

# Abortion in the Structure of Causes of Maternal Mortality

## *Aborto na estrutura das causas da mortalidade materna*

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### Abstract

**Objective** To study the structure of maternal mortality caused by abortion in the Tula region.

**Methods** The medical records of deceased pregnant women, childbirth, and postpartum from January 01, 2001, to December 31, 2015, were analyzed.

**Results** Overall, 204,095 abortion cases were recorded in the Tula region for over 15 years. The frequency of abortion was reduced 4-fold, with 18,200 in 2001 to 4,538 in 2015. The rate of abortions per 1,000 women (age 15–44 years) for 15 years decreased by 40.5%, that is, from 46.53 (2001) to 18.84 (2015), and that of abortions per 100 live births and stillbirths was 29.5%, that is, from 161.7 (2001) to 41.5 (2015). Five women died from abortion complications that began outside of the hospital, which accounted for 0.01% of the total number. In the structure of causes of maternal mortality for 15 years, abortion represented 14.3% of the cases. Lethality mainly occurred in the period from 2001 to 2005 (4 cases). Among the maternal deaths, many women died in rural areas after pregnancy termination at 18 to 20 weeks of gestation ( $n = 4$ ). In addition, three women died from sepsis and two from bleeding.

**Conclusion** The introduction of modern, effective technologies of family planning has reduced maternal mortality due to abortion.

### Keywords

- ▶ abortion
- ▶ pregnancy
- ▶ maternal mortality
- ▶ family planning
- ▶ sepsis

### Resumo

**Objetivos** Estudar a estrutura da mortalidade materna causada pelo aborto na região de Tula.

**Métodos** Os registros médicos de mulheres grávidas falecidas, de parto e de pós-parto, de 01 de janeiro de 2001 a 31 de dezembro de 2015, foram analisados.

**Resultados** No geral, 204.095 casos de aborto foram registrados na região de Tula, em um período de 15 anos. A frequência de aborto foi reduzida a 1/4, passando de 18.200 abortos em 2001 para 4.538 em 2015. A taxa de abortos a cada 1.000 mulheres (com idades entre 15 e 44 anos) diminuiu 40,5% em 15 anos, isto é, de 46,53 (2001) para 18,84 (2015), e a taxa de abortos a cada 100 nascidos vivos e natimortos foi de 29,5%, isto é, de 161,7 (2001) para 41,5 (2015). Cinco mulheres morreram de complicações do aborto que começaram fora do hospital, o que representou 0,01% do número total. No quadro geral de causas de mortalidade materna neste período de

### Palavras-chave

- ▶ aborto
- ▶ gravidez
- ▶ mortalidade materna
- ▶ planejamento familiar
- ▶ sepsis

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15 anos, o aborto representou 14,3% dos casos. A letalidade ocorreu, principalmente, no período de 2001 a 2005 (4 casos). Entre as mortes maternas, muitas mulheres morreram em áreas rurais após a interrupção da gravidez, com 18 a 20 semanas de gestação ( $n= 4$ ). Além disso, três mulheres morreram por sepse, e duas, por sangramento.

**Conclusão** Com a introdução de tecnologias de planejamento familiar modernas e eficazes, a mortalidade materna devido ao aborto vem sendo reduzida.

## Introduction

The Millennium Development Goal 5 calls for a 75% reduction in the maternal mortality ratio (MMR) between 1990 and 2015. Maternal mortality is one of the most important indicators of women's health and the quality of care at national and international levels.<sup>1,2</sup> A decrease in maternal mortality can only happen based on the evaluation of each case at the regional level, which will serve as the basis for developing priority actions that reduce the rate throughout the country.<sup>3</sup> Since 2012, in Russia, birth is recognized as a term for a pregnancy of 22 weeks or more, in which the child's weight at birth is  $\geq 500$  g (or less than 500 g, in case of multiple births), and the body length of the newborn is  $\geq 25$  cm (in case the newborn's weight is unknown). The abortion issue always stands out for its socio-political significance, because it is closely connected with the socio-economic situation of the country, the state's attitude toward women's reproductive health, and basic demographics.<sup>4</sup>

Legislative initiatives at the federal and regional levels aimed at reducing the availability of abortion were introduced in Russia with enviable regularity.<sup>4</sup>

This study aimed to analyze and study the structure of maternal mortality due to abortion in the Tula region.

## Methods

Maternal death is defined as the death of a woman while pregnant or within 42 days of pregnancy termination, irrespective of the duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.<sup>1</sup>

This study analyzed the dynamics and structure of causes of maternal mortality in the Tula region within a period of 15 years, according to government statistics. The data were obtained from official statistics and published national studies. This study retrospectively analyzed anonymized copies of primary medical records, autopsy protocols, forensic

examination, and statistical data. Overall, the data were analyzed in 5-year periods: 2001 to 2005, 2006 to 2010, and 2010 to 2015. The present study was approved by the institutional review board and the need to obtain an informed consent from the patients was waived.

We searched for the abortion incidence data in the region of Tula from 2000 to 2015. The data were obtained from official statistics and published or unpublished regional and national studies.

All statistical analyses were performed using the software package Statistical version 6.0 (StatSoft, Tulsa, OK, USA). The results were considered statistically significant when  $p < 0.05$ .

The study was performed according to the plan of the Tula State University: Project No. 115102710029/ 49–16

## Results

In 15 years of the 21st century (2001–2015), in the Tula region, 35 women died for reasons connected with pregnancy, childbirth, and puerperium (42 days after delivery).<sup>5</sup> During the same period, the region had 287,387 living children. When calculating per 100,000 live births, the maternal mortality rate accounted for an average of 12.2%. In the period from 2001 to 2005, the maternal mortality rate was 25.5%; from 2006 to 2010 it was 17.4%; from 2011 to 2015 it was 9.26% per 100,000 live births. Official statistics show that the absolute numbers of live births have a positive trend, particularly in the last 5 years, and the maternal mortality rate decreased by 52.25%.<sup>5</sup>

For 15 years in the Tula region, medical statistics revealed 204,095 abortion cases (► **Table 1**).

The table shows that in 15 years, the abortion rate per 1,000 women of fertile age decreased by 40.5%, and the rate of abortions per 100 live births and stillbirths by 29.5%.

Note that deaths due to medical legal (artificial) abortion and abortion on medical and social grounds during the study period were not registered. Regarding maternal deaths due

**Table 1** Dynamics of abortion in the Tula region (2001–2015)

	Study time periods (year)		
	2001–2005	2005–2010	2010–2015
Total cases of abortion	93,298	67,457	43,340
Estimated abortion rates per 1,000 women aged 15–44 years	43.94	41.27	29.13
Abortion rate per 100 live births and stillbirths	141.3	97.6	57.3

to complication of abortions that began outside the hospital, five deaths were registered, which accounted for 0.01%. In general, in the structure of maternal mortality causes in these 15 years, abortion accounted for 14.3%.

A significant difference in maternal mortality from abortion was noted over the 5-year periods. During the period from 2001 to 2005, there were 4 cases of maternal deaths (25%), with 6.4% per 100,000 live births; during the period from 2006 to 2010, 1 case was recorded corresponding to 8.3%, with an index equal to 1.45. During 2011–2015, no cases of maternal mortality from abortion were registered.

A detailed analysis of each case found that four of the five women were from rural areas. The average age was 36.6 years (range, 22–41 years). All five women were admitted to the hospital with incipient abortion, of which two were instructed on out-of-hospital intervention. The greatest number of deaths were registered after pregnancy termination at 18 to 20 weeks ( $n = 4$ ), with one case at 10 to 11 weeks.

The direct causes of the deaths of women due to unsafe abortion in three cases were sepsis, multiple organ failure, hemorrhage (two cases), hemorrhagic shock, disseminated intravascular coagulation, and multiple organ failure. All the analyzed observations had underestimated the severity of the patients' condition upon admission to the hospital in terms of bad survey, late diagnosis of sepsis, multiple curettage of the uterus, delay in operational use, and blood transfusion.

## Discussion

According to the Ministry of Health, Russia has experienced a steady decline in the absolute number of abortions in 2000 to 2014, going from 1,961,539 in 2000 to 814,162 in 2014 (58.4%). The number of abortions per 100 live births has decreased by 26.8% from 2000 to 2014. In 2014, in the Far Eastern Federal District in Russia, there was a decrease in the number of abortions at 8,675 (absolute number) or 15.5% compared with that in 2013.<sup>6</sup> Therefore, the rate of abortion in the Tula region correlated with the index in Russia and reflects the overall downward trend. Similar dynamics of the frequency of abortions is observed in the countries of the former USSR.<sup>7,8</sup> When comparing the estimated abortion rates per 1,000 women aged 15 to 44 years with European countries during 2010 to 2015, it was established that the figure is lower than that in Eastern Europe at 42% (90% uncertainty interval [UI] 38–51) and Southern Europe at 26% (90% UI 18–57) and higher than that in Northern Europe at 18% (90% UI 17–20) and Western Europe, also at 18% (90% UI 14–31) during the period from 2010 to 2014.<sup>9</sup> The decline in the number of abortions in Russia is confirmed by official statistics and results of sample surveys of women. A particularly rapid decline in abortions is typical in young women; Russia lost the said leadership on the level of teenage pregnancies, and the abortion rate among adolescents in Russia is lower than that of many Western countries. The decomposition of fertility according to the Bongaarts model shows that the role of contraception in the structural meth-

ods of family birth control in Russia at present is far superior to the role of induced abortions. The effectiveness of family planning in the country increased.<sup>10</sup>

Despite the decline in abortion rates, their level remains high and is accompanied by adverse changes in their structure, in which the share of spontaneous abortions increased. The proportion of spontaneous abortion was of 12.3% in 2015. The increase in the prevalence of spontaneous abortions shows a decrease in the level of reproductive health of modern Russian women.<sup>11</sup>

In addition, a positive trend is observed on reducing the number of abortions per 1,000 women aged 15–44 years worldwide, that is, 40 in 1990–1994 and 35 in 2010 to 2014. However, due to population growth, the annual number of abortions in the world increased by 5.9 million from 50.4 million in 1990 to 1994 to 56.3 million in 2010 to 2014. In developed countries, the abortion rate decreased by 19 points from 46 to 27. In developing countries, the same slight decrease is noted at 39 to 37 points. Approximately 25% of pregnancies ended in abortion in 2010 to 2014.<sup>9</sup> In France, around 220,000 abortions annually were observed at a steady rate for many decades (prior to 14 weeks of gestation).<sup>12</sup> In Russia, no statistical data were found of abortion with respect to the marital status of women. In the period from 2010 to 2014, 73% of abortions were performed by married women compared with the 27% of unmarried women worldwide.<sup>9</sup>

At the same time, in Russia, an extremely unfavorable growth was observed in 2014 for the maternal deaths from abortions initiated outside the hospital and undetermined cases of abortion (8 cases in 2013 to 11 in 2014; with 0.42 to 0.57 per 100,000 live births, respectively, that is, 35.7%).

The Tula region, as well as all of Russia, has a positive dynamic of reducing maternal mortality due to abortion. In St. Petersburg, there is clearly a strong positive dynamic of reduction of mortality due to abortion, that is, 19.6 per 100,000 in 1988 to 1990, and 2.6 per 100,000 live births in 2006 to 2009.<sup>13</sup>

Mainly in the Tula region, women died from abortion in 2000 to 2005, which roughly coincides with data from other regions in Russia. Hence, for 10 years (1998–2007) in the Kemerovo region, 27 of 145 patients died from sepsis that developed after an abortion.<sup>14</sup> During these years, the maternal death rate from abortions alone took first place in the Khabarovsk region, at 9.3 points in the overall structure, which significantly exceeded the figure for the Russian Federation in 2010 (1.8 per 100,000 live births).<sup>15</sup>

The general trend is that the majority of deaths occurs after abortion at 18–20 weeks of gestation.<sup>14</sup>

Most women who died due to abortion (4 out of 5) lived in rural areas, indicating a lack of aid to rural areas that has been emphasized by many Russian authors.<sup>4,14</sup>

The direct causes of maternal deaths, as a rule, were sepsis and multiple organ failure. The primary role of sepsis as the immediate cause of maternal mortality due to abortion is noted in several other studies, both in the whole territory of Russia or in individual regions.<sup>14–17</sup> The second cause of death was bleeding, which results from the typical underestimation

of the severity of the condition, repeated curettage of the uterine cavity, and later surgery.

One of the target indicators of the state program of healthcare development of the Russian Federation (adopted by the decree of the RF Government No. 2511-p on December 24, 2012) is the proportion of women who decided to carry on with the pregnancy, and the number of women applying for abortion in medical facilities.<sup>10</sup>

Measures to reduce abortion in our country have shifted instead of introducing effective methods of contraception among adolescents and students,<sup>18</sup> it is recommended that abortion be rejected in favor of birth if an unwanted pregnancy occurs.

## Conclusion

With the introduction of modern, effective technologies of family planning, abortion lost its role in the structure of maternal mortality in the region of Tula.

### Conflicts of Interest

The authors have no conflicts of interest to declare.

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