DOI: 10.1590/1980-549720190009.supl.3

ORIGINAL ARTICLE/*ARTIGO ORIGINAL*

Change in the profile of causes of death after investigation of hospital deaths in Belo Horizonte, Brazil, 2017

Mudança no perfil de causas de morte após investigação de óbitos hospitalares em Belo Horizonte, 2017

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ABSTRACT: ***Introduction*:** Deaths certified with ill-defined causes or garbage codes (GC) compromise the analysis of mortality and its use for planning and evaluation of public health policies. The hospital investigation of these causes is one of the strategies qualifying the profile of mortality in the country. ***Objective*:** To evaluate the change in the hospital mortality profile after investigation of deaths certified with GC in 2017 in Belo Horizonte, Brazil. ***Methods*:** A sample of hospital deaths reported with GC in the Mortality Information System (SIM) of Belo Horizonte in 2017 was investigated and subsequently certified by a physician to compare the mortality profile before and after investigation. ***Results*:** After investigating 1,395 deaths out of 3,038 reported with GC, a reduction of 35.5% of these causes was observed. Groups of all ages presented decreases in GC occurrence. A higher proportional increase was observed for deaths due to ischemic heart diseases, Alzheimer's disease, chronic obstructive pulmonary disease, ischemic and hemorrhagic stroke, and external causes of death (accidental falls, homicides and traffic/transport accidents). ***Conclusion:*** The investigation on reported hospital deaths is one of the strategies to improve mortality statistics, reducing the occurrence of GC among reported deaths and changing the mortality profile in these facilities. The importance of continuous physician training in cause-of-death certification is emphasized.

***Keywords*:** Mortality. Information systems. Cause of death.

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Conflict of interests: nothing to declare – **Financial support:** Funding from Vital Strategies as part of the Bloomberg Philanthropies Data for Health Initiative (Project 23998 Fundep/UFMG).

RESUMO: ***Introdução*:** Óbitos declarados com causas mal definidas, ou causas *garbage* (CG), comprometem a análise da mortalidade e sua utilização para planejamento e avaliação de políticas públicas de saúde. A investigação hospitalar destas causas é uma das estratégias para qualificação do perfil de mortalidade no país. ***Objetivo***: Avaliar a mudança no perfil de mortalidade hospitalar após investigação de óbitos declarados com CG, em 2017, em Belo Horizonte. ***Métodos*:** Tomou-se uma amostra dos óbitos hospitalares notificados com CG no Sistema de Informação sobre Mortalidade de Belo Horizonte em 2017. Posteriormente, os dados foram investigados e analisados por médico, para comparação do perfil de mortalidade antes e depois do processo de investigação. ***Resultados*:** Após investigação de 1.395 óbitos, dentre 3.038 declarados com CG, houve redução de 35,5% para estas causas. Todas as faixas etárias apresentaram decremento na ocorrência de CG. Observou-se maior incremento proporcional para os óbitos causados por doenças isquêmicas do coração, doença de Alzheimer, doença pulmonar obstrutiva crônica, acidente vascular cerebral isquêmico e hemorrágico e as mortes por causas externas (quedas acidentais, homicídios e acidentes de trânsito/transporte). ***Conclusão*:** A investigação de óbitos hospitalares notificados é uma das estratégias para aprimorar as estatísticas de mortalidade, reduzindo a ocorrência de CG entre as mortes declaradas e alterando o perfil de mortalidade nestes estabelecimentos. Enfatiza-se a importância de educação permanente de médicos para qualificação das causas de morte.

***Palavras-chave*:** Mortalidade. Sistemas de Informação. Causas de morte.

INTRODUCTION

Mortality statistics are among the most important tools for analyzing the health situation of populations, subsiding the planning and evaluation of public policies[1,2]. The Mortality Information System (SIM), implemented in Brazil in the 1970s, uses the death certificates (DC), an instrument of mandatory completion by physicians, as data source. However, in 2000, the quality of these sources is still precarious and unequal, with a high proportion of deaths due to ill-defined causes[3] even with death records with above 90% coverage in the country.

We emphasize that the proportion of deaths whose underlying cause is declared by the physician as nonspecific, including the codes from chapter XVIII of the International Statistical Classification of Diseases and Health-related Problems – 10ª Review (ICD-10), and also codes of other chapters, among the problems involving the quality of information on mortality. These causes have been denominated incomplete, unhelpful causes or garbage codes (GC), as proposed by the Global Burden of Disease initiative (GBD); and compromise the analysis of mortality when occur in high proportion[4,5]. GBD also proposes the grouping of GCs according to the severity of its impact on the mortality profile and, consequently, in the definition of assertive public policies[6]. In Brazil, 33% of about 1.3 million total deaths in 2016 were declared with GC, with a similar proportion among hospital deaths[7].

Since 2005, the Brazilian Ministry of Health (MoH) has incremented actions aiming at improving the definition of causes of death in the country, implementing standardized

instruments for investigation of deaths, training teams of death surveillance and establishing goals and quality indicators of SIM, having the transfer of financial incentives to municipalities as counterpart[8-10]. Recently, in 2018, the *Protocolo de investigação de óbitos com causas classificadas como códigos garbage – sessenta cidades do Brasil* ("Protocol for Investigating Deaths with Causes Classified as Garbage Codes – sixty cities of Brazil") was implemented, relying on the support of partner institutions and including the investigation of hospital deaths reported with GC in 2017. Belo Horizonte was one of the cities included in this project[11], with about 29% of these cases, which until then investigated deaths from ill-defined and external causes due to event of undetermined intent, in addition to all infant, fetal, maternal deaths and death of women of childbearing age.

This study analyzed the change in the profile of hospital mortality after investigation and correction of deaths declared with GC in Belo Horizonte in 2017, considering that most of deaths in hospital facilities should present a specific cause of death.

METHODS

This is an evaluative descriptive epidemiological study using the SIM database, available at the local base of the Municipal Health Secretariat of Belo Horizonte (SMS-BH), regarding the deaths of residents occurring in hospitals in this municipality in 2017. Belo Horizonte has a total of 2,375,151 inhabitants, according to the population census conducted by the Brazilian Institute of Geography and Statistics (IBGE) in 2010, and records approximate annual average of 15,000 deaths of residents, 70% of these in hospitals[7].

The following GC were selected for investigation, considered priority by MoH in the protocol and referring to the following three-or four-character codes of the ICD-10: ill-defined causes (R00-R99, except R95); sequelae or cerebrovascular accident (stroke) unspecified as hemorrhagic or ischemic (I64, I67.4, I67.9, I69.4, I69.8); septicemia (A40-A41); heart failure and unspecified heart diseases (I50, I51); essential hypertension (I10); unspecified neoplasia (C26, C55, C76, C78, C79, C80); pulmonary embolism (I26); pneumonia (J15.9, J18); respiratory failure, not elsewhere classified (J96) and other respiratory disorders (J98); renal failure (N17, N19); external causes due to event of undetermined intent and unspecified accidents (Y10-Y34, X59); unspecified traffic accidents and homicides (V89, Y09). GC were grouped in severity levels (1 to 4) according to the list proposed by GBD/2017[12], considering its impact on public policies, which was defined by Anaconda[13] as: very high (Level 1), for causes with serious implications; high (Level 2), GC with substantial implications; medium (Level 3), containing GC with important implications; and low (Level 4) in which GC have limited implications. According to GBD, levels 1 and 2 are the most important for their greater impact on mortality analysis.

The investigations were conducted according to the operational capacity of the epidemiological surveillance teams of the municipality and in three different stages of sample selection, presented below.

- **1st stage:** from the total of hospital deaths with priority GC between January and April 2017 (n = 475), approximately 80% (n = 374) were selected, which occurred in the 16 hospitals in the city with greater proportions of these events.
- **2nd stage:** We selected hospital deaths with priority GC (n = 289) identified by epidemiological surveillance in routine investigations of diseases and illnesses of compulsory notification, infant and maternal death, deaths of women of childbearing age and deaths by external causes due to event of undetermined intent.
- **3rd stage:** A probabilistic sample of all deaths with priority GC not investigated in the previous stages (n = 1,698) was selected. The prevalence of the three main causes of death among the uninvestigated cases (unspecified pneumonia, unspecified stroke and septicemia) was adopted as a parameter to estimate the sample of this stage, with 664 deaths. A proportional stratification was performed between hospitals with five or more deaths to be investigated to minimize the possibility of selection bias, and a collection of 20% or more cases was defined in each hospital to compensate for possible sample loss, resulting in a total sample of 797 deaths.

We used the form of *Investigação de* Óbitos *por Causa Mal Definida Hospitalar* ("investigation of hospital deaths due to ill-defined causes" – IOCMD-H), elaborated by the MoH in 2017 for hospital investigation of the deaths selected in the first and third stages. This form includes data from the clinical history and results of complementary exams recorded in the hospital records during the last hospitalization that culminated with the death investigated. Epidemiological surveillance teams (physicians, nurses and dentists) of the SMS-BH and the selected hospitals, including the teams of the Epidemiology Hospital Centers, were previously trained to investigate and use the IOCMD-H form. In the second stage, the hospital investigation reports of the epidemiological surveillance teams were evaluated for deaths related to compulsory notification diseases and illnesses and the standardized forms by the MoH for investigation of infant and maternal deaths. Regarding the deaths from external causes and initially coded with priority GC in chapter XX of ICD-10, the information from the technical reports elaborated by the forensic physicians of the *Instituto Médico Legal* (forensic institute – IML) of Belo Horizonte and research in electronic media to specify the circumstances involved in the deaths.

The investigations of the three stages were completed by a certifier physician to define a new underlying cause of death. In cases, in which the investigation did not allow the definition of another cause of death, the original underlying cause in the DC was maintained. All investigations conducted were subsequently forwarded to the same group of encoders of the previous DC for recoding of the post-investigation underlying cause. The reclassified cases were included in the SIM.

The proportional distributions of the selected deaths were analyzed in the three stages according to the following variables: sex, age range (0 to 19, 20 to 39, 40 to 59, 60 to 79, and 80 years or more), priority GC and the impact levels of the respective codes. We compared the proportion of deaths from GC and specific causes (according to the list of causes of

GBD/2015), before and after the investigation, and stratified by age range to evaluate the change of causes of death comparing with the total number of hospital deaths.

The variables of interest were tabulated using the Microsoft Office Excel program; the Minitab-18 program was used for the analysis of frequency and measures of central tendency, establishing a 0.05 significance level.

This study was approved by the Ethics and Research Committee of the Universidade Federal de Minas Gerais (CAEE 75555317.0.0000.5149) and developed according to the ethical precepts established in Ordinance No. 466/2012 of the National Health Council.

RESULTS

In Belo Horizonte, of the 24,490 deaths reported in the SIM in 2017, 68.4% were of residents in the city, and of these, 58.6% occurred in hospitals in the capital. Among the 3,038 hospital deaths with GC, 2,361 (77.7%) were declared with priority GC. In total, 1,395 deaths were investigated: 374 and 289 in the first two stages, respectively, and 732 in the third, as shown in Figure 1.

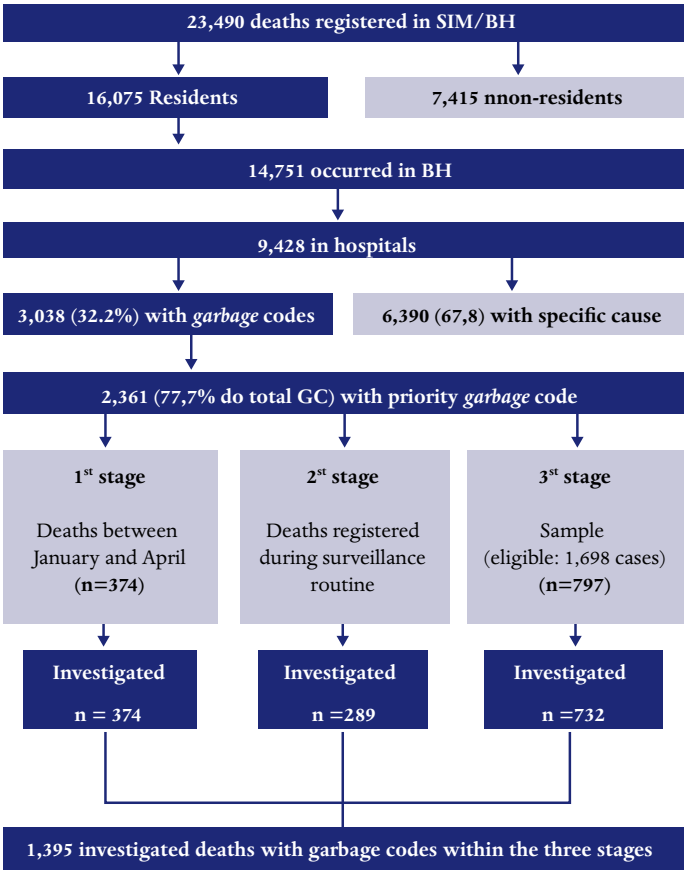

Figure 1. Flowchart of selected and investigated garbage code deaths. Belo Horizonte, 2017.

Source: Mortality Information System of Belo Horizonte (SIM).

The proportional distribution of men among total deaths with total GC and priority GC was similar (49.7 and 49.6%, respectively; p = 0.98) and the median of identical age (77 years; p = 0.56) (data not shown). Men predominated in the sample investigated, as shown in Table 1. Although most of the deaths investigated (76.1% of the total) were of adults older than 60 years of age, the proportion of deaths in the age group of 20 to 39 years in the second stage was high (15.2%), with a median age of 65 years. The median age among the deaths investigated in the three stages were different: 71 years in the first, 65 in the second, and 80 in the third (p < 0.00).

Table 1. Deaths investigated according to variables, level of garbage codes and stages of the investigation. Belo Horizonte, 2017.

Variable		First		Second		Third		Total	
		n	%	n	%	n	%	n	%
Sex	Women	167	44.7	93	32.2	394	53.8	654	46.9
	Man	207	55.3	196	67.8	338	46.2	741	53.1
Age group	0 to 19	11	2.9	22	7.6	3	0.4	36	2.6
	20 to 39	24	6.4	44	15.2	15	2	83	5.9
	40 to 59	76	20.3	52	18	87	11.9	215	15.4
	60 to 79	149	39.8	90	31.1	253	34.6	492	35.3
	80 and more	114	30.5	81	28	374	51.1	569	40.8
GC Priority	External causes	124	33.2	223	77.2	36	4.9	383	27.5
	Pneumonia	5	1.3	10	3.5	295	40.3	310	22.2
	Unspecified Stroke	61	16.3	0	0	132	18	193	13.8
	Septicemia	58	15.5	7	2.4	82	11.2	147	10.5
	Ill-defined	33	8.8	46	15.9	23	3.1	102	7.3
	Other causes	93	0	3	0	164	0	260	0
GC level	Level 1	138	36.9	52	18	197	26.9	387	27.7
	Level 2	139	37.2	225	77.9	53	7.2	417	29.9
	Level 3	31	8.3	2	0.7	57	7.8	90	6.5
	Level 4	66	17.6	10	3.5	425	58.1	501	35.9
Total		374	100	289	100	732	100	1,395	100

The main causes among the deaths investigated were the external causes due to event of undetermined intent, pneumonia and unspecified stroke, with 27.5% (n = 383), 22.2% (n = 310) and 13.8% (n = 193) of the deaths, respectively. While external causes had greater

relative importance in the first (33.2%) and second (77.2%) stages, pneumonia accounted for 40.3% of the deaths investigated in the third stage. Unspecified stroke and septicemia showed higher proportions in the first (16.3%) and second (13.8%) stages. Table 1 shows that garbage codes classified in levels 1 and 2 (higher severity) combined corresponded to 74.1% and 95.9% of deaths in the first two stages, respectively, while level 4 presented a proportion of 58.1% of deaths in the third stage.

External causes due to event of undetermined intent, pneumonia and unspecified stroke stood out among adults older than 60 years, as shown in Table 2. In the age groups below 40 years, the external causes due to event of undetermined intent also predominated. It also draws attention to the predominance of level 2 attributed to GC in the age groups of 0 to 19 (77.8%), 20 to 39 (72.3%) and 40 to 59 years (35.3%), while level 4 prevailed in the age groups of 60 to 79 (33.7%) and 80 or more years (46.7%).

Table 2. Hospital deaths investigated by causes and levels of priority of garbage codes, by age group. Belo Horizonte, 2017.

Priority garbage codes	Age group (years)										Total	
	0 to 19		20 to 39		40 to 59		60 to 79		> = 80			
	n	%	n	%	n	%	n	%	n	%	n	%
External causes	28	77.8	60	72.3	70	32.6	120	24.4	105	18.5	383	27.5
Pneumonia	3	8.3	9	10.8	38	17.7	85	17.3	175	30.8	310	22.2
Unspecified Stroke	0	0	0	0	20	9.3	81	16.5	92	16.2	193	13.8
Septicemia	4	11.1	8	9.6	24	11.2	50	10.2	61	10.7	147	10.5
Ill-defined causes	1	2.8	2	2.4	21	9.8	42	8.5	36	6.3	102	7.3
Other causes	0	0	4	4.8	42	20	114	23	100	18	260	19
Levels of garbage codes												
Level 1	5	13.9	12	14.5	55	25.6	145	29.5	170	29.9	387	27.7
Level 2	28	77.8	60	72.3	76	35.3	135	27.4	118	20.7	417	29.9
Level 3	0	0	2	2.4	27	12.6	46	9.3	15	2.6	90	6.5
Level 4	3	8.3	9	10.8	57	26.5	166	33.7	266	46.7	501	35.9
Total	36	100	83	100	215	100	492	100	569	100	1,395	100

Generally, deaths due to external causes increased in absolute values and in all age groups, drawing attention to deaths due to traffic accidents in the age group of 20 to 39 years, with

over 1 death to 29 cases. From the deaths among children under 20 years of age, 30.6% (n = 11) remained with GC. Table 3 showed a relative reduction of 35.5% in total hospital deaths attributed to GC, from 3,038 to 1,959 deaths. This reduction was observed in all age groups, especially in the group between 20 and 39 years, which decreased from 35% to 16.4%, and the range under 20 years, with the lowest reduction, 26.6% to 20%. The relative reduction were 40.6%, 36.3% and 32.3% for the age groups of 40 to 59, 60 to 79 and 80 or more years respectively (data not shown).

Table 3. Main causes of hospital death according to age range, before and after investigation and variation. Belo Horizonte, 2017.

Age group	Main causes of death	Before		After		Variation (%)
		n	%	n	%	
0-19 years (n = 380)	Homicides	18	4.7	30	7.9	66.7
	Traffic accidents	1	0.3	5	1.3	400
20-39 years (n = 397)	Accidental Falls	0	0	3	0.8	300
	Traffic accidents	1	0.3	29	7.3	2,800
40-59 years (n = 1,571)	Homicides	8	0.5	20	1.3	150
	Hypertensive heart disease	0	0	7	0.4	700
	Suicides	0	0	8	0.5	800
	Traffic accidents	0	0	14	0.9	1,400
	Accidental Falls	0	0	19	1.2	1,900
60-79 years (n = 3,686)	Hypertensive heart disease	8	0.2	25	0.7	212.5
	Ischemic stroke	6	0.2	36	1	500
	Suicides	2	0.1	12	0.3	500
	Accidental Falls	5	0.1	69	1.9	1,280
	Traffic accidents	0	0	22	0.6	22,000
80+ (n = 3,394)	Hypertensive heart disease	11	0.3	30	0.9	172.7
	Traffic accidents	0	0	8	0.2	800
	Ischemic stroke	3	0.1	37	1.1	1,133.3
	Accidental Falls	10	0.3	124	3.7	1,140

Table 4 shows the distribution of the main causes of death before and after the investigation process, ordered from the highest to the lowest proportional value in comparison with the total number of deaths (n = 9,428). Ischemic heart diseases maintained the highest relative frequency (with an increase of 5 to 5.4%), remaining in the first place among the causes

of death. An increase in the relative frequency of deaths attributed to chronic obstructive pulmonary disease (COPD) (from 3.9 to 4.5%), Alzheimer's disease (3.9 to 4.5%) and ischemic stroke (2.2 to 3.5%, passing from 9º to 4º place) is observed. External causes of mortality present an important change, with accidental falls passing from 79º to 10º place; homicide from 20º to 15º place; and specified traffic/transport accidents, from 122º to 24º place.

Table 4. Main causes of hospital deaths in order of occurrence, before and after investigation. Belo Horizonte, 2017.

Order before investigation	n	%*		n	%*	Order after investigation
1. Ischemic heart disease	469	5.0	→	508	5.4	1. Ischemic heart disease
2. Alzheimer's	372	3.9	↘	424	4.5	2. COPD
3. COPD	358	3.8	↗	421	4.5	3. Alzheimer's
9. Ischemic stroke	203	2.2	→	334	3.5	4. Ischemic stroke
10. Diabetes mellitus	177	1.9	↘	215	2.3	10. Accidental falls
13. Hemorrhagic stroke	152	1.6	↘	210	2.2	11. Diabetes mellitus
20. Homicides	77	0.8	↘	174	1.8	12. Hemorrhagic stroke
30. Hypertensive heart disease	19	0.2	↘	121	1.3	15. Homicides
79. Accidental falls	15	0.2	↗	78	0.8	24. Traffic accidents**
122. Traffic accidents**	2	0.0	↘	62	0.7	30. Hypertensive heart disease
Garbage codes***	3038	32.2		1959	20.8	Garbage codes***
Level 1	992	10.5		697	7.4	Level 1
Level 2	657	7.0		294	3.1	Level 2
Level 3	332	3.5		288	3.1	Level 3
Level 4	1011	10.7		632	6.7	Level 4

*Comparing with total hospital deaths (n = 9,428); ** traffic accident specified; *** Excluded levels of garbage codes excluded in 46 (before) and 48 (after) deaths. D.: disease.

Regarding the levels attributed to each GC before investigation (n = 3,038), levels 1 and 4 presented a proportion of 33.2% and 33.8%, respectively, and level 3 had the lowest proportion (11.1%). Level 2 showed a higher reduction after the investigation, (55.3%), followed by levels 4 (37.5%) and 1 (29.7%); the lowest reduction occurred at level 3 (13.3%). The proportion of deaths remaining as GC after investigation (n = 1,959) was 36.5%, 15.4%, 15.1% and 33.1% for levels 1 to 4, according to severity levels, respectively. For levels 1 and 4 in the age groups of 60 to 79 years, the proportion reduced from 3.7% to 2.5% and from 3.5% to

2.4%, respectively; the highest decrease was observed over 80 years, from 4.8% to 3.3% and from 5.9% to 4%, respectively (data not shown).

Of the total 310 deaths investigated and reported as due to pneumonia (codes J15 to J18 of ICD-10), 11.3% were reclassified for Alzheimer's disease, 10.3% for COPD, 6.5% for hypertensive heart disease and 14.5% maintained the same cause. The total number of hospital deaths reported with the codes R00 to R99 (chapter XVIII of ICD-10), reduced from 1.5% to 0.7% after the investigation (data not shown).

DISCUSSION

This study showed an important reduction of 35% in the proportion of GC after investigation of deaths and, therefore, reinforces the applicability of the process performed as a tool to qualify and improve the SIM. External causes (falls, homicides and traffic/transport accidents) and non-communicable chronic diseases (ischemic heart disease, Alzheimer's and unspecified stroke) increased their importance as causes of death in hospitals after the investigation. However, 20.8% of the total hospital deaths in 2017 still remained with GC.

Few studies have analyzed the distribution of GC levels before and after investigating deaths. In this study, the highest proportion of GC with high level (level 2) observed in the second stage may be attributed to external causes due to event of undetermined intent in young adults, while level 4 in older adults stood out in the third stage, in which pneumonia and stroke not specified as ischemic or hemorrhagic are relatively more common. Among the deaths whose cause remained as *garbage code* after the investigation, a level change was observed for some of these causes, i.e., a Level 1 GC may have been reclassified to another level of lower impact due to improved information. An example of this situation is one death due to unknown cause (ICD-10 code R99: Level 1) in which a sequela of stroke unspecified if ischemic or hemorrhagic (ICD-10 code I 69.4: Level 4) was identified as a cause, after investigation.

In Brazil, GC still remains an important concern in the analysis of mortality, compromising the planning and evaluation of public policies. The quality of the physician's completion of DC and the data coding process have been reported as relevant for the occurrence of CG[14,15]. The lack of training and attention of the physician for the correct registration, the quality of information available in clinical records and the diagnostic resources available have been pointed out among the factors involved in the quality of the completion of the DC[16]. In this study, the identification of a well-defined cause of death or change in the GC level with lower impact corroborated the hypothesis that one of the main factors compromising the quality of the SIM refers to the completion of the DC by the physician since clinical data and diagnostic support to define a specific cause were available in hospital records.

Other studies have pointed out that the occurrence of deaths with GC may be related to their higher frequency in more advanced age groups, to sex, to the difficulty

of physicians in defining the external causes due to event of undetermined intent and the existence of a death verification service (SVO) to investigate deaths from natural causes without medical care or epidemiological interest[16,18]. In older adults, for example, the coexistence of several comorbidities in the same patient may hinder the physician's identification of the underlying cause of death[18]. In Brazil, a study analyzing deaths in the age range of 15 to 59 years between 1998 and 2012 also showed a higher proportion of ill-defined causes in the most advanced ages[19]. Still on the proportion of deaths with GC, the analysis of 762,000 deaths occurring in 24 provinces in Ecuador between 2001 and 2013 found differences related to sex (higher in women) and age (higher in older adults), different from observed in this study, possibly due to the criteria used for sampling[20]. A higher proportion of GC in young men was observed among the deaths investigated in this study, which can be attributed to the preponderance of external causes due to event of undetermined intent verified in the first and, mainly, in the second stage. Furthermore, the highest proportion of deaths with GC investigated occurred in adults older than 60 years, except for the first two stages, in which deaths from external causes due to event of undetermined intent predominated and those investigated by the routine of the services of epidemiological surveillance.

In Belo Horizonte, the investigation of deaths with undetermined or unknown underlying cause (ICD-10 code R99) has been a priority for the city's surveillance teams, even in those occurring in a hospital facility. This municipality does not have SVO to support the elucidation of these deaths and those without medical assistance. Although SIM information in the city is considered good regarding the ill-defined causes (chapter XVIII of ICD-10) – 5% of total deaths are reported with ill-defined causes – between 2011 and 2013, 68.4% of deaths occurred in hospitals, of which 28.7% have GC, compromising the analysis of mortality both for these establishments and for the municipality[7]. A study evaluating the investigation of deaths from ill-defined causes in Brazil in 2010 detected a reduction of 20% of these causes and around 65% of reclassification into defined causes[21]. In this study, total GC reduced 53%, reaching a value of 0.7% after the investigation. These findings indicate that a considerable proportion of deaths remains with ill-defined causes after investigation even in hospital deaths, for which a more specific cause is expected to be identified.

One limitation of this study was the investigation only 46% of the hospital deaths reported with GC selected in three stages with different methodologies, considering the operational difficulties for analyzing the total number of deaths. In addition, the study prioritized the investigation of priority GCs, as proposed by the MoH. In this sense, the change in the distribution of the causes of hospital death found in this study would possibly be even greater if all deaths with GC had been included in the investigation. However, our results indicate that there was a change in the hospital mortality profile after the investigation, with identification of several causes that had not previously been emphasized and became important.

CONCLUSION

The study showed that the investigation of hospital deaths with GC is a viable strategy that allows the qualification of the death certificate, improving the analysis of mortality profile in these establishments and enabling managers to direct more assertive care actions, with a view to coping with the main causes of death. A fundamental and timely strategy to minimize the occurrence of deaths reported with GC involves improving the medical records through training these professionals in qualified completing of causes of death in the DC. The improvement of health care services with qualified diagnostic support and the need to implant a SVO in the municipality is also noteworthy.

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Received: 06/12/2019
Final version presented on: 07/18/2019
Approved: 08/08/2019

Acknowledgments: The authors thank the team of technicians of the epidemiological surveillance to the death of the central level of the Municipal Health Secretariat and the sanitary districts of Belo Horizonte, as well as the teams of the Epidemiology Hospital Centers for supporting the process of research and qualification of the mortality information system, enabling the achievement of the objectives of this study.

Authors' contribution: Corrêa PRL, Ishitani LH, Lansky S, Santos MR and France EB conceived and delineated the study, organized the database and analyzed the results, wrote and revised the manuscript. Teixeira AR contributed to the conception of the study, sample selection and statistical analysis of the data. All authors approved the final version of the manuscript and declared themselves responsible for all aspects of the work, guaranteeing their accuracy and integrity.