








ORIGINAL ARTICLE

Spontaneous abortions and missed miscarriage in a public hospital: maternal and sociodemographic profile*

HIGHLIGHTS

1. Higher education was associated with missed miscarriage.
2. Abortion was prevalent in low schooling.
3. Adolescents and ≥ 35 years old: most vulnerable to missed miscarriage.
4. Prevalence of abortions until the 12th week of gestation.

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ABSTRACT

Objective: Analyze the influence of socio-demographic and maternal factors on the occurrence of spontaneous and missed miscarriage. **Method:** A descriptive epidemiological study that analyzed socio-demographic, obstetric, and nursing variables for the period 2019-2024, collected in electronic records of a hospital in the northwest of Paraná, and analyzed using the Pearson chi-square test. **Results:** Of the 436 cases, predominance was identified until the 12th week of pregnancy (82.2% of missed miscarriage and 67.7% of spontaneous abortions). Abortions were significantly more prevalent in women with up to eight years of study and those with higher educational levels. Adolescents and women aged 35 or older were more vulnerable to missed miscarriage, while those aged 16 to 34 were more vulnerable to spontaneous abortion. **Conclusion:** Maternal age and schooling influence the types of abortion, evidencing sociodemographic inequalities that permeate the reproductive process. Public policies that broaden access and qualify reproductive care in the Single Health System are necessary.

DESCRIPTORS: Women; Maternal Age; Abortion, Spontaneous; Abortion, Missed; Socioeconomic Factors.

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INTRODUCTION

Spontaneous miscarriage and missed miscarriage are gestational complications with distinct characteristics, differentiation of which is essential for proper clinical management¹⁻². Abortion occurs without intentional intervention to interrupt pregnancy and is usually preceded by signs such as bleeding and cramps³⁻⁴. The missed miscarriage, in turn, is characterized by fetal death without the expulsion of gestational material, being often diagnosed by ultrasound and, in general, without obvious clinical signs⁴.

Both types represent potentially life-threatening conditions in the pregnancy-puerperal cycle, in addition to having a significant impact on the physical and emotional health of the woman⁵. Its etiology is multifactorial, covering genetic causes, maternal age, infections, uterine abnormalities, and/or hormonal disorders, as well as sociodemographic factors, such as age⁶, schooling,^{2,7} and color/race⁸, which interact with broader social determinants⁷. These elements reinforce the importance of timely recognition of risk factors to support early diagnosis and adoption of appropriate clinical interventions.

Abortion is the fourth leading cause of maternal death in Brazil, unlike in developed countries, where abortion death rates are low.⁴ It is estimated that 10 to 15% of pregnancies in Brazil result in spontaneous miscarriage⁴, but there are no data on the missed miscarriage. However, in other contexts, such as Iraq, they account for between 10 and 20% of pregnancies¹.

The frequency of these events, associated with serious maternal complications and inequalities in access to health services, and also psychosocial impacts such as mental suffering⁹ and mourning processes¹⁰, increases the complexity of care. These aspects highlight the relevance of abortions as a public health problem, and the need for preventive and qualifying care strategies such as multidisciplinary action and strengthening obstetric care¹¹.

In this scenario, the differentiation between the two main types of abortions and the identification of specific characteristics related to each of them are fundamental to improve surveillance, guide clinical management, and qualify health policies and practices. In view of this, the present study aimed to analyze the influence of socio-demographic and maternal factors in the occurrence of spontaneous and retreated abortions.

METHOD

A descriptive epidemiological study was conducted in a school hospital located in the northwestern region of the state of Paraná, Brazil. The institution carries out care exclusively by the Unified Health System (SUS), has 123 beds and records, on average, 12 thousand hospitalizations per year, and, in the obstetric area, in 2024, it carried out 1200 births. The recommendations of *Strengthening the Reporting of Observational Studies in Epidemiology* (STROBE) were used in the preparation of this study report.

Although the literature describes several clinical classifications of abortion, such as inevitable, incomplete, complete, infected, usual, or recurrent⁴, the present study included only cases registered as spontaneous miscarriage or missed miscarriage. This delimitation stems from both the epidemiological relevance and the greater consistency and comparability of the data available in the analyzed scenario, which enable a more robust quantitative approach.

The data was collected between March and November 2024, using electronic records of women who were attended between 2019 and 2024. The inclusion criteria were: diagnosis of abortion identified by codes O03 and O021 – spontaneous abortion and missed miscarriage, respectively, of the International Classification of Diseases-CID 10. Cases of isolated vaginal bleeding were not included, and the records for which the absence of records did not allow the identification of characteristics of the women or the abortion were excluded. Of the total 234 registers of spontaneous abortions and 240 missed miscarriage cases, 88 and 97 cases were excluded, respectively, due to incompleteness prejudicing the analysis and characterization of the information.

The variables of interest were: age group, in years (≤ 15 ; 16-34; ≥ 35); education (≤ 8 years and > 8 years); civil status (with and without companion); self-declared race/color of skin (white; not white); number of births (primary; multiple); history of prior abortion (yes; no); gestational age (≤ 12 weeks and 6 days; ≥ 13 weeks); municipality of residence (up to 100 thousand inhabitants; more than 100 thousand inhabitants); year of admission (2019, 2020, 2021, 2022, 2023, 2024); referred pain (yes; no); and referral of other service (yes; no).

The data were collected by consulting the study hospital's computerized system, which was registered in a spreadsheet developed by the researchers and made available electronically. Before starting the collection, a pilot test was conducted using records from 13 previous years that were not included in the survey, as the form needed to be reformulated.

Two properly trained researchers were responsible for collecting the information: a nursing student and a nurse, a teacher who was also responsible for the spreadsheet-filling conference. To ensure the accuracy and integrity of the data, a 10% draw process was adopted for review and verification, carried out by two researchers, who identified and corrected possible errors or inconsistencies, reinforcing the reliability of the information.

In the analysis, to evaluate the relationship between the types of abortion (dependent variable) and the sociodemographic and reproductive variables (independent variables), the *Pearson* chi-square test or, in cases where the expected frequency in at least 20% of the cells was less than 5, the exact *Fisher* test was applied. In addition, the adjusted standardized residues in the contingency tables were interpreted to determine whether the observed frequencies in the categories were significantly higher or lower than expected.

Standardized waste with absolute values greater than 1.96 was considered indicative of significant contributions to the global association, allowing us to identify which specific categories contributed positively or negatively to the results. Cases with missing values or incomplete information were excluded from the bivariate analysis. All analyses were conducted using a 5% significance level ($p < 0.05$). The software used was IBM SPSS *Statistics* 30®.

The matrix study was authorized by the Commission for the Regulation of the Academic Activities of the Study Hospital and approved by the Ethics Committee in Human Research (CEP) of the signatory institution (Opinion No. 6.656.413) on 19 February 2024.

RESULTS

Considering the 436 records analyzed, it was found that the two types of abortion in the study were more frequent in white women, multiple couples, and occurred up to 12 weeks and six days of gestation. Spontaneous abortion predominated among those with the lowest level of education and the age group of 16 to 34 years. Missed miscarriage were more frequent among women with an educational level of more than eight years of study, with a relatively high incidence among adolescents and women of more advanced age groups (Table 1).

It is observed that schooling and age group presented a statistically significant association with the type of abortion, being the most frequent spontaneous abortion among women with up to eight years of study and in the age group of 16 to 34 years, while retreatment abortion predominated among those with more than eight years of schooling and among adolescents or women 35 years or older. The other independent variables analyzed did not present a statistically significant association with the outcome (Table 1).

Table 1. Association between sociodemographic and clinical-epidemiological variables and type of abortion. Maringá, PR, Brazil, 2019 to 2024

Variable	Type of abortion		p-value
	Spontaneous n (%)	Retreat n (%)	
Declared race/color			
White	146 (65.5)	143 (67.1)	1.000*
Not white	76 (34.1)	70 (32.9)	
Ignored	1 (0.4)	0	
Schooling			
Up to 8 years	118 (52.9) ⁺	87 (40.9) ⁻	<0.001*
More than 8 years	58 (26) ⁻	93 (43.6) ⁺	
Ignored	47 (21.1)	33 (15.5)	
Civil State			
With companion	82 (36.8)	79 (37.1)	0.840*
Without companion	102 (45.7)	92 (43.2)	
Ignored	39 (17.5)	42 (19.7)	
Age group (in years)			
≤ 15 and ≥ 35	29 (13.1) ⁻	93 (43.6) ⁺	<0.001*
≥ 16 and ≤ 34	194 (86.9) ⁺	120 (56.4) ⁻	
Residence municipality			
Up to 100.000 inhabitants	96 (43.1)	105 (49.3)	0.723*
Over 100.000 inhabitants	127 (56.9)	108 (50.7)	
Number of births			
Primipara	55 (24.6)	53 (24.9)	0.891*
Multipara	168 (75.4)	160 (75.1)	
Previous abortion			
No	152 (68.2)	140 (65.7)	0.663*
Yes	71 (31.8)	73 (34.3)	
Gestational age			
Up to 12 weeks and 6 days	151 (67.7)	175 (82.2)	0.138*
Over 13 weeks	29 (13)	22 (10.3)	
Ignored	43 (19.3)	16 (7.5)	

Legend: ⁺positive association; ⁻negative association; *chi-square independence test.

Source: The authors (2025).

In the year 2023, the number of missed miscarriage was more than double the previous year. Spontaneous abortions also showed growth, though more discreet, from 36 (16.1%) in 2022 to 47 (21.1%) in 2023 (Figure 1).

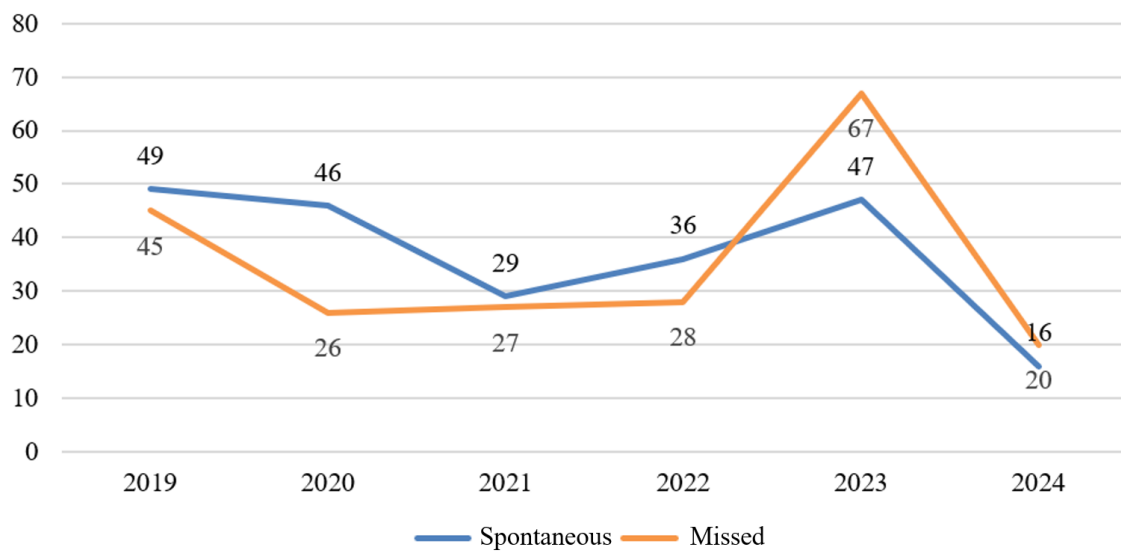


Figure 1. Comparison of the number of spontaneous miscarriages and missed miscarriages over the study period. Maringá, PR, Brazil, 2019 to 2024

Source: The authors (2025).

Regarding access to health care, it was observed that the majority of women with miscarriage, 157 (70.4%), and withdrawn, 139 (65.3%), sought hospital in a study on a spontaneous request. The rest were forwarded by health units belonging to the same municipality or to municipalities in the region.

As for the municipality of residence, of the 223 cases of spontaneous abortion, 125 (56.1%) were residents of the municipality where the hospital was located and 98 (43.9%) were referred. Of the 213 missed miscarriage, 108 (50.7%) were women resident in Maringá and 105 (49.3%) were referred. Pain at the time of admission to the service was mentioned by 50 (23.5%) women in the cases of missed miscarriage and by 111 (49.8%) of those with spontaneous abortion.

DISCUSSION

This study identified that the majority of women who had a miscarriage or retirement were white, which differs from the literature in relation to other states and countries. This divergence is related to the fact that 64.6% of the population residing in the municipality of the location of the study hospital and in the state of Paraná is of the race/color declared white¹². A study conducted with national data regarding hospitalizations in the public health system in Brazil demonstrated that abortions are more frequent among pardas¹³, a result also found in a study that considered only the state of Bahia⁸. In contrast, in the United Kingdom, the majority of women who had abortions were black¹⁴.

Such variations reinforce the importance of considering territorial, racial and socioeconomic contexts in the analysis of reproductive outcomes. The human development indicators between the states of Paraná and Bahia show significant

structural differences. In the state of Paraná, where this study was conducted and from which the majority of the study participants come, the Human Development Index (IDH) is 0.769, being classified as high¹⁵. Moreover, municipalities with low or medium HDI tend to present structural inequalities that influence the sociodemographic profile of women¹⁴ and directly impact access to health services, the quality of the care offered, and the outcomes related to abortion.

In addition to these markers, the number of pregnancies also proved to be a relevant element in the analysis of the profile of women in the situation of abortion. In this study, in both types of abortion, the majority of cases occurred among multiple women. This finding contradicts the results of a study conducted in Mexico, according to which the chances of miscarriage decrease from the second gestation¹⁶. On the other hand, it differs from the data of a study conducted in a hospital in Iraq, specifically focused on cases of missed miscarriage, in which it was found that more than 50% of women were primiparas². Similarly, in China, it was identified as a risk factor for the occurrence of abortion, having only had one pregnancy¹⁷.

Another aspect to be considered is the history of abortions. The literature points out that those with a previous abortion in the first trimester present a risk of recurrence between 12% and 14%. This risk rises to approximately 26% after two gestational losses and can reach 45% after three consecutive abortions¹⁸. However, the data from this study show that the majority of participants, regardless of the type of abortion, did not have a history of gestational losses, which differs from the profiles traditionally described. These contrasts suggest that the association between parity and abortion may take different configurations, reinforcing the need for more in-depth and sensitive investigations into these specifics.

The association observed between abortion and lower levels of education may be related to the barriers faced by women with less access to information, sexual and reproductive education, and health services¹⁹. This condition can delay the detection of fetal abnormalities or hormonal changes²⁰. However, this pattern does not manifest uniformly across contexts. For example, a study conducted in the Puglia region in Italy found that the majority of women who experienced abortion episodes had a full high school²¹. Such disparity evidences that the relationship between schooling and abortion is mediated by contextual determinants.

Additionally, the data from this research indicate a correlation between abortion withholding and higher levels of education, with the predominance of women with higher education. A similar result was identified in a cross-sectional study conducted in Iraq, with 77 women who underwent this type of abortion². These findings suggest that educational and social factors can influence both access and demand for medical care, as well as the greater ability to recognize signs and symptoms associated with gestational risk conditions, varying depending on the type of abortion.

In this study, the statistically significant association observed between age and type of abortion deserves attention. Missed miscarriage were more common among adolescents under the age of 15 and women aged 35 or older, both classified as gestational risk groups³. In the case of adolescents, in addition to physical risks, psychosocial aspects are highlighted, such as poor preparation to assume maternal responsibilities, the negative impact on school trajectory, incomplete biological development, and less adherence to prenatal follow-up¹⁹.

These factors are closely related to the hormonal instability characteristic of this stage of life, especially as regards the levels of human chorionic gonadotropin, estradiol, and progesterone, hormones essential for the maintenance of pregnancy. Changes or

insufficient levels of these substances may act as predictors of retentive abortion²². The absence of adequate prenatal monitoring contributes to the inclusion of women in statistics of higher reproductive risk, which may partly explain the association observed in this research.

For women aged 35 years or older, the risks associated with missed miscarriage are primarily influenced by the difficulty of fertilization due to the decrease in the quantity and quality of the eggs with age, which impacts the viability of a healthy pregnancy²³. In addition, unhealthy lifestyles, often associated with this age group, can also contribute to increased risk of miscarriage⁷. The relationship with the hormone predictors of missed miscarriage becomes even more relevant in this group, since the proximity of menopause can provoke greater hormonal instability and less production of hormones essential to gestation¹⁷.

In the cases of miscarriage, although it is generally associated with late pregnancy²⁰, its predominance in women aged between 16 and 34 years, observed in this study, shows consistency with what is described in other research. It should be noted that although fertility is higher in this period, the risks remain significant and they are not confined to economic, social, and cultural barriers, but also include factors such as absence of preventive tests, lack of anti-tetanic vaccination, recent hospitalizations²⁴, paternal age over 40 years²⁵, prior abortions²⁶, and anatomical changes²⁷.

In this study, the civil status did not present statistically significant differences, and in both types of abortion, the majority of women did not have a mate. A similar result was recorded in Spain²⁴. On the other hand, studies conducted in the region of Puglia, Italy, and the metropolitan region of Santiago, Chile, identified a higher proportion of women with partner^{21,25}. These variations suggest that marital status can influence gestational care, especially in terms of access to health services and emotional and social support during pregnancy. Women without a partner may face additional difficulties in accessing medical care on a timely and continuous basis, as well as being more exposed to psychosocial factors that negatively impact maternal health²⁸.

It is hypothesized that the civil status, by itself, does not constitute a determining factor for the occurrence of spontaneous or missed miscarriage. Such outcomes result from a complex set of elements, which include, among other things, the socioeconomic conditions, the social insertion of women, and the timely and qualified access to health services. Still, the findings in the literature reinforce the need for care strategies that consider expanded support networks, beyond the conjugal core, especially in contexts of greater social vulnerability^{10,14,21}.

Regarding the municipality of residence, no statistically significant associations were observed between population size (small or medium) and types of abortion, suggesting that the simple territorial categorization is not sufficient to explain the reproductive outcomes.

Early miscarriage, defined as one that occurs up to 12 weeks and 6 days of gestation⁴, was the most frequent in both types. However, it is important to consider that in cases of miscarriage, the estimation of gestational age may have been made based on the date of the last menstruation or by means of ultrasound examination. This methodological variation may generate discrepancies in the records²⁹ and, consequently, affect the accuracy of the collected data and, consequently, have interfered with the analysis of the results of this research.

Regarding gestational age, although no statistically significant association was identified, a subtle difference was observed between the groups, with slightly higher

numbers of missed miscarriage occurring less than 13 weeks of gestation. This result is consistent with the literature, which points to a progressive reduction in the risk of gestational loss as the pregnancy progresses to ¹⁴, plus a higher incidence of abortions between the sixth and tenth weeks of gestation, with a gradual decrease in subsequent weeks ²⁶. Such evidence reinforces that, as with the other variables analyzed, abortion-related outcomes should not be understood separately, but in the light of a set of interdependent factors, including social, economic, cultural, and care determinants.

Until 2021, there was a national trend of decreasing the number of abortions and hospitalizations associated with this condition ^{13, 26, 30}. This decline was therefore expected to continue in subsequent years. However, the data from this study indicate an increase in the cases of spontaneous abortion in general and the withholding of abortion in the years 2022 and 2023. This growth may be related to multiple factors, including the improvement of diagnostic methods, increased awareness of women and professionals about the signs and symptoms of missed miscarriage, as well as possible impacts of changes in socioeconomic conditions and in the organization of health care. In this context, the role of the COVID-19 pandemic is highlighted, which may have disrupted the regularity of prenatal monitoring and contributed to the deterioration of reproductive outcomes, especially among populations at greater vulnerability.

The possible limitations of this study are related to the use of secondary data, from electronic records, subject to register errors, missing data, or inconsistencies that the researcher cannot correct. In addition, the standardized structure of the records in the medical records made it impossible to access information related to clinical, social, or behavioral variables that could favor the deepening and understanding of the cases analyzed.

CONCLUSION

The findings of this study point out that sociodemographic factors, such as schooling and maternal age, significantly influence the types of abortion, revealing inequalities that pervade the reproductive process. There was a higher incidence of spontaneous abortions among women with a lower level of education, while the missed miscarriages were more frequent among those with a higher level of education. Adolescents and women aged 35 or older were more vulnerable to missed miscarriage, reflecting biological, social, and care challenges that affect these age groups in a differentiated way.

By highlighting structural inequalities, the study's results offer relevant contributions to women's health within the SUS and have the potential to guide public health actions. The data reinforce the need to strengthen sexual and reproductive education programs aimed at women with lower education levels, broadening access to qualified information and reproductive planning. Similarly, they highlight the importance of improving obstetric care, with follow-up strategies that are more sensitive to the vulnerabilities of adolescents and women in advanced age groups, considering both hormonal risks and psychosocial aspects characteristic of these groups.

In addition, the study's findings highlight the importance of incorporating social determinants of health into analyses of reproductive outcomes and point to the need for public policies to promote equity. Priority strategies include providing comprehensive care for women's health and expanding timely, continuous, and qualified access to health services. It is also recommended to conduct additional research that contextualizes the interaction among biological, social, and care factors to support more effective and sensitive interventions for local realities.

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