



**International Journal of Biology, Pharmacy  
and Allied Sciences (IJBPAS)**

*'A Bridge Between Laboratory and Reader'*

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**INVESTIGATING THE CAUSES OF PREGNANT MOTHERS' DEATH REFERRED  
TO TEHRAN FORENSIC MEDICINE FROM 2011 TO 2013**

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**ABSTRACT**

Maternal mortality ratio has been considered as one of the key development indicators of each country. Accordingly, the present study aimed to investigate and determine the causes of death in women referred to Tehran province forensic medicine dissection hall.

Autopsies have been performed in Tehran province forensic medicine dissection hall on a total of 87 pregnant women who had died since the beginning of the 1390 by the end of 1392. They were studied about age of the deceased, gestational age, nationality, type of delivery, direct, indirect and non-maternal causes.

89.6% of deaths were because of "maternal" causes, including 56.7% direct and 33.3% indirect maternal deaths. 9.2% of deaths were from "non-maternal deaths". Among the direct causes, the most common cause is high blood pressure, followed with frequency of bleeding, embolism, infection. Most of Iranian deceased had experienced at least two pregnancies and

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their deaths occurred during the bleeding period in the teaching hospital and the dominant method of pregnancy termination was cesarean. The current pattern of pregnant maternal mortality in Tehran is similar to developing countries.

**Keywords: Death – pregnant woman -Tehran-forensics medicine**

## **INTRODUCTION**

Maternal mortality ratio is considered as one of the key development indicators of each country. Accordingly, by 2015, 75% reduction in the mortality rate of pregnant mothers has been announced as the target.

(1) maternal death is referred to the death of mothers during pregnancy to 42 days after termination of pregnancy, irrespective the time and place and for any reason related to pregnancy, worsened during pregnancy or because of care provided, but not because of an accident. The number of death mothers to the total number of live births ratio at the same area for a same year (Maternal Mortality Ratio-MMR) is one of the instruments for measuring mothers' mortality. Our country health care system has been established based on primary health care and referral systems [2, 15].

Maternal mortality ratio in Iran has decreased in the last three decades. In the country the implementation of the maternal mortality care system was formally launched in order to identify avoidable factors contributing to maternal mortality and interventions to solve the problems from 1379. In this system, the care cycle begins with the death of the mother and

then the questioning team is collecting the death data. Maternal mortality committee is analyzing the avoidable causes, designing appropriate interventions and monitoring the performance based on studying the questionnaires [5]. The Forensic medicine as a trustee, which is in charge of burial permits for all hospital suspicious deaths can play a key role in providing comparative statistics and better determination of the causes of death and, therefore, in improvement of information providing for the country health planning. Accordingly, the present study aimed to determine the causes of death in women referred to Tehran forensic medicine dissection hall.

## **ANALYSIS METHOD**

This study was a cross-sectional study. By examining the files from Legal Medicine Organization of Tehran and the records of the Tehran province pregnant maternal mortality committee during 2011-2013, required information such as the age of the deceased, the year of death, gestational age, citizenship, the type of delivery, level of death on the basis of pregnancy levels,

direct, indirect and non-maternal died causes were coded and analyzed by *spss*.

## RESULTS

87 pregnant women who had died since the beginning of 1390 by the end of 1392 for various reasons were examined and autopsy for 3 years in the Tehran Legal Medicine dissection hall. The results are as follows,

### The amount and kinds of deaths:

Among those surveyed, for 78 people (89.6 percent of all deaths) the type of death was "pregnancy-related". In this group the death cause for 49 people (56.7 percent of all deaths) directly related to pregnancy and the changes resulting during pregnancy or its complications (direct maternal death) and for 29 people (33.3 percent of all deaths) related to the individuals underlying diseases or the worsening during pregnancy (indirect maternal death). In 8 people (9.2% of all deaths) the type of death was the "non-maternal death". In three cases (1.1%) the definitive cause of death was not found [Table 1, Figure 1].

Among the direct causes, the most cause of death was blood pressure disorders (19 cases), followed with frequency of bleeding (15 cases), embolism (7 cases), infection (4 cases) and aberrant abortion (2 cases), respectively [Diagram 2]

Among the indirect causes of death, the most common cause was cardiovascular disease (16 cases), followed with

gastrointestinal (5 cases), kidney (3 cases), infection (2 cases), nervous (2), and pulmonary (1 case) diseases, resulted in death [Diagram 3].

Among the non-maternal causes of death, the most common cause was malignancies (4 cases). Other causes, each with a frequency of 1 case were: poisoning, falls, uterine infection and unexplained internal illness, respectively [Diagram 4].

### Age distribution of died pregnant mothers:

In this study, the lowest age of died pregnant mothers was 16 and the maximum age was 41 (29.01 mean). The most number of died mothers (49.4 percent) was in the age limit from 20 to 29 and the lowest (2.3 percent) was in the age limit from 20 and younger.

### The nationality of died pregnant mothers:

67 of these deaths (77%) were Iranian and 16 (18.4%) were from Afghanistan. In 4 cases there was not any information about the nation.

### The pregnant mothers' place of death

49 cases of total deaths (56.3%) died in teaching hospitals, 22 (25.3%) in public hospitals and 12 (13.8%) in private hospitals. The death place of four deceased is unknown.

### Pregnancy ending method in died pregnant mothers

Among directly or indirectly deaths most common method of ending pregnancy is cesarean (56.3%) and among the non-maternal deaths most common method of

ending pregnancy is before labor (57.1%). In 4 cases there was no information on how the pregnancy ended.

Table 1: The amount and types of death

Group	Frequency	Percentage	Valid percentage	The cumulative percentage
Valid	49	56.3	57.0	57.0
Direct	29	33.3	33.7	90.7
Indirect	8	9.2	9.3	100.0
Non-maternal	86	98.9	100.0	
missing system	1	1.1		
Total	87	100.0		

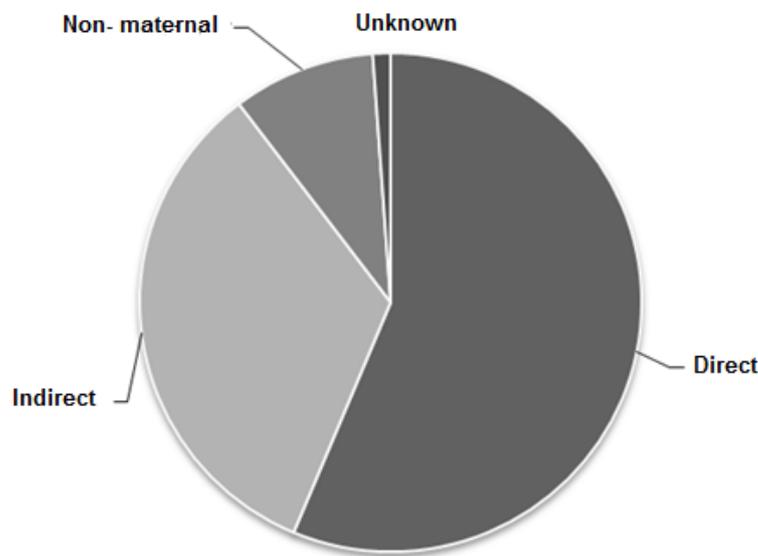


Diagram 1: Types of pregnant mothers' death

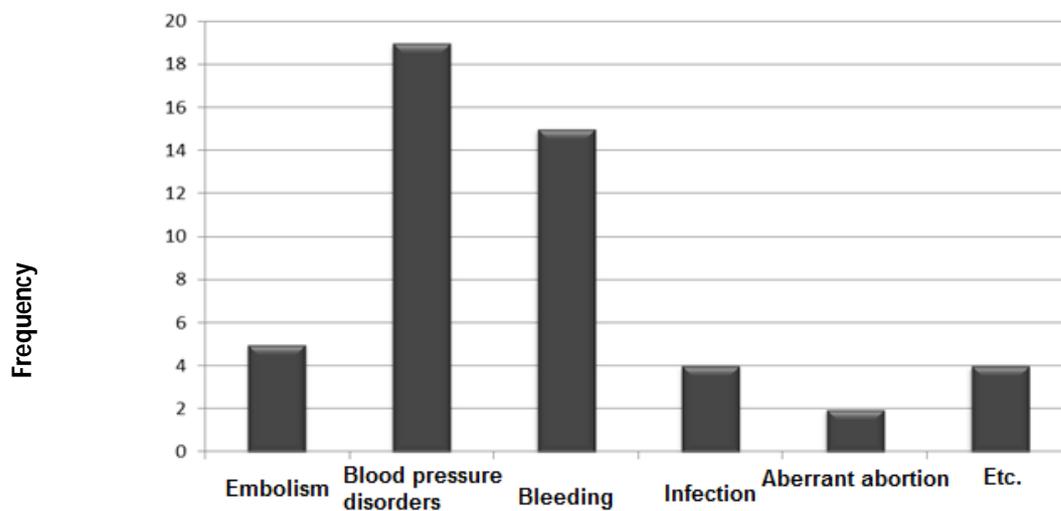


Diagram 2: The direct causes of pregnant mothers' death

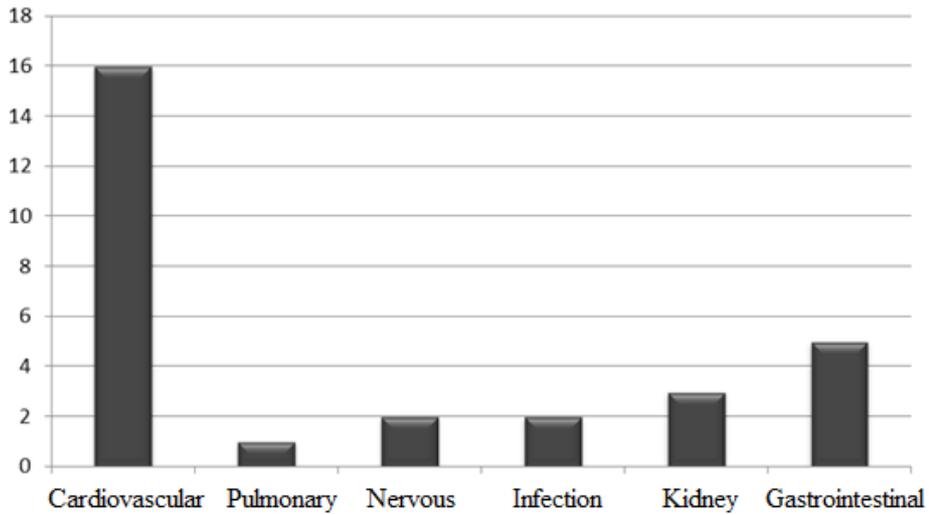


Diagram 3: The indirect causes of pregnant mothers' death

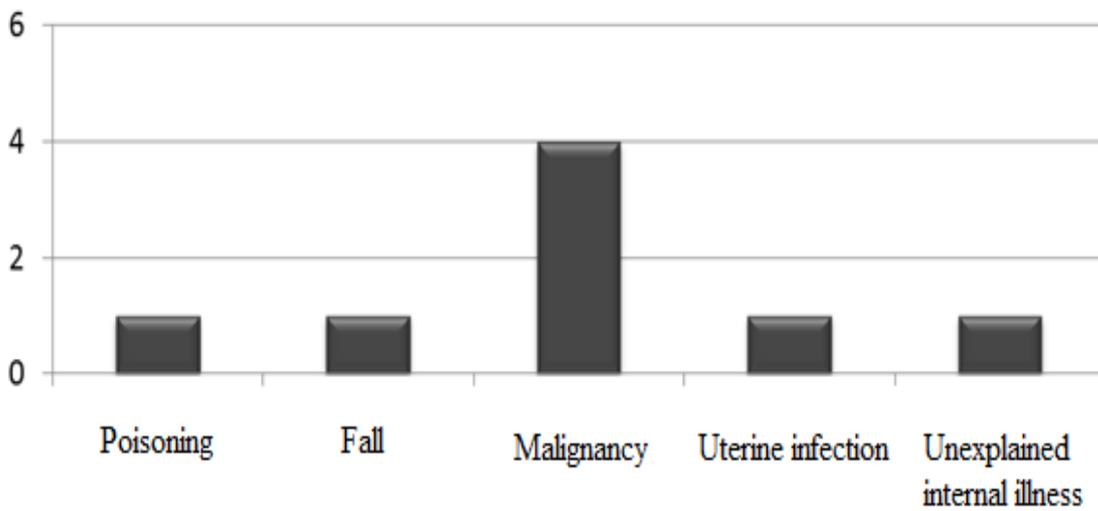


Diagram 4: The non-maternal causes of death

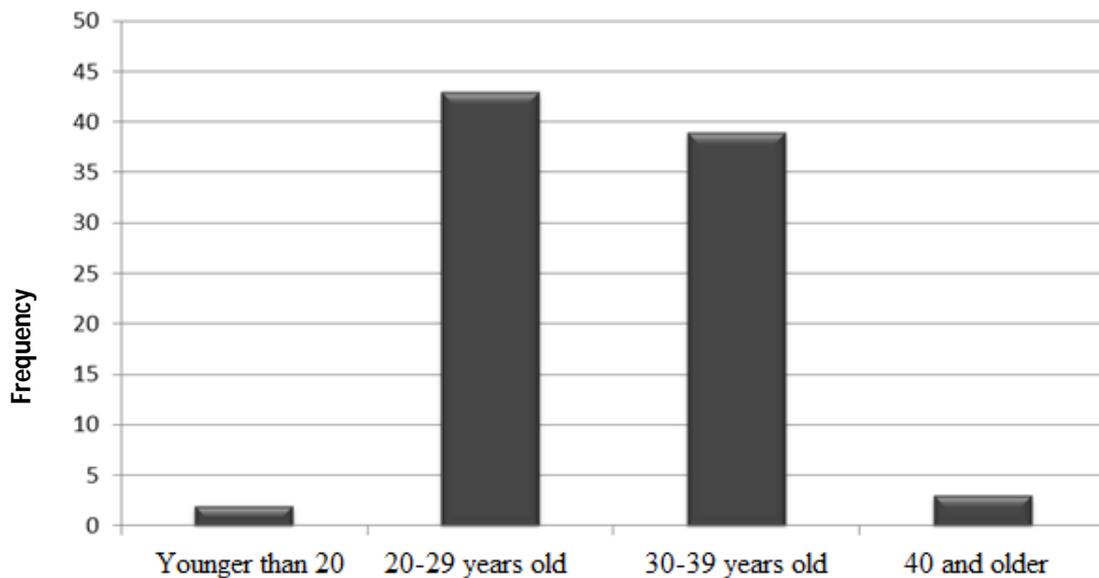


Diagram 5: Distribution of the ages

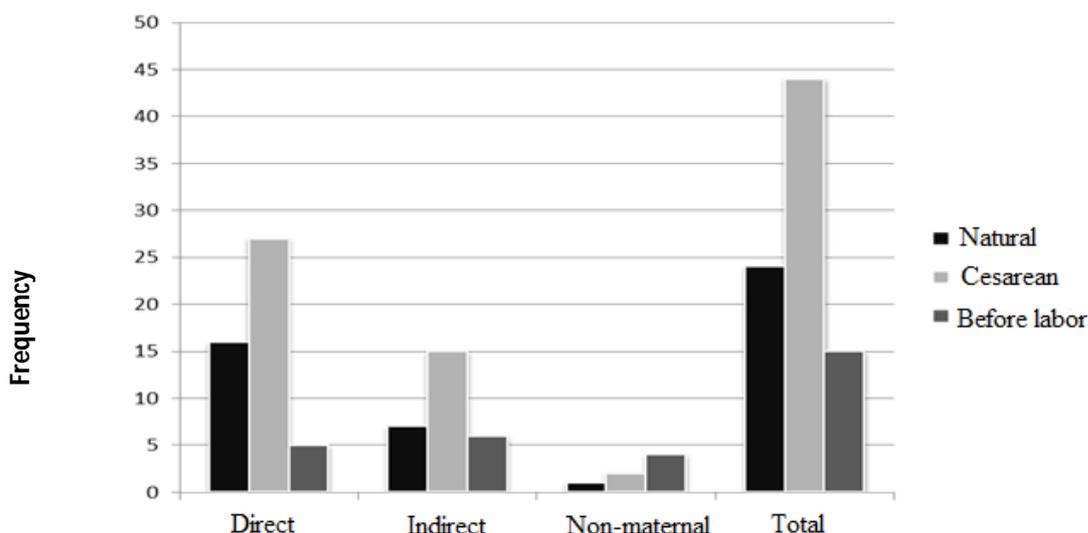


Diagram 6: Pregnancy ending method in died pregnant mothers

**The level of died pregnant mothers' death**

Among direct or indirect deaths the highest number has been related to the postpartum period. In 2 cases, there was no information on how the pregnancy ended. Pregnant mothers' death due to direct causes occurred in the postpartum period (53.1%), the time of delivery (36.7%) and during pregnancy (10.2%), respectively and due to indirect causes happened in the postpartum period (57.1%), during pregnancy (25.0%) and the time of delivery (17.9%), respectively.

**Died pregnant mothers' year of death**

The death rate of pregnant mothers has increased since 2011 to 2013. This pattern was completely increasing in the direct

causes and decreasing in the second year and increasing in the third year (additive in the whole three years) in indirect causes. In 2 cases the death level has not been known.

**Pregnancy history of died pregnant mothers**

Most of pregnancy history in mothers who have died of directly causes is two times (38.8%), and more than 2 times (32.7%), respectively, while most of pregnancy history in mothers who have died of indirectly causes is one time (27.6%) and more than 2 times (24.1%), respectively.

In total, the highest rate of death is related to mothers with a pregnancy history of more than 2 times (31.1%), 2 times (26.4%) and one time (19.5%), respectively.

Table 2: pregnancy history of died pregnant mothers

The cause of dead		Frequency	Percentage	Valid percentage	Cumulative percentage
Direct	Valid	1	7	16.7	16.7
		2	19	38.8	61.9
		>=3	16	32.7	100.0
		Total	42	85.7	100.0

	Missing	System	7	14.3		
	Total		49	100.0		
Indirect	Valid	1	8	27.6	42.1	42.1
		2	4	13.8	21.1	63.2
		3	7	24.1	36.8	100.0
		Total	19	65.5	100.0	
	Missing	System	10	34.5		
	Total		29	100.0		
Non- maternal	Valid	1	2	25.0	40.0	40.0
		>=3	3	37.5	60.0	100.0
		Total	5	62.5	100.0	
	Missing	System	3	37.5		
		Total		8	100.0	
Total	Valid	1	17	19.5	25.4	25.4
		2	23	26.4	34.3	59.7
		>=3	27	31.1	40.3	100.0
		Total	67	77.0	100.0	
	Missing	System	21	23.0		
	Total		87	100.0		

## DISCUSSION

The main aim of this study was to find the cause of pregnant mothers' dead in Tehran province and as secondary objectives, to find information such as age distribution, nationality, the pregnancy ending method, levels of death, time and place of death.

The findings of this study showed that in most cases the death was due to pregnancy-related causes. Among all the deaths, the highest rate of death was due to direct following with indirect and non-maternal causes. This result is consistent with the results from many of reviewed studies [3,6,8,4,9,11,12,13,14,15,16,19], but the impact of non-maternal causes, contrary to the findings of Mardani et al [7], performed in Isfahan province is less than indirect maternal causes.

Among the direct causes the the highest rate is allocated to impaired blood pressure and bleeding, respectively and in this sense is similar to performed studies in Nigeria

[19 and 20], Morocco [9], China prior to the intervention programs of government [17], West Azerbaijan [4], Khorasan [8], Sistan and Baluchestan [6], Ilam [3] and Isfahan [7]. The results of this study does not approve findings from Moazzeni [18] on changing the pregnant mothers' death causes from developing countries- related causes (bleeding after childbirth, infections) to the developed countries-related causes (pulmonary embolism, stroke) and pregnant mothers' dead in Tehran province is still following the model for developing countries such as Morocco and Nigeria.

Among the indirect causes, the most common cause is cardiovascular disease, conducted to Engin-Ustun research in Turkey [14], a study performed in Morocco [9], findings of Mardani et al [7] and Abdullahi Pour et al [3]. The majority rate of non-maternal death is due to malignancy.

In Tehran in terms of age distribution, more deaths are related to the third decade of life and happened in the young and active age group that in this respect is similar to the results obtained in Nigeria [20] [19] and Isfahan [7] and against the results obtained in Brazil [16] that most involved people over forty years old.

About 77% of deaths were Iranians and the rest were from Afghanistan, which is unexpected according to the distribution of population.

In the majority of deaths due to pregnancy-related deaths (direct and indirect) the method of ending pregnancy was caesarean, which was similar to the findings conducted in Brazil [16], Khorasan [8] Isfahan [7] and Sistan and Baluchestan [6].

Similar to the studies carried out in Sistan and Baluchestan [6], Isfahan [7] and Ilam [3] most died pregnant mothers experienced 2 and more than 2 times pregnancy, which is against the results from studies conducted in Niger [15].

The mortality rate of pregnant mothers has been rising since 2011 to 2013, while a decline was observed according to studies in Saudi Arabia [10 and 22] and the reports of *WHO* [25] from Iran during 1990 to 2013.

The highest rate of mortality due to direct or indirect causes is related to the

postpartum period, which is similar to the results of studies carried out in Sistan and Baluchestan [6], Ilam [3] and Niger [15]. By looking at the causes of mothers' death and the increasing trend of maternal mortality rate relative to time, we have been able to become close to the developed countries pattern in this regards, which would mention the necessity for revision of programs and solve the existing problems in this regard.

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