operations research study during 2014–2016, with the overall goal of deriving national cause-specific mortality estimates from the study data. The study covered a sample of nearly 15,000 deaths from a representative sample of 19 districts. A local adaptation of international VA standards was developed to reinvestigate registered causes in the study sample, using physician review for cause of death assignment from VA [9,10]. Table 1 demonstrates the value of VA methods in successfully identifying specific causes for about two-thirds of nonmedically certified deaths that were originally assigned ill-defined causes at registration. For deaths in the sample that had occurred in hospitals, available medical records were reviewed to validate registered causes. The study findings were utilized to adjust the data gaps in the registration data and derive the first-ever empirical national cause-specific mortality estimates for Malaysia [11].

In addition to providing reliable evidence for health policy and program evaluation, the study achieved several key operational objectives. First, large-scale implementation of VA across 19 districts substantiated the logistic feasibility of VA in Malaysia. Local health clinics operated by the Ministry of Health in the selected districts were the operational units for the study, with VA interviews conducted by clinic nurses and medical assistants, and assignment of causes of death by health clinic physicians. The study materials and methods including data collection questionnaires, data management tools, quality control mechanisms, training materials, and data analysis protocols serve as a basis for broader VA implementation across the country. Finally, a key overall outcome of the study was the establishment of a critical mass of experienced personnel in the 19 districts as well as at the Institute for Public Health, who are skilled in VA field procedures, ascertainment of causes of death from VA and medical records, selection and coding of causes of death as per international standards, and demographic and epidemiological data analysis. This critical mass serves as a vital resource for scaling up the methodology for strengthening the national vital registration system. Overall, the study served as a prime example of health sector initiatives to strengthen the quality of data from Civil Registration and Vital Statistics (CRVS) systems [12].

3. SYSTEM-STRENGTHENING INITIATIVES

Building on this experience, the Malaysian government has taken a specific initiative to improve the quality of data on causes of death from registration data, by increasing the proportion of deaths with medically certified causes. The Director General of Health has issued a national circular mandating a national system for verification of nonmedically certified deaths using the VA methodology developed and tested by the recent research study [13]. The circular prescribes that causes of death for nonmedically certified deaths should be verified using VA questionnaires. Completed questionnaires should reviewed by local physicians who will assign causes of death, after which these deaths will also be considered medically certified deaths for statistical purposes. The circular has instructed implementation of these actions by all States and Territories of Malaysia, with effect from June 2017. Mechanisms have been established to facilitate data sharing and collaboration between local offices of the JPN and the health sector institutions.

To guide implementation, the IKU team first developed a standardized 3-day training program on VA methods for staff in local government health clinics and district health offices. The training covers the protocols and procedures for household VA interviews, guidelines for physician review of completed questionnaires to assign multiple causes of death as per international standards, and rules for selection and coding of underlying causes of death. A national-level 3-day "training of trainers" workshop was conducted in August 2017 by the IKU research team. Subsequently, over the period of about a year, 110 state-level training activities were organized to cover all 13 states and three federal territories in Malaysia. A total of about 2750 community nurses and medical assistants were trained in VA methods, and 1450 physicians trained in assigning causes of death.

Since October 2018, VA implementation has been commenced to ascertain causes for nonmedically certified deaths registered across the country during 2018. The findings will be separately compiled and submitted to the Department of Statistics, Malaysia, for further coding, tabulation, and analysis. The IKU research team will work in close collaboration with the National Registration Department

as well as Department of Statistics, to utilize the VA-derived causes to strengthen the analysis of vital statistics and indicators from registration data. The collaboration will also monitor the implementation of this intervention along with its impact. It is envisaged that continuous attention to these system-strengthening initiatives along with regular monitoring and evaluation including analysis for data quality and interim mortality estimation exercises will establish the basis for overall improvements in data quality by 2025. The approach adopted and lessons learnt from the Malaysian experience could serve as important guidance for other countries facing similar challenges in measuring and monitoring progress toward the United Nations Sustainable Development Goals [14].

4. SUMMARY OF LESSONS FROM THE FIELD

(1) Design and implement operations research to test specific interventions to improve quality of data from CRVS systems. Where necessary, this should address both completeness of death recording as well as accuracy of recorded causes of death.

(2) Study design should be adequate for utilization of findings to estimate mortality indicators for descriptive assessment of the study population, as well as develop skills and experience in a critical mass of human resources to provide local technical leadership for further CRVS development activities.

(3) Knowledge generated from operations research must be followed up with concrete administrative action in the form of new or revised instructions, training activities, and funding support for scaling up the system strengthening intervention to ensure the sustainability of CRVS development.

CONFLICTS OF INTEREST

The authors declare they have no conflicts of interest.

AUTHORS' CONTRIBUTION

CR and MAO conceptualized the manuscript, and CR prepared the first draft. SSG and NST contributed and analyzed relevant data and information related to system-strengthening initiatives. All authors critically reviewed the draft and contributed to editing the final version for submission.

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