

# Evaluation of maternal mortality ratio and causes in a university hospital in eastern Turkey

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## Summary

**Aim:** To investigate the maternal mortality ratio (MMR) and causes of maternal death in order to decrease these deaths. **Materials and Methods:** The number of live births, maternal deaths, and the causes of deaths in Yuzuncu Yil University were recorded between 2004 and 2013. **Results:** The MMR was 268 per 100,000. Forty-nine maternal deaths were examined in terms of cause. The most frequent cause of death is eclampsia (33%) and associated intracerebral complications. The antenatal follow-up rate was 23.3%. The majority of patients had low income (92.3%), 72.2% were from rural areas, and 95.5% were illiterate. **Conclusion:** The high MMR may arise from the high incidence of pregnancy complications in eastern Turkey, the rareness of antenatal follow-ups, and the present hospital being a referral hospital. The most frequent cause of maternal mortality is eclampsia and associated complications, followed by bleeding.

**Key words:** Maternal mortality ratio; Causes of maternal death; Maternal health.

## Introduction

Maternal mortality is defined as deaths due to a disease or its treatment during pregnancy or within 42 days of the birth without depending on the period and localization of the pregnancy. In this definition, accidental deaths or deaths due to crashes are not included [1]. Every day approximately 800 women die due to preventable causes related to pregnancy and birth. Almost all (99%) maternal deaths occur in developing countries. The maternal mortality ratio (MMR) is 240 per 100,000 live births, while it is 16 per 100,000 in developed countries. Major complications are responsible for 80% of maternal mortality worldwide. Leading causes of maternal mortality are severe bleeding, infections, high pressure in pregnancy (preeclampsia and eclampsia), and unsafe abortions [2].

In this study, the authors aimed to calculate their MMR and create strategies to decrease maternal deaths by examining the causes.

## Materials and Methods

The archive of Yuzuncu Yil University, Faculty of Medicine, Department of Obstetrics and Gynecology was investigated retrospectively. Information about live births and maternal deaths between years 2004 and 2013 was collected. The number of live births, maternal deaths, and the causes of deaths were recorded according to year. The MMR was calculated as maternal deaths per 100,000 live births. In addition, cases were evaluated with re-

gards to age, gravida, parity, educational status, antenatal follow up, status of pregnancy at the time of death, socio-economic status, and literacy.

## Results

In the present clinic, during the ten-year period, 18,263 live births and 49 maternal deaths were recorded. The present MMR was 268 per 100,000. Of the 49 deaths, mean age was  $32.37 \pm 6.5$  years, and mean gravidity and parity were  $4.09 \pm 2.2$  and  $3.31 \pm 1.9$ , respectively. Mean gestational age at the time of death was  $33.34 \pm 5.3$  weeks. Of the mothers who died, 95.5% were not literate, 92.3% were of low socio-economic status, and 72.2% were living in a rural area. The rate of antenatal care was only 23.3%. The distribution of maternal deaths according to year is shown in Figure 1.

When the causes of death were evaluated, the main causes in 41% of cases were eclampsia and HELLP syndrome, in 39% were bleeding (uterine rupture, placental abruption, uterine atony, placenta percreta), in 12% were cardiac arrest, in 6% were amniotic fluid embolism, and in 2% cases were cerebral venous sinus thrombosis (Figure 2).

## Discussion

MMR is an important indicator for evaluating the health-care system and policy of a country. Although maternal mortality is low in developed countries, it is still an impor-

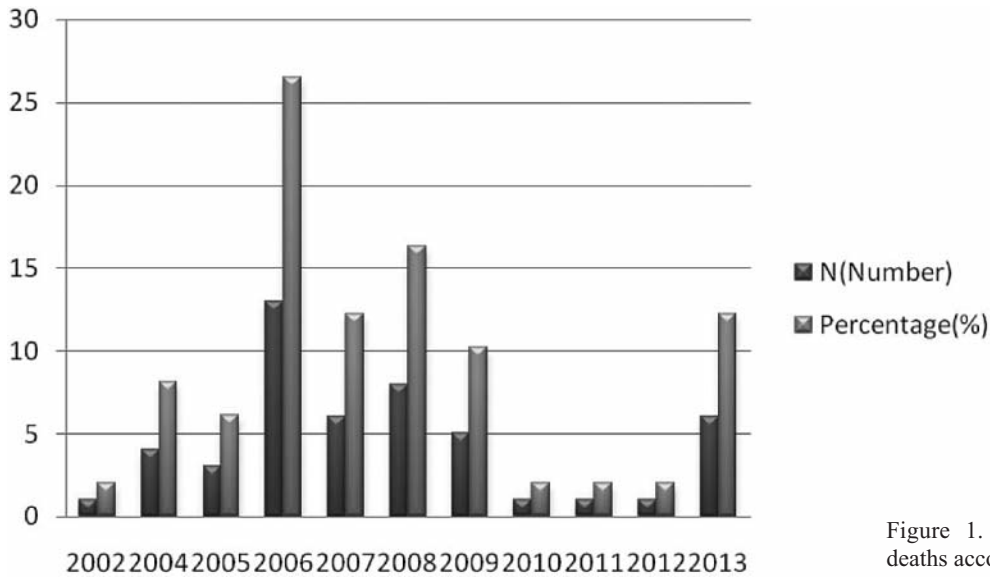


Figure 1. — Distribution of maternal deaths according to year.

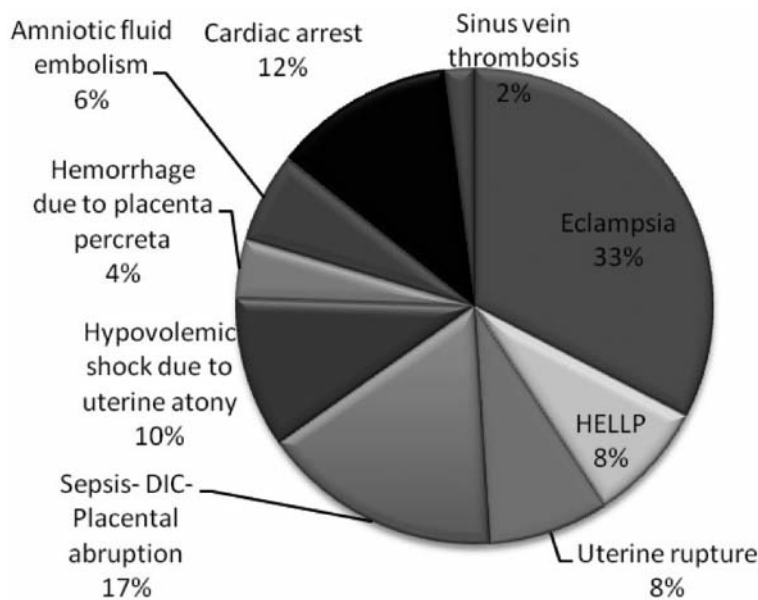


Figure 2. — Causes of maternal deaths.

tant health problem in developing countries. According to the data of the World Health Organization (WHO), the United Nations Children Fund (UNICEF), the United Nations Population Fund (UNFPA), and the World Bank, the global MMR is 170-300 per 100,000 live births. Around 99% of global maternal deaths occur in developing countries, mostly in sub-Saharan Africa and South Asia. While Sub-Saharan Africa has the highest MMR (500/100,000), East Asia has the lowest (37/100,000) [3]. The MMR was reported as 412 in Tanzania, 79 in Egypt, and 8.4 in France per 100,000 live births [4-6].

In the analysis by the WHO regarding the causes of maternal deaths, it is reported that bleeding is the main cause

in Africa and Asia, whereas in Latin America and the Caribbean, the most frequent cause of death is hypertensive disease. Abortions are mostly seen in Latin America and the Caribbean, while deaths related to sepsis are more common in Africa [7]. Worldwide, the major causes of maternal mortality reported are severe bleeding (25%), infections (13%), unsafe abortion (13%), eclampsia (12%), obstructed labor (8%), other reasons (8%), and indirect reasons (20%) (malaria, anemia, AIDS, cardiovascular diseases) [8].

In Turkey, the MMR was calculated as 208 per 100,000 live births in 1974-1975 [9, 10]. The Ministry of Health began to register maternal mortalities by creating the Ma-

ternal Mortality Monitoring System in 2007. The MMR in this country was reported as 29 per 100,000 according to the National Maternal Mortality Study published in 2009 [11]. The estimation of MMR by the WHO, UNICEF, UNFPA, and the World Bank for Turkey in 2010 was 20 per 100,000, whereas the Ministry of Health reported this rate as 15.5 per 100,000 in 2011 [3, 12].

Between January 1997 and December 2000, the present clinic's MMR was calculated as 960 per 100,000. When causes of maternal death were examined, it was seen that preeclampsia, severe preeclampsia, and HELLP syndrome ranked first and placental abruption ranked second [13]. In the other study from the present city, between January 1995 and December 2004, MMR was reported as 143.42 per 100,000 live births. Severe bleeding was the most common cause, with 32.28%, followed by pregnancy-induced hypertensive diseases, with 29.92% [14].

In the present study covering a ten-year period, when compared to these two studies in this region, the maternal mortality ratio was calculated as 268 per 100,000 live births. When compared to the first study, the MMR in the present clinic appears lower. However, it is still above the average rate for Turkey. The reason for this may be the excessive fertility rate in the east of Turkey, the lack of observations in antenatal care, and the fact that the present hospital is a tertiary referral hospital. Women with pregnancy and birth complications having high maternal mortality and morbidity like uterine rupture, severe preeclampsia, eclampsia, HELLP syndrome, and uterine atony are mostly referred to the present hospital, and this may explain the present high MMR. The average age of the mothers that died was 32.4 years, were mostly illiterate and came from rural areas, and the rate of antenatal care was low. From the same region but another city, Yalınkaya *et al.* found an MMR of 1,100 per 100,000 in Dicle University and they reported that the most frequent cause of maternal mortality was postoperative and postpartum bleeding [15].

In a study from the west of Turkey, Aksu *et al.* reported an MMR of 80 per 100,000 live births. This rate was low compared to the present. The most common cause of maternal death, as in the present study, was pregnancy-induced hypertension [16]. Dolanbay *et al.* reported MMR as 36.1 per 100,000 live births in Kayseri. They also reported that the most common cause of maternal death was hypertensive diseases, followed by obstetric hemorrhage [17].

In conclusion, maternal mortality is an important measurement associated with the general development and healthcare level of a country. The most frequent cause of maternal mortality in the present region is eclampsia and complications related to it, followed by obstetric hemorrhage. In addition, the lack of antenatal care is also remarkable. In order to reduce maternal mortality, antenatal care should be increased by creating awareness in society and new regulations for urgent cases such as preeclampsia/eclampsia and obstetric hemorrhage should be set up.

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