

The Correlation between Maternal Age and Second-Trimester Pregnancy Losses

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Abstract:

Aims: *The primary objective of this research was to study the correlation between maternal age and second-trimester pregnancy losses, and then the most frequent diagnoses of these pregnancy losses.*

Materials and Methods: *We conducted a retrospective analysis of all cases of second-trimester pregnancy losses at Obstetrics and Gynecology Clinic/University Clinical Center of Kosovo, between January 1, 2014, and December 31, 2014.*

Results: *From total 95 patients, who they lost their pregnancy in the second-trimester of pregnancy in the year 2014, the percentage of pregnancy loss by age groups was: women under 19 years had only 1.1% pregnancy losses, those 20-24 years: 6.3%, 25-29 years: 22.1%, 30-34 years: 27.3% and those over 35 years: 43.2% had lost their pregnancy in the second-trimester.*

The value of r in this cases is approximately 0.9713, that is strong positive correlation between the two variables (maternal age and second-trimester pregnancy losses).

From total 95 patients, they lost 76.9% of their pregnancies between 14-22 weeks of pregnancy, while 23.1% between 23-27 weeks. (Comparison of proportions: difference 53.8%, 95% confidence interval 39.9 to 65.1, Chi-squared:52.86, Df:1, Significance level $P < .0001$)

Of the most common diagnoses that led to the loss of pregnancy in the second trimester of pregnancy were: Fetal causes: Amniotic fluid disorders, fetal death in utero, Central Nervous System Anomalies. Maternal causes: hypertensive disease of pregnancy, Multiple pregnancies, Mullerian fusion defects etc.

Conclusions: *From this study there resulted that the greater to be maternal age, the higher is the frequency of second-trimester pregnancy losses. 76.9% of women, they had lost their pregnancy between 14-22 weeks of pregnancy, while 23.1% between 23-27 weeks. Of the most common diagnoses that led to the loss of pregnancy in the second-trimester of pregnancy were:*

Fetal causes: Amniotic fluid disorders, fetal death in utero, Central Nervous System Anomalies.

Maternal causes: hypertensive disease of pregnancy, Multiple pregnancies, Mullerian fusion defects etc.

Key words: maternal age, correlation, second-trimester pregnancy loss.

Introduction

Second trimester pregnancy loss is traumatic in the emotional aspect. The obstetrician physician can play an important role in helping the patient and her family cope with the emotional aspects of pregnancy loss.

During the year 2014, had 95 cases of second-trimester pregnancy loss in Obstetrics and Gynecology Clinic/University Clinical Center of Kosovo.

From total 95 patients, 76.9 percent they lost their pregnancy between 14-22 weeks of pregnancy, while 23.1 percent between 23-27 weeks.

In this study it turned out a strong positive correlation between: maternal age and frequency of pregnancy losses in the second-trimester.

Of the most common diagnoses that led to the loss of pregnancy in the second-trimester of pregnancy were:

1. Fetal causes: amniotic fluid disorders, fetal death “in utero”, central nervous system anomalies.
2. Maternal causes: hypertensive disease of pregnancy, multiple pregnancies, mullerian fusion defects etc.

Aims

The primary objective of this research was to study the correlation between maternal age and second-trimester pregnancy losses, and then the most frequent diagnoses of these pregnancy losses

Materials and Methods

We conducted a retrospective analysis of all cases of second-trimester pregnancy losses in Obstetrics and Gynecology Clinic/University Clinical Center of Kosovo, between January 1, 2014, and December 31, 2014.

The population studied comprised of women aged 15 to 35 years and above, who had second-trimester pregnancy losses during 2014.

95 patients who had lost their pregnancy in the second trimester of pregnancy were analyzed by age-group divided into 5 categories by seniority.

Women participant in study were ranked according to ages intervals:

15-19

20-24

25-29

30-34

Above 35, then was calculated the percentages of second-trimester pregnancy losses, and was distributes across age-groups.

Statistical analysis was performed using the computer programs for statistics.

Sum tests were used to compare differences in categoric variables.

Correlation coefficient was used to detect trends between maternal age and second-trimester pregnancy losses.

Results

From total 95 patients, who they lost their pregnancy in the second-trimester of pregnancy in the year 2014, the percentage of pregnancy loss by age groups was: women under 19 years had only 1.1% pregnancy losses, those

20-24 years: 6.3%,

25-29 years: 22.1%,

30-34 years: 27.3% and those

over 35 years: 43.2% they had lost their pregnancy in the second-trimester.

On the basis of the distribution of the percentage of loss of pregnancy, in different age-groups, was created hypothesis that: the greater the age of the mother, the higher is the loss of pregnancies.

Calculation of correlation coefficient was used to detect correlation between maternal age and second-trimester pregnancy losses

We have entered the following data:

$X=17 \quad 22 \quad 27 \quad 32 \quad 35$ (the average age between intervals)

$Y= 1 \quad 6 \quad 22 \quad 27 \quad 43$ (Percentage rounded to integer)

The correlation coefficient is: $r = 0.9713$

Explanation

Table 1.: Step 1: I have found $X \cdot Y$, X^2 and Y^2 as it was done in the table below.

X	Y	$X \cdot Y$	$X \cdot X$	$Y \cdot Y$
17	1	17	289	1
22	6	132	484	36
27	22	594	729	484
32	27	864	1024	729
35	43	1505	1225	1849

Step 2: I have found the sum of every column to get:

$$\sum X=133, \sum Y=99, \sum X \cdot Y=3112, \sum X^2=3751, \sum Y^2=3099$$

Step 3: I have used the following formula to work out the correlation coefficient.

$$r = \frac{n \cdot \sum XY - \sum X \cdot \sum Y}{\sqrt{[n \sum X^2 - (\sum X)^2] \cdot [n \sum Y^2 - (\sum Y)^2]}}$$

$$r = \frac{5 \cdot 3112 - 133 \cdot 99}{\sqrt{[5 \cdot 3751 - 133^2] \cdot [5 \cdot 3099 - 99^2]}} \approx \underline{\underline{0.9713}}$$

The value of r in this cases is approximately 0.9713, that is strong positive correlation between the two variables (maternal age and second-trimester pregnancy losses).

The distribution diagram

Linear dependence between the two variables: maternal age and second-trimester pregnancy losses, is strong positive correlation, suggesting that, the greater the age of the mother, the higher is the loss of pregnancies in the second-trimester.(confirmed the hypothesis). (see below)

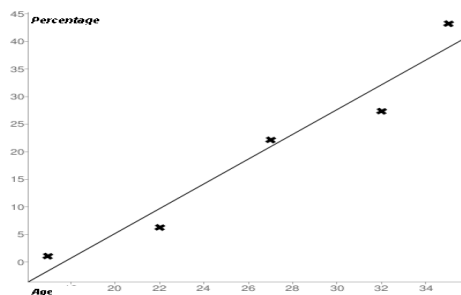


Figure 2: Linear regression - Statistical analysis for correlation between maternal age and second-trimester pregnancy losses.

Pearson's product moment correlation coefficient - seen the potential power of the linear dependence between the two variables. ($p < .005$)

Table No. 2. Pearson significance (p-value)

Data pairs count	Pearson correlation coefficient (r)	Pearson coefficient of determination (r^2)	Pearson significance (p-value)
5	0.9713	0.9434	0.005

From total 95 patients, they lost 76.9% of their pregnancies between 14-22 weeks of pregnancy, while 23.1% between 23-27 weeks. (Comparison of proportions: difference 53.8%, 95% confidence interval 39.9 to 65.1, Chi-squared:52.86, Df: 1, Significance level $P < .0001$)

Of the most common diagnoses that led to the loss of pregnancy in the second trimester of pregnancy were: fetal causes and maternal causes (see table No. 3 and No. 4)

Table No 3. Fetal causes

Pathology according to the system	Diagnoses	Percentages
Amniotic fluid disorders:	Anhydramnios (n = 24)	32.60 %
	PPROM (n = 20)	
Mors foeti in utero	Stillbirth (n = 43)	31.85%
Congenital central nervous system anomalies:	Hydrocephalus (n = 9)	10.3%
	Meningocele (n = 3)	
	Spina bifida (n = 1)	
	Dandy Walker syndrome (n = 1)	
Lymphatic system disorders:	Hygroma Colli (n = 2)	3.70%
	Foetal hydrops (n = 3)	
Congenital anomalies of the urinary system:	Fetal megavesica (n = 1)	2.96%
	Renal agenesis (n = 2)	
	Ren polycysticus (n = 1)	
Genetic disorders :	Fibrosa cystica (n = 1)	2.96%
	St.Edward's (n = 1)	
	Foetal anomaly multiplex (n = 2)	
Intrauterine growth restriction:	IUGR (n = 4)	2.96%
Placental problems:	Placenta praevia (n = 2)	2.22%
	Abruption placenta (n = 1)	
<i>Digestive system anomalies:</i>	<i>Omphalocele</i> (n = 1)	0.74%

Table No. 4. Maternal causes

Pathology according to the system	Diagnoses	Percentages
Hypertensive disease of pregnancy	Preeclampsia (n = 4)	3.70%
	PIH-syndrome (n = 1)	
Multiple pregnancy	Multiple pregnancy (n = 4)	2.96%
Mullerian <i>fusion defects</i>	Bicornuate uterus (n = 2)	1.48%
In vitro fertilization pregnancy	IVF et ET (n = 2)	1.48%

Discussion

Analysis of 95 patients, who they lost their pregnancy in the second-trimester of pregnancy in the year 2014, in Obstetrics and Gynecology Clinic/University Clinical Center of Kosovo, showed a clear effect of maternal age in pregnancy losses in the second-trimester.

In this study we have made some statistical analysis for correlation between maternal age and second-trimester pregnancy losses, in a linear regression, can we see clear linear dependence between the two variables

Several studies have shown an increase in the risk of spontaneous abortion in women aged ≥ 35 years (Dominguez *et al.*, 1991; Nybo Andersen *et al.*, 2000; Osborn *et al.*, 2000). [1, 2, 3].

Multiple regression analysis in a cross-sectional unmatched case-control study (Dominguez *et al.*, 1991) has shown that maternal age begins to have an effect only after the age of 35 years. [4]

Various hypotheses have been put forward to account for the increase in adverse reproductive outcomes with age. In women, a link between increasing age and a higher incidence of chromosomal abnormality has been established (Boue *et al.*, 1975; Cowchock *et al.*, 1993). [5]

Conclusions

From this study resulted that the greater to be maternal age, the higher is the frequency of second-trimester pregnancy losses.

76.9% of women, they had lost their pregnancy between 14-22 weeks of pregnancy, while 23.1% between 23-27 weeks.

Of the most common diagnoses that led to the loss of pregnancy in the second-trimester of pregnancy were:

Fetal causes: Amniotic fluid disorders, fetal death in utero, Central Nervous System Anomalies.

Maternal causes: hypertensive disease of pregnancy, Multiple pregnancies, Mullerian fusion defects etc.

Acknowledgements

I would like to thank my colleagues from the Obstetrician and Gynecological Clinic (OGC) Pristine/ University Clinical Center of Kosovo, for assistance in this study.

I also thank my parents for the unceasing encouragement, support and attention.

I am also grateful to my wife Lauren and my child Dielli, who supported this study.

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