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Literature Review of Death Recording Systems in Developed and Developing Countries: Accuracy, Completeness, and Challenges in Mortality Statistics

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Abstract
Death registration is a key component of a vital statistical system because it provides basic data for population planning, public health evaluation, and evidence-based policymaking. However, the quality of death records in different countries shows significant differences, especially between developed and developing countries. This study aims to examine the death registration system in Indonesia and developed countries, identify factors that affect the accuracy and completeness of mortality data, and examine the challenges and solutions for improving the Civil Registration and Vital Statistics (CRVS) system. The research was conducted through a qualitative descriptive approach based on literature studies using national and international official reports such as WHO, UNSD, BPS, as well as various relevant scientific articles. The results of the study show that developed countries have a recording completeness rate of more than 95%, supported by integrated digital systems, strong reporting obligations, and adequate medical personnel. On the other hand, Indonesia faces obstacles in the form of low reporting of household deaths, limited medical verification, suboptimal data integration between agencies, and uneven technological infrastructure. Socio-economic, geographical, public awareness, and administrative weaknesses also affect the low quality of recording. This study concludes that improvement efforts need to include digitizing the CRVS system, increasing training of health workers, strengthening mandatory reporting regulations, public education, and integration of data across institutions. Lessons from the best practices of developed countries show that institutional reform and consistency in the implementation of digitalization are key to improving the quality of national mortality statistics.

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Introduction

Death recording is a fundamental component of vital statistical systems because it provides an empirical basis for demographic planning, public policy, and public health evaluation. Accurate and complete mortality data allows the government to calculate important indicators such as gross mortality rate, life expectancy, and distribution of causes of death, which then become the main reference in formulating national health strategies. According to the United Nations Statistics Division (UNSD), a quality and good vital statistics system must include universal, sustainable, and reliable recording of deaths to support an effective population system (United Nations, 2017) [1]. Thus, death registration is not just an administrative process, but an important instrument in ensuring that every death event is recorded and can be used as a basis for strong evidence-based decision-making.

In developed countries, death registration systems have achieved a very high level of completeness and accuracy compared to developing countries. Countries such as the United States, Australia, and the United Kingdom have implemented a civil registration system that is mandatory, integrated, and supported by trained health workers who are able to fill out the certificate of cause of death correctly (Bita *et al*., 2024) [2]. The World Health Organization (WHO) noted that developed countries generally have a complete death recording rate of more than 95%, so the quality of the data is very reliable for the purposes of epidemiological analysis and long-term policy planning (WHO, 2022) [3]. In contrast, many developing countries still rely on sample surveys or estimation methods because their vital registration systems do not yet cover all regions and populations.

Indonesia still faces challenges in the form of low completeness and accuracy of death registration. This is due to limited administrative infrastructure, lack of reporting from families, and lack of medical personnel who are able to fill out the Medical Certificate of Cause of Death. According to BPS data in 2020, national death registration has not reached international standards, so the recorded death rate often does not reflect the actual conditions. In addition, the inaccuracy and location of the recording further hampered the analysis of mortality rate trends.

The World Health Organization (WHO) and the United Nations (UN) emphasize the importance of using formal definitions and international standards on mortality such as the ICD-11 guidelines and UNSD recommendations so that death data between countries can be validly compared (United Nations, 2017; WHO, 2018) [1, 4]. However, the implementation of this standard is still not optimal in Indonesia.

Therefore, research on death registration is very crucial to support the strengthening of the national vital data system. Improving the accuracy and completeness of the data will enable the government to develop more targeted health and social policies, while increasing the effectiveness of demographic planning. This research is expected to contribute from a scientific perspective in strengthening death registration as the basis for evidence-based policies.

Based on the above background, the following questions arise: 1) How does the death registration system in Developing Countries compare to Developed Countries? 2) What are the factors that affect the accuracy and completeness of death registration? 3) What are the main challenges in improving the quality of mortality data?

Method

This study takes a qualitative descriptive approach with a literature study method. This approach was chosen to gain a deeper understanding of the death registration system and the statistical quality of mortality in developed and developing countries, especially Indonesia. The data used are secondary and obtained from various credible literature sources, including official reports from agencies such as the Central Statistics Agency (BPS), the Ministry of Health of the Republic of Indonesia, the World Health Organization (WHO), the United Nations Statistics Division (UNSD), as well as articles from relevant scientific journals and academic books.

Literature collection was carried out through searching scientific databases and official publications, focusing on the topic of the Civil Registration and Vital Statistics (CRVS) system, completeness and accuracy of death registration, as well as standards for determining causes of death based on the International Classification of Diseases (ICD). The literature used is prioritized from publications of the last ten years to ensure the relevance and novelty of information. All sources were then selected based on credibility, relevance, and level of contribution to the research objectives.

Data analysis was carried out in a descriptive-qualitative manner by grouping the literature into several main themes, namely the mechanism of recording deaths, the level of completeness and accuracy of the data, factors that affect the quality of death statistics, and challenges and best practices in strengthening the CRVS system.

Furthermore, a comparison was made between the death registration system in Indonesia and developed countries to identify gaps and policy learning. The results of the analysis are synthesized systematically to produce conclusions and recommendations based on scientific evidence.

Literature Review

1. Basic Concepts of Mortality and Vital Statistics

Mortality is a measure that describes the number of deaths in a population over a given period of time and serves as a key indicator in public health and demographic analysis. According to WHO (2022) [3], mortality is defined as a mortality event that can be calculated to assess the risk of death based on age, gender, and cause of death factors. Some common indicators of mortality include the Crude Death Rate (CDR), Age-Specific Death Rate (ASDR), Infant Mortality Rate (IMR), and Under-Five Mortality Rate (U5MR), which are often used to assess the health and development situation of the population (United Nations, 2020) [5].

The cause of death is a key element in mortality statistics. WHO through the International Classification of Diseases (ICD-11) provides a global standard for coding causes of death so that data is consistent and comparable between countries (WHO, 2018) [4]. The accuracy of filling out the Medical Certificate of Cause of Death (MCCD) by medical personnel greatly determines the accuracy of information regarding the cause of death (AbouZahr *et al*., 2015) [6].

Vital statistics, which include the recording of births, deaths, marriages, divorces, and other demographic events, are important instruments in the preparation of population projections and public policies. The United Nations (2017) [1] states that an ideal vital statistical system should be universal, sustainable, timely, and accurate, so as to produce reliable demographic data for national and international planning needs.

According to the Central Statistics Agency (BPS, 2023) [7], mortality is one of the main components in population dynamics that describes the mortality rate of the population in a certain region and period. BPS defines the death rate as the number of deaths that occur in a year per 1,000 population in the middle of the year. Commonly used indicators include Gross Mortality Rate (AKK), Infant Mortality Rate (AKB), and Toddler Mortality Rate (AKABA), which function to describe public health conditions and development effectiveness in the health sector. Mortality data collected by BPS through the Intercensus Population Survey (SUPAS), Population Census, and Indonesian Demographic and Health Survey (SDKI) are an important basis for the formulation of national health and population development policies (BPS, 2023) [7].

2. Quality of Mortality Statistics

The quality of death statistics is generally assessed through the aspects of accuracy, completeness, and the accuracy of the allocation of time and the place of death. Accuracy is related to the accuracy of recording identity, date and location of death, as well as determining and coding the cause of death according to International Classification of Diseases (ICD) standards. Errors in filling out death certificates or coding the cause of death can reduce the validity of mortality statistics and result in bias in estimating mortality patterns (AbouZahr *et al*., 2015; WHO, 2016) [6, 8].

In addition to accuracy, the completeness of death registration is an important indicator in assessing the quality of the registration system. Completeness is defined as the proportion of deaths recorded in the registration system compared to the total estimated deaths in a population. The United Nations emphasizes that a quality Civil Registration and Vital Statistics (CRVS) system must be universal, continuous, timely, and accurate (United Nations, 2014) [9]. In this framework, reliability refers to the consistency and reliability of data, including the quality of determining and coding the causes of death, which is the basis for the comparison of mortality statistics between regions and between countries.

3. Comparison of Developed and Developing Countries

Developed countries generally have a vital registration system that has been established and integrated with the health service system, so that almost all deaths are officially recorded. The causes of death are largely determined by medical personnel and systematically coded using ICD standards, which allow for the compilation of complete, accurate, and comparable mortality statistics over time, as seen in the death registration system in the United States (AbouZahr *et al*., 2015) [6].

In contrast, in many developing countries such as Indonesia, the Philippines, and India, the quality of death recording still faces various structural constraints. Common problems include low reporting of deaths at the community level, high proportion of deaths occurring outside health facilities, and limited capacity to determine and code causes of death. This condition leads to under-registration and low-quality mortality data, which some studies describe as a scandal of invisibility, as most deaths are not reflected in official statistics and limit the use of data for health policy planning (United Nations, 2014) [9].

Results and Discussion

1. Death Registration System

The death registration system is an important part of the implementation of Civil Registration and Vital Statistics (CRVS) because it provides basic data on the number, characteristics, and patterns of causes of death in a population. The existence of this system is the basis for the government in formulating health, population, and social policies, and is an important indicator for the state's ability to manage vital data in a sustainable manner. Therefore, an understanding of how the death recording mechanism works, its level of completeness, and the quality of the data generated is essential to assess the effectiveness of the existing system and identify room for improvement. In this section, we will discuss in detail the death registration system in Indonesia, the registration system in developed countries, and the comparison between the two to provide a comprehensive picture of Indonesia's position in the global context.

Death Registration System in Indonesia

The death registration system in Indonesia is part of the implementation of population administration managed by the Directorate General of Population and Civil Registration (Dukcapil) of the Ministry of Home Affairs. The death registration mechanism is carried out through reporting by the family, the head of RT/RW, or health facilities which is then processed by the district/city Dukcapil Office for the issuance of a Death Certificate. In addition, death data is also recorded by the Ministry of Health through health service facilities (health centers and hospitals) and by the Central Statistics Agency (BPS) through a survey and census system. Despite having a clear regulatory framework, the quality of death data in Indonesia still faces challenges in terms of completeness, system integration, and accuracy of causes of death.

Mechanically, the registration of deaths is carried out through reporting of the deceased person to the Dukcapil within a period of 30 days from the time the death occurred, as stipulated in the Population Administration Law (Law No. 23 of 2006 jo. Law No. 24 of 2013). Death reports from health facilities are usually accompanied by a Death Certificate (SKK) from a doctor, while deaths that occur at home only rely on family reports and regional officials. Meanwhile, the Ministry of Health is conducting death data collection through cause of death ICD-10 based and the Community-Based Death Recording and Reporting Program (PBM), which in some regions is still a pilot project. BPS also plays a role through the Inter-Census Population Survey (SUPAS), population census, and special Death Survey in certain years. The level of completeness of recording deaths in Indonesia is still relatively low. The WHO assesses that the completeness of death registration in Indonesia has been below 60% in recent years, which shows that most deaths have not been formally recorded by the state system. This limitation is caused by several factors, such as low public awareness to report deaths, uneven access to population administration in remote areas, limited recording personnel at the village and puskesmas levels, and the lack of integration of the Dukcapil information system with the overall health system. In addition, the accuracy of the cause of death still faces obstacles because not all deaths get medical examination, so many deaths are categorized as "ill-defined" in mortality statistics.

Improvement efforts have been made through the integration of data systems between Dukcapil and health facilities, the development of the Population Administration Information System (SIAK), and the strengthening of the national CRVS program. However, this achievement still requires strengthening the aspect of cross-sector coordination, increasing the capacity of officers, and public awareness so that death reports are carried out in a timely and complete manner.

Death Registration System in Developed Countries

Death registration systems in developed countries have generally developed with a high level of completeness and accuracy, in line with the strong legal framework, administrative infrastructure, and institutional technical capacity that supports the implementation of CRVS. In countries such as Japan, South Korea, Australia, the United Kingdom, and Canada, death recording is strictly mandatory,

digitally integrated, and supported by a tiered reporting mechanism involving health facilities, national statistical agencies, and civil registration authorities. The level of reporting compliance is also high because the public has understood the vital administrative function as part of public services and legal protection.

Death reporting in developed countries is generally carried out automatically from hospitals or health facilities through an electronic system that is directly connected to the civil registry agency. In many cases, doctors are required to fill in medical certificate of cause of death (MCCD) uses the ICD-10 or ICD-11 standard, which is then verified by national statistical agencies before being published in the annual mortality statistics. This system allows the data on the cause of death to have a high level of accuracy and minimize the proportions "ill-defined causes". In addition, an audit mechanism for the cause of death is also routinely implemented to ensure data quality and detect misclassification.

The advantages of the system in developed countries can also be seen from the high level of completeness which in many reports has reached more than 95%. This is due to the existence of digital infrastructure that allows real-time data exchange between agencies, such as civil registration offices, health ministries, hospitals, and national statistical agencies. Robust system integration makes recording deaths not only an administrative process, but also part of ongoing public health information management. In addition, the capacity of well-trained health workers and registration officers ensures that the entire reporting process follows international standards.

Overall, developed countries show that the success of death registration systems is highly dependent on regulatory consistency, the availability of integrated data systems, the readiness of trained human resources, and public awareness. The quality of the system makes the resulting mortality data reliable, accurate, and can be used in health policy evaluation, epidemiological monitoring, and evidence-based decision-making.

Comparison of System in Indonesia and Developed Countries

Comparisons between the death registration system in Indonesia and developed countries show significant differences in institutional aspects, completeness of registration, technology integration, and best practices that can be lessons learned for Indonesia. In terms of institutional structure, developed countries generally have a centralized, stable, and regulated CRVS system through a consistent legal framework, so that coordination between civil registration agencies, health facilities, and statistical institutions runs effectively. On the other hand, Indonesia still faces the challenge of inter-agency coordination due to the involvement of many institutions such as Dukcapil, the Ministry of Health, BPS, and local governments that are not fully integrated into one uniform system.

In terms of completeness of registration, developed countries have achieved a completeness rate of above 95% with the reporting of deaths that are almost entirely recorded and verified through electronic systems. Indonesia, on the other hand, is still at a lower level of completeness, partly due to limited reporting of deaths that occur at home, low administrative compliance of the community, and uneven access to population registration services. In addition, the accuracy of the cause of death in developed countries is much better because all deaths that occur in health facilities and at home must be reviewed by medical personnel and recorded using international standard MCCD, while in Indonesia there are still many causes of death that are classified as "ill-defined".

The differences in integration and technology aspects are also very visible. Developed countries have implemented digital-based vital recording systems that allow real-time data exchange between health facilities and government agencies. This system not only maintains the quality and consistency of data, but also supports fast and accurate monitoring of population health. In contrast, Indonesia is still in the development stage of data integration, although some regions have implemented SIAK connected to health facilities. The remaining challenges include limited technological infrastructure, human resource readiness, and differences in capacity between regions.

Important lessons from developed countries include strengthening mandatory death reporting regulations, implementing integrated electronic systems, improving the competence of health workers in filling out MCCDs in accordance with ICD-10/ICD-11, and implementing periodic death audits. In addition, the success of developed countries shows that public education and ease of access to administrative services also play a major role in improving reporting compliance. By adopting these practices, Indonesia has the potential to gradually improve the completeness and quality of death data and strengthen the national CRVS system.

2. Factors Affecting the Quality of Recording

The death recording system is influenced by various social, economic, geographical, institutional, and infrastructure factors that determine the completeness and accuracy of the data. Understanding these factors is important because the quality of mortality data plays a direct role in health program evaluation, policy planning, and monitoring of public health status. Therefore, this section discusses the factors that cause the difference in the quality of recording and analysis to the inhibiting and driving factors for improving the quality of the CRVS system.

Factors Causing Differences in Recording Quality

Socio-economic factors have a great influence on people's ability to access recording services. People with higher education and income tend to better understand the importance of population documents and have easier access to administrative services (WHO, 2023) [10]. In contrast, families in poor and remote areas often find it difficult to report due to limited facilities and transportation costs.

Geographical factors are also the main determinants of the quality of reporting. Archipelagic areas, mountains, and areas with poor transportation access cause reports of deaths to often be late or even not recorded at all. This condition is often accompanied by the lack of the existence of registrars or health facilities that can issue a Death Certificate.

Public awareness is another important factor. Many families only report deaths when they are needed for specific legal purposes, such as inheritance or retirement, so records are not routinely and timely. In some areas, cultural and religious aspects also affect people's reluctance to deal with the administration after a death.

A strong legal system plays a role in improving reporting

discipline. Countries with mandatory reporting regulations that are consistently implemented have proven to have a high level of completeness, while in Indonesia there is still a gap in implementation between regions even though the reporting obligation has been regulated in law (Kemendagri, 2022) [11]. The last factor is the data technology infrastructure. The digitization of population and health information systems will improve the quality of reporting, but its implementation in Indonesia is still uneven. Some regions have used electronic systems such as SIAK, but not all health facilities are connected so that data exchange has not taken place optimally (BPS, 2020) [12].

Analysis of Inhibiting and Driving Factors for Improving the Quality of Recording

Several factors are obstacles to improving the quality of recordkeeping, including the lack of administrative literacy, low reporting of deaths that occur at home, and the lack of recorders at the village level. Technical obstacles in the form of inaccurate data on the cause of death because not all deaths received medical verification, also led to a high proportion of deaths ill-defined causes in national statistics (Kemenkes RI, 2021) [13]. In addition, data integration between institutions such as Dukcapil, health facilities, and BPS is still not running optimally, so death data is often inconsistent. Differences in digital infrastructure capacity between regions also cause reporting quality gaps.

However, there are a number of driving factors that can strengthen the quality of death registration. The digitization of population administration services, the implementation of integrated SIAK, and the development of national CRVS are significant steps that can improve reporting efficiency. Increased training of health workers in filling medical certificate of cause of death (MCCD) and public education about the benefits of recording deaths also have the potential to encourage continuous improvement in data completeness (WHO, 2023) [10].

3. Challenges and Solutions for Improving the Death Registration System

The death registration system in Indonesia still faces various challenges stemming from administrative, technical, social, and institutional factors. This challenge has a direct impact on the completeness of the data, the accuracy of the cause of death, and the efficiency of the reporting process. To strengthen the national CRVS system, it is necessary to clearly identify the obstacles that occur and the preparation of repair solutions that are in accordance with the needs in the field. This section outlines the main challenges of the death registration system in Indonesia as well as strategic recommendations based on the literature and practices of developed countries.

Challenges of the Death Registration System

1. Administrative challenges arise in the form of delays in reporting deaths by families and village officials, especially in areas with limited access to administrative services. Many death reports are not submitted on time because the public does not see the direct benefits of population documents. In addition, duplication of data and differences in reporting procedures between regions cause insynchronization of mortality data at the central and regional levels (WHO, 2023) [10]. The shortage of registrars at the village level and the lack of administrative capacity are also factors that slow down the documentation process.
2. Technical challenges, related to the low accuracy of recording the cause of death. Most deaths that occur at home do not receive medical verification so they are classified as ill-defined causes, which lowers the quality of mortality statistics (Kemenkes RI, 2021) [13]. In addition, the uneven use of electronic systems causes many health facilities to still rely on manual recording, making them vulnerable to input errors and reporting delays. The lack of training of health workers in filling out the medical certificate of cause of death (MCCD) has also worsened the quality of the data.
3. Social challenges, namely low public awareness of the obligation to report deaths, are the main obstacles. Many families do not feel obligated to report a death if it is not related to certain administrative interests. In some communities, cultural factors such as trust in traditional funeral processes or reluctance to take care of paperwork after death are also responsible for low reporting rates. The socio-economic conditions of the community also contributed, where poor groups and people living in remote areas faced cost, transportation, and time constraints to report deaths.
4. Institutional challenges, especially arise from weak coordination between Dukcapil, the Health Office, health facilities, and local governments. Each institution has its own recording system so that data integration becomes difficult to implement. Differences in reporting flows between regions and the absence of a fully integrated national system have led to data inconsistencies between the local and central levels (UNSD, 2022) [14]. In addition, the lack of supervision and periodic audit mechanisms cause the quality of reporting to not be optimally monitored.

Death Registration System Improvement Solutions

1. Digitization and Integration of CRVS

Digitizing the recording system and data integration between Dukcapil, health facilities, and BPS is a strategic step to improve the completeness and speed of reporting. Developed countries such as Australia and the United Kingdom have proven that the integration of electronic-based systems improves data accuracy and reduces duplication (ABS, 2022) [15].

2. Standardization of Death Certificate Filling and ICD-10/ICD-11 Training

The implementation of national standards for MCCD filling as well as training of health workers in ICD-10 and ICD-11 will improve the accuracy of causal data on deaths. Standardization allows for more consistent and consistent recording of causes of death in accordance with international standards.

3. Strengthening Mandatory Death Reporting Regulations

It is necessary to enforce regulations on mandatory death reporting more consistently, including strengthening regulations at the regional level. Clear and consistent regulations have been shown to increase reporting rates in countries that implement similar policies (OECD, 2021) [16].

4.Community Education.
Increasing public awareness of the importance of recording deaths through socialization, public campaigns, and the use of local media can increase reporting participation. Education is especially important for people living in remote and low-income areas.

5. Strengthening Inter-Agency Coordination
More effective coordination between Dukcapil, Health Offices, health facilities, and local governments is needed to overcome the fragmentation of the reporting system. The establishment of CRVS coordination teams at the provincial and district/city levels is an important strategy to improve the synchronization of data flows.

6. Adoption of Best Practices in Developed Countries
Best practices from developed countries such as auditing causes of death, automated electronic reporting of health facilities, and the use of real-time vital statistics systems can be used as a reference for system development in Indonesia (ONS, 2021) [17]. Adaptation of such practices must take into account the geographical conditions and technical capacity of the region.

4. General Discussion and Integration of Findings with Previous Research

Synthetis of All Research Findings

The results of the discussion show that the death registration system in Indonesia is still in the development stage, with relatively low registration completeness compared to developed countries. In section “Death Registration System”, it is found that the Indonesian system involves many agencies such as Dukcapil, the Ministry of Health, and BPS that have not been fully integrated, resulting in data inconsistencies. In contrast, developed countries have centralized and digital-based systems, with a completeness rate of more than 95% (OECD, 2021) [16].

The factors influencing recordkeeping, as described in Section “Factors Affecting the Quality of Recording”, indicate that the main barriers stem from socio-economic conditions, geography, public awareness, and the limitations of technological infrastructure. Administrative, technical, and institutional challenges further weaken data quality. This explains why the proportions ill-defined causes in Indonesia is still high, while developed countries are able to produce more accurate data on the causes of death (WHO, 2023) [10].

The synthesis of Section “Challenges and Solutions for Improving the Death Registration System” shows that improvement efforts require a combination of strategies: digitalization, inter-agency integration, capacity building of health workers, and public education. Lessons from developed countries such as Australia and the UK confirm the importance of electronic systems and periodic audits to improve the quality of mortality data.

Relevance to Previous Research or Reports

The findings of this study are in line with the WHO report stating that many middle-income countries still face challenges in the completeness of death recording and the low accuracy of the causes of death (WHO, 2023) [10]. Similarly, UNSD emphasizes the importance of CRVS integration as a key condition for improving the quality of vital statistics, which supports the results of the analysis in Section “Challenges and Solutions for Improving the Death Registration System” on the need for an integrated system between sectors.

Previous research has shown that the success of the recording system in developed countries is influenced by regulatory consistency, digitization of vital data, and the capacity of medical personnel in filling out MCCDs. These findings are consistent with the discussion of section “Comparison of Systems in Indonesia and Developed Countries”, which concludes that institutional and technological factors are the main differentiators between Indonesia and developed countries. The BPS and Ministry of Health reports also support the findings that limited infrastructure and low reporting of deaths at home are internal factors that need to be addressed immediately to improve the completeness of data in Indonesia.

The integration of the findings with the literature shows that the improvement of the CRVS system requires not only technological improvement, but also policy reform, human resource capacity building, and massive socialization to the community. Consistency with the international literature strengthens the validity of the study's conclusions.

Critical Interpretation

Critically, the findings of this study show that the quality of death recording is a reflection of the state's capacity to manage population and public health data. Weaknesses in Indonesia's CRVS system not only have an impact on health statistics, but also affect development planning, life expectancy estimates, and the state's ability to respond to public health problems in a timely manner. Thus, investment in strengthening the death registration system should be seen as an integral part of improving the national health system.

On the policy side, the findings of this study indicate the need for stronger reforms in the areas of population and health administration. The full implementation of digital integration between Dukcapil and health facilities is an urgent need, because data integration is the foundation to improve the completeness of recording. In addition, improved practice of auditing causes of death, as implemented in developed countries, can help reduce the proportion of undefined causes of death.

The implication for further research is the need for field studies that assess the effectiveness of the CRVS program at the regional level, including an evaluation of the capacity of recorders and operational obstacles in health centers and village governments. Further research can also explore digital-based data integration models that best suit Indonesia's diverse geographical conditions.

Conclusion

The death registration system in Indonesia remains behind that of developed countries due to the lack of full integration, continued reliance on manual reporting, and lower levels of data completeness and accuracy. In contrast, developed countries have implemented integrated digital systems supported by strong mandatory reporting regulations. The accuracy and completeness of mortality data in Indonesia are influenced by various socio-economic, geographical, technical, and institutional factors, including low public awareness of death reporting, limited access to remote areas, shortages of medical and technological personnel, and suboptimal coordination among recording institutions. Furthermore, the main challenges in improving mortality data quality include reporting delays, insufficient medical

verification of causes of death, low utilization of digital systems, and weak cross-sector integration. Therefore, systematic improvements are required through the acceleration of digitalization, capacity building for health workers, strengthening regulatory frameworks, and enhancing inter-agency coordination to achieve a more accurate and comprehensive death registration system.

To improve the quality of death registration in Indonesia, it is essential to strengthen digitalization and unify the Civil Registration and Vital Statistics (CRVS) system at the national level so that death data from Dukcapil, health facilities, the Ministry of Health, and Statistics Indonesia (BPS) can be recorded accurately, promptly, and consistently. The capacity of health workers and registrars should also be enhanced through continuous training on completing Medical Certificates of Cause of Death (MCCD) in accordance with ICD-10 or ICD-11 standards to reduce the proportion of ill-defined causes of death. In addition, public awareness regarding the importance of death reporting needs to be improved through sustained socialization efforts, particularly in regions with low reporting coverage. Strengthening coordination among institutions involved in the death registration process is also necessary to ensure a more integrated reporting flow and to minimize data discrepancies between regional and central levels. Furthermore, Indonesia can gradually improve the quality of its mortality statistics by adopting best practices from developed countries, such as the implementation of automated electronic reporting systems and routine audits of causes of death.

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