

Completeness and accuracy of death certificate on cause of clinical death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017

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<p>Article history</p> <p>Received: March.29, 2019 Received in revised form: Sept 14, 2019 Accepted: Sept 27, 2019 Available online: Nov 10, 2019</p> <p>Corresponding author</p> <p>Rosa Mutiara Mandasari Faculty of Medicine, Public Health, and Nursing Universitas Gadjah Mada Jalan Farmako Sekip Utara 55281 Yogyakarta, Indonesia rosa.mutiara.m@mail.ugm.ac.id</p> <p>Phone: +6282225312527 Email: rosa.mutiara.m@mail.ugm.ac.id</p>	<p>Abstract</p> <p>Background: Ludira Husada Tama Hospital is one of privately-owned hospitals in Yogyakarta. Being classified as a type D hospital, the author aims to observe the implementation of writing death certificate in terms of completeness and accuracy.</p> <p>Objective: To know the completeness and the accuracy of death certificate on cause of clinical death at Ludira Husada Tama Hospital in 2015-2017</p> <p>Method: This study is a descriptive-observational study using cross-sectional method. This study was taken place at Ludira Husada Tama Hospital, Yogyakarta by taking the medical record of the patient who die in this hospital which have death certificate on cause of clinical death in 2015-2017.</p> <p>Result: The amount of medical record contains death certificate on cause of clinical death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017 that met inclusion and exclusion criteria is 55 data. In the completeness of death certificate on cause of clinical death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017, 98% is classified as fair and 2% is classified as poor. In the accuracy of death certificate on cause of clinical death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017, the percentage of accuracy on the section I (a) is 62%, on the section I (b, c) is 22%, on the section I (d) is 20%, and on the part II is 11% accurate.</p> <p>Conclusion: In the completeness of death certificate on cause of clinical death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017, 98% is classified as fair and 2% is classified as poor. In the accuracy of death certificate on cause of clinical death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017, the percentage of accuracy on the section I (a) is 62%, on the section I (b, c) is 22%, on the section I (d) is 20%, and on the part II is 11% accurate.</p>
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Keywords: Death Certificate on Cause of Clinical Death; Cause of Death.

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Introduction

Death is a process in which cellular metabolic processes in different tissues and organ ceases to function at different rates (1). There are two types of death – somatic and cellular death. Somatic death or clinical death is when the person irreversibly loses its sentient personality, being unconscious, unaware of (or to communicate with)

its environment, and unable to appreciate any sensory stimuli or initiate any voluntary movement or when three main systems which act as life support (circulatory, cardiovascular and respiratory system) are stopped permanently. Cellular death is when tissues and its constituent cells are no longer functioning or have any metabolic activity, primarily aerobic respiration (2).

Death certificate provides important personal information about the decedent, the circumstances and the cause of death (3). Accurate certification of death is essential. It acts a legal evidence of the facts and causes of death, thus enabling the death to be formally registered (4). It is important for physicians to understand how to complete a death certificate properly. Accurate completion of this legal document is necessary for the needs of registration compiling health statistics, person engaged in medicolegal work, hospital, or other health care personnel, and the family of the deceased. Prompt completion is crucial to ensure arrangements can proceed without delay, especially in countries which does not permit burial to take place without an official death certificate (5). Knowing the cause of death is also key in insurance and workers' compensation claims, as it will determine if the partner or the children are entitled to death benefits (6).

Ludira Husada Tama Hospital is one of privately-owned hospitals in Yogyakarta. Being classified as a type D hospital, the author aims to observe the implementation of writing death certificate and how it differs from other type of hospital.

Ludira Husada Tama Hospital envision as a hospital that works based in humanity and prioritizes health service a whole. Their mission is to provide comprehensive, good quality care that are based on ethical principles to everyone in need.

To fulfill its vision and mission, a good support from the hospital itself is needed, one which is the proof of service done in the hospital. It is crucial for data to be complete and accurate so that the information is accountable, and be used further as an evaluation to improve performance, quality and service in the hospital. Thus, this study aims to identify the plenitude of death certificate so that future studies can identify the incidence of each lethal disease, all of which serves as inputs and proof to improve a better quality care in the hospital.

Materials and Methods

This study is a descriptive-observational study using cross-sectional method. This study design is chosen to fulfill the main objective, to know the completeness and the accuracy of death certificate on cause of clinical death at Ludira Husada Tama Hospital, Yogyakarta in 2015-2017.

The subject of this study is death certificate on cause of clinical death at Ludira Husada Tama Hospital in 2015-2017. The inclusion criteria of this

study were all medical record of patient who died at Ludira Husada Tama Hospital in 2015-2017 which has death certificate. Then, the exclusion criteria were medical record of patient who died at Ludira Husada Tama Hospital in 2015-2017 which has death certificate that was not written clearly so that it cannot be interpreted.

The materials needed in this study are ethical clearance which is used for permission to conduct study and death certificate on cause of clinical death at Ludira Husada Tama Hospital in 2015-2017. The equipment needed in this study are check list to facilitate data collection regarding the completeness and accuracy of death certificate on cause of clinical death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017.

Results

Amount of Death Certificate on Cause of Clinical Death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017

The data of this study were obtained from the medial record which contains the death certificate or medical certification of death in 2015-2017 at Ludira Husada Tama Hospital Yogyakarta. Based on the observation, it is known that the death certificate in 2015-2017 were 90 data. After that, another selection was made so that 55 data that met the inclusion and exclusion criteria were obtained. From 55 data, 22 data were from 2015, 28 data were from 2016, and 5 data were from 2017.

The amount of data on death certificate that met the inclusion and exclusion criteria is as follows

Table 1. Amount of data on death certificate at Ludira Husada Tama Hospital in 2015-2017

Year	Amount of Data	%
2015	22	40
2016	28	51
2017	5	9
Total	55	100

Completeness of Death Certificate on Cause of Clinical Death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017

The completeness of death certificate on cause of clinical death at Ludira Husada Tama Hospital Yogyakarta was classified into poor (0-59% of all points in the death certificate were filled), fair (60-79% points in the death certificate were filled), and

good (80-100% points in the death certificate were filled). The result can be seen in Table 2

Table 2. Completeness of death certificate on cause of clinical death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017

Year	Poor		Fair		Good	
	Amount	%	Amount	%	Amount	%
2015	1	2	21	38	0	0
2016	0	0	28	51	0	0
2017	0	0	5	9	0	0
Total	1	2	54	98	0	0

Based on 22 data from 2015, 1 data (2%) was classified as poor and 21 data (38%) were classified as fair. Then, based on 28 data from 2016, 28 data (51%) were classified as fair. While, based on 5 data from 2017, 5 data (9%) were classified as fair. Therefore, it can be said that no data was classified as good, 54 data (98%) were classified as fair and a data (2%) was classified as poor.

The completeness of data filling in death certificate based on its elements can be seen in Table 3.

Table 3. Completeness of data filling in death certificate based on its elements

Elements	Poor		Fair		Good	
	Amount	%	Amount	%	Amount	%
Death certificate	0	0	0	0	55	100
Identity						
Decedent's	20	36	35	64	0	0
Identity						
Cause of	27	49	26	47	2	4
Death						
Legal Aspect	55	100	0	0	0	0

Based on the table 3, in the death certificate identity 55 data (100%) were classified as good. In the decedent's identity, 20 data (36,4%) were classified as poor and 35 data (63,6%) were classified as fair. In the cause of death, 27 data (49%) were classified as poor, 26 data (47,2%) were classified as fair, and 2 data (3,8%) were classified as good. Then, in the legal aspect, 55 data (100%) were classified as poor.

Accuracy of Death Certificate on Cause of Clinical Death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017

The accuracy of death certificate on cause of clinical death at Ludira Husada Tama Hospital Yogyakarta was classified into accurate (filled and appropriate) and inaccurate (not filled and/or written incorrectly or not related to the series of event in a disease). The accuracy of death certificate on cause of clinical

death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017 can be seen in Table 4.

Table 4. Accuracy of death certificate on cause of clinical death

	Accuracy of Data			
	2015	2016	2017	Total
Part I (a)	12	17	5	34(62% 0
Part I(b,c)	2	6	4	12(22%)
Part I(d)	5	5	1	11(20%)
Part II	4	2	0	6(11%)

Based on the data served in the table 4, the highest accuracy was found in the part I(a) (62%). While the lowest accuracy value was found in the part II (11%) because the large amount of data that is empty in this section.

Underlying Cause of Death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017

Underlying cause of death can be seen in the part I (d) in the death certificate form. It is important to know the underlying cause of death, especially for the hospital itself, in order to make a program for prevention of the disease and management of patient to reduce mortality.

Table 5. Underlying cause of death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017

Category	Disease	Amount
Diseases of Circulatory System	Congestive Heart Failure	10
	Hypertensive Emergency	4
	Hypertensive Heart disease	4
	Non traumatic Intracranial Hemorrhage	1
	Chronic Gastric Ulcer	3
Diseases of Digestive system		
	Chronic Kidney Disease	2
Diseases of Genito urinary System	Renal failure	2
	Urinary Tract Infection	3
	Bronchitis	1
	Chronic Obstructive Pulmonary Disease	1
	Pneumonia	10
Diseases of Respiratory System	Streptococcal Pharyngitis	1
	Diabetes Mellitus	3
	Acute Gastroenteritis	4
Endocrine, Nutritional & Metabolic Diseases		
	Fracture of Costae	1
Infectious & Parasitic diseases	Other Fracture	1
Injury, Poisoning & Certain Other consequences of external causes		
	Breast Cancer	2
Neoplasm	Lung Cancer	2

The underlying cause of death at Ludira Husada Tama Hospital in 2015-2017 can be seen in the Table 5. Based on table 5, the leading cause of death at Ludira Husada Tama Hospital in 2015-2017 is the disease of circulatory system (35%) which consists of congestive heart failure (10 cases), hypertensive emergency (4 cases), hypertensive heart disease (4 cases), and non-traumatic intracranial hemorrhage (1 case), then followed by the disease of respiratory system (24%) which consists of bronchitis (1 case), chronic obstructive pulmonary disease (1 case), pneumonia (10 cases), and streptococcus pharyngitis (1 case).

Discussion

Amount of Death Certificate on Cause of Clinical Death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017

The amount of medical record contains death certificate on cause of clinical death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017 is 90 data consist of 35 data were from 2015, 46 data were from 2016 and 9 data were from 2017. Then the data was selected again based on inclusion and exclusion criteria so that the data could be read and interpreted. After the selection was made, 55 data were obtained because there were 27 data (13 data from 2015, 13 data from 2016, and 1 data from 2017) which was written as Dead on Arrival (DoA) and 8 data (5 data from 2016, 3 data from 2017) were not written clearly so that the cause of death cannot be interpreted.

Furthermore, the amount of sample that meet the inclusion and exclusion criteria (55 data) did not fulfilled target sample which is determined by Slovin's formula with 150 population within 3 years (66 data) because at Ludira Husada Tama Hospital, the doctor usually write the death certificate stating the cause of death - only if the person who died in this hospital owns an Identity Card that states his place of residence as Kota Yogyakarta. This is in line to the local health authority's regulation, who is responsible for recapitulating the data for evaluation purposes regularly.

Completeness of Death Certificate on Cause of Clinical Death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017

Based on 55 data obtained, 1 data (2%) was classified as poor (less than 60% of all points in the death certificate were filled), 54 data (98%) were classified as fair (60-79% of all points in the death certificate were filled) and no data was classified as good (80-100% of all points in the death certificate were filled).

The completeness of death certificate on cause of clinical death was assessed from four elements in the research checklist, which consist of death certificate identity, decedent's identity, cause of death, and legal aspect of death certificate, then classified into poor (0-59% of all points in each element were filled), fair (60-79% of all points in each element were filled), and good (80-100% of all points in each element were filled).

Based on the research done by Rachmadhani at one of the public hospital in Surabaya, from 106 death certificate used in this research, 46 data (45,28%) were classified as incomplete, 24 data (22,64%) were classified as moderately-complete, and 34 data (32,08%) were classified as complete (7). If it's compared with research done at Ludira Husada Tama Hospital, it's known that the completeness of death certificate in one of public hospital in Surabaya from January until April 2017 is still higher than those at Ludira Husada Tama Hospital Yogyakarta in 2015-2017.

Death certificate identity element consist of certificate number, date when making death certificate, hospital's name, hospital's code, serial number of death record every month, and medical number. In this element, 55 data (100%) were classified as good which means that 80-100% of all points in this element were filled.

Decedent's identity element consist of name, identity card number, sex, place and date of birth, educational background, job, address, residence status, time and date of death, age when died, place of death, base of diagnosis, and modification plan. In this element, 20 data (36%) were classified as poor, which means that less than 60% of all points in this element were filled, and 35 data (64%) were classified as fair, which means that 60-79% of all points in the element were filled. The low level of completeness in filling of decedent's identity mostly happens because in 55 data (100%), the identity card number, residence status, and modification of plan were not filled. Moreover, job was not filled in 51 data (93%), educational background was not filled in 52 data (95%), place and date of birth was not filled in 13 data (24%), base of diagnosis was not filled in 5 data (9%), age when died was not filled in 3 data (5%), sex was not filled in 2 data (4%), and place of death was not filled in 1 data (2%).

Cause of death element consist of I(a) (disease or condition that led directly to death), I(b,c) (intermediate cause of death), I(d) (underlying cause of death), and II (disease or condition that

contributed to death but not lead to underlying cause of death). In this element, 27 data (49%) were classified as poor which means that less than 60% of all points in this element were filled, 26 data (47%) were classified as fair which means that 60-79% of all points in the element were filled, and 2 data (4%) were classified as good which means that 80-100% of all points in this element were filled. This value was obtained from the prevalence of filling the cause of death in death certificate which includes I(a), I(b,c), I(d), and II. Based on the observation, 53 data (96%) in point I(a) were filled, 49 data (89%) in point I(b,c) were filled, 29 data (53%) in point I(d) were filled, and 6 data (11%) in point II were filled.

Legal aspect of death certificate element consist of signature, name, and status of recipient and signature and name of author. In this element, 55 data (100%) were classified as poor which means that less than 60% of all points in this element were filled. It's happened because in 55 data (100%), the recipient of the death certificate (family or relatives of decedent) was not signed and written their name in this death certificate, but they usually signed in another document.

Incompleteness of death certificate on cause of clinical death at Ludira Husada Tama Hospital Yogyakarta is influenced by several things. First, it's because there are some patients who are hospitalized for only a few hours and then die, so that in-depth observation cannot be carried out. In addition, the data written in this death certificate was not directly written by attending-physician or doctor who diagnose the patient because the death certificate form is not distributed in each division in the hospital (for example, in emergency room and wards). Therefore, after the patient died, the medical record officer would see from the recapitulation data whether the deceased owns an identity card that states his place of residence as Kota Yogyakarta, then ask the doctor to fill the form based on the recapitulating data and medical record.

Based on the study done by Ni Wayan Eka Budhi Pahyuni (2018) at RSUP Dr. Sardjito in 2014-2016, from 103 death certificate used in this research, 90 data (87%) were completely filled. If it's seen from four categories (death certificate identity, decedent's identity, cause of death and legal aspect), 102 data (99%) from death certificate identity-section were filled, 92 data (89%) from decedent's identity-section were filled, 102 data (99%) from cause of death-section were filled, and 101 data (98%) from legal aspect-section were filled

(8). If it's compared with study done at Ludira Husada Tama Hospital, it's known that the completeness of death certificate at RSUP Dr. Sardjito in 2014-2016 is still higher than those at Ludira Husada Tama Hospital in 2015-2017.

Accuracy of Death Certificate on Cause of Clinical Death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017

Based on the observation done on the 55 data of death certificate on cause of clinical death in 2015-2017, 34 data (62%) were classified as accurate in filling in the section I(a) (direct cause of death). In section I(b,c) (intermediate cause of death), 12 data (22%) were classified as accurate in filling in that section, which is approximately almost the same as the accuracy in the section I(d), which shows that 11 data (20%) were classified as accurate in the section Id. Then, in the part II, 6 data (11%) were classified as accurate or in another words, 89% of data in the section II were classified as inaccurate.

From the result above, it can be said that the filling in the section I (a) is said to be quite accurate (62%). However, the filling in the section I (b,c), I (d), and II is still less accurate. This happens because in filling in the section I (b,c) and I (d), a series of event (or disease) in that section is considered as less related. Even though, all conditions in the section I (a), I (b,c), and I (d) should be related. Besides that, only 29 data (53%) in the section I (d) were filled and affect the accuracy of I (d) section because in this study, the definition of inaccurate is when the data filled in the section written incorrectly or not related with the series of event in a disease) and when the data is not filled. While, in the section II, the accuracy of data is considered as low because from 55 data used in this research, only 6 data (11%) were filled in the section II.

Based on the research done at a tertiary care teaching institute in Bhubaneswar named Kalinga Institute of Medical Sciences, from 151 death certificate in the research, 111 data (73,51%) data from immediate cause of death were correctly filled, 116 data (76,82%) data from antecedent cause of death were correctly filled, and 67 data (44,37%) data from underlying cause of death were correctly filled (9). If it's compared with research done at Ludira Husada Tama Hospital, it's known that the accuracy of cause of death at Kalinga Institute of Medical Science in 2012 is still higher than those at Ludira Husada Tama Hospital Yogyakarta in 2015-2017.

Underlying Cause of Death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017

The most effective public health strategy to prevent death is to prevent the factor causing death. Therefore, the underlying cause of death is the most important factor to identify when reporting death statistics (10).

Based on the result of the analysis on the underlying cause of death, the leading cause of death in the Ludira Husada Tama Hospital Yogyakarta in 2015-2017 is the disease of circulatory system (35%), which consists of various diseases such as congestive heart failure, hypertensive emergency, hypertensive heart disease, and non-traumatic intracranial hemorrhage. Then, it's followed by the disease of respiratory system (24%), disease of genitourinary system (13%), neoplasm (7%), infectious and parasitic disease (7%), disease of digestive system (5%), endocrine, nutritional, and metabolic disease (5%), and injury, poisoning and other consequences of external cause (4%).

Based on the data from WHO, of the 15,6 million deaths worldwide in 2016, 54% were due to the top 10 causes, including ischemic heart disease ($\pm 9,5$ million), stroke ($\pm 5,7$ million), chronic obstructive pulmonary disease (± 3 million), lower respiratory infections (± 3 million), Alzheimer disease and other dementias (± 2 million), trachea, bronchus, lung cancer ($\pm 1,8$ million), diabetes mellitus ($\pm 1,7$ million), road injury ($\pm 1,5$ million), diarrheal disease ($\pm 1,5$ million), tuberculosis ($\pm 1,4$ million) (11).

Based on the data from WHO, the leading cause of disease in Indonesia in 2012 are stroke (21,2%), ischemic heart disease (8,9%), diabetes mellitus (6,5%), lower respiratory infections (5,2%), tuberculosis (4,3%), cirrhosis of the liver (3,2%), chronic obstructive pulmonary disease (3,1%), road injury (2,9%), hypertensive heart disease (2,7%), kidney diseases (2,6%) (12).

Conclusion

In the completeness of death certificate on cause of clinical death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017, 98% is classified as fair and 2% is classified as poor.

In the accuracy of death certificate on cause of clinical death at Ludira Husada Tama Hospital Yogyakarta in 2015-2017, the percentage of accuracy on the section I (a) is 62% accurate, on the section I (b,c) is 22% accurate, on the section I (d) is 20% accurate, and on the part II is 11% accurate.

The leading cause of death at Ludira Husada Tama Hospital in 2015-2017 are disease of circulatory system (35%) and disease of respiratory system (24%).

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Conflict of Interest

None

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