

**Table 1.** Investigated sources and frequency of extracted errors

Hayavi haghghi et al. [20]	✓	✓	✓				✓	✓								✓		
Meraji and Barabadi [21]	✓		✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓		
Keyvan-Ara et al. [22]			✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓		
McGuiren et al. [23]	✓		✓						✓		✓	✓				✓		
Benkhalil et al. [24]		✓	✓	✓		✓	✓	✓			✓	✓	✓			✓		
Maharjan et al. [25]	✓	✓	✓	✓				✓								✓		
Qudumi et al. [26]	✓	✓	✓	✓				✓			✓	✓	✓			✓		
Hazard et al. [27]	✓		✓							✓	✓	✓	✓					
Patel et al. [28]		✓	✓								✓	✓	✓			✓		
Cheng et al. [29]	✓		✓	✓					✓									
Rajah [30]	✓	✓	✓	✓		✓		✓	✓						✓	✓		
Nojilana et al. [5]	✓	✓	✓								✓	✓	✓			✓		
Burger et al. [31]	✓	✓	✓					✓			✓	✓	✓			✓		
Priet et al. [32]	✓		✓					✓	✓		✓	✓		✓				
Alai et al. [33]	✓	✓	✓	✓								✓	✓			✓		
<b>Total</b>	12	9	15	8	1	3	1	5	8	1	4	8	12	8	2	2	5	7

**Table 2.** The absolute and relative frequency of documenting errors of death in the death certificate (the total number of cases was 204; the numbers in parentheses are percentages)

<b>Documentation errors of the death cause</b>	<b>Observed</b>	<b>Not observed</b>	<b>Unknown</b>
<b>Recording the final status (direct cause)</b>			
Failure to record the direct cause of death (Line A, Section 1)	21 (10.3)	183 (89.7)	-
Recording poorly defined signs and symptoms	166 (81.4)	17 (8.3)	21 (10.3)
Record the cause of death (underlying cause) instead of the final state of death	6 (2.9)	177 (86.8)	21 (10.3)
Recording diagnoses with general and vague terms	27 (13.2)	156 (76.5)	21 (10.3)
Recording more than one status in the first line	25 (12.3)	158 (77.5)	21 (10.3)
Others	1 (0.5)	-	-
<b>Recording the intermediate causes of death</b>			
Failure to record an intermediate cause	20 (9.8)	184 (90.2)	-
Recording poorly defined signs and symptoms	145 (71.1)	39 (19.1)	20 (9.8)
Recording diagnoses with general and vague terms	97 (47.5)	87 (42.6)	20 (9.8)
Recording more than one status in the first line	56 (27.5)	128 (62.7)	20 (9.8)
Others	21 (10.3)	-	-
<b>Recording the cause of death (underlying)</b>			
Failure to record the underlying cause of death (last line of section 1)	11 (5.4)	193 (94.6)	-
Recording diagnoses with general and vague terms	68 (33.3)	125 (61.3)	11 (5.4)
Recording more than one status in the last line of the first part	27 (13.2)	166 (81.4)	11 (5.4)
Recording poorly defined signs and symptoms	56 (27.5)	137 (67.2)	11 (5.4)
Others	3 (2.3)	-	-
<b>The second part regarding other conditions and diseases</b>			
Failure to record other status and diseases in section 2	192 (94.1)	12 (5.9)	-
Recording the underlying cause in the section on other status and diseases in section 2	2 (1.0)	10 (4.9)	192 (94.1)
Recording diagnoses with general and vague terms	6 (2.9)	6 (2.9)	192 (94.1)
Others	-	-	-

**Table 3.** The main problems identified regarding poor documentation of death certificates in the panel of experts

<b>Problems</b>
<b>1- Death certificate form</b>
<b>1-1- Death certificate form structure</b>
1-1-1- Simultaneous existence of death certificate and burial permit in one sheet
2-1- Instructions for the death certificate form
1-2-1- Lack of accurate explanation of some paragraphs of 19 cases of delivering a corpse to forensic medicine, such as paragraph 15
2-2-1- Lack of comprehensive mention of common cases of vague, general, unreal, and improbable diagnoses
3-2-1- Lack of accurate explanation regarding the responsibility of completing the death certificate
4-2-1- Lack of integrated, codified, comprehensive and objective instructions
<b>2- System structure</b>
1-2- No item related to the time interval between diagnosis and death in the system
2-2- Ability to reject the error of registering a null code easily by the user
3-2- Impossibility to provide a proper report on null codes in the hospital
<b>3- People responsible for documentation</b>
<b>1-3- Professors or residents</b>
1-1-3- Lack of familiarity with the diagnostic principles according to the International Classification of Diseases
2-1-3- Lack of understanding the obligation to complete all items of the death certificate
3-1-3- Lack of time and allocation of priority to the treatment of hospitalized patients until the completion of the deceased's file
4-1-3- Lack of motivation to accept responsibility for completing the death certificate (financial incentive and evaluation)
5-1-3- Low knowledge about the instructions for completing the death certificate
6-1-3- Fear of the legal consequences of completing a death certificate
7-1-3- Lack of knowledge of 19 cases
8-1-3- Lack of knowledge of diagnostic cases leading to null, general, ambiguous, and unlikely codes and their alternatives
9-1-3- Failure to receive feedback from your performance regarding documenting the death certificate
<b>2-3- Health information technology expert</b>
1-2-3- Lack of clear policy to deal with unreal, vague, general, and improbable diagnoses
2-2-3- Lack of positive experience of following the change of diagnoses leading to the null code from the relevant physician
3-2-3- Changing the diagnosis for null cases and assigning the relevant code as a result of the doctor's diagnosis not matching the code registered in the system
<b>4- Necessary executive strategies</b>
<b>1-4- In-department coordination</b>
1-1-4- Coordination between secretary and doctor
1-1-1-4- Lack of an accurate protocol in cases of incomplete completion of the death certificate
2-1-4- Lack of coordination between the physician issuing the death certificate and the physician informed about the condition of the deceased and lack of knowledge about the deceased in the first shift and the lack of treatment process and insufficient documents to determine the cause of death by the resident
3-1-4- Restriction of the bed and the necessity of emptying the bed of the deceased to provide services to the next patient and sometimes applying a time limit to complete the death certificate form
<b>2-4- Coordination out of the department</b>
1-2-4- Failure to justify the person in charge of the morgue in cases of the prohibition of delivery of the body and vice versa
2-2-4- Improper and sometimes simultaneous use of the corpse referral form along with the death certificate
3-2-4- Follow-up and insistence of the deceased's family for faster delivery of the body
4-2-4- Lack of monitoring system, incentive and punishment program and providing feedback on people responsible for documentation performance