



CHARACTERISTICS OF FETAL GROWTH RESTRICTION CASES AT THAI NGUYEN NATIONAL HOSPITAL FROM MAY 2016 TO DECEMBER 2020

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ABSTRACT

Background: Fetal growth restriction is considered the main cause of stillbirth and the second leading cause of neonatal death. Fetal growth restriction causes many short-term and long-term consequences for the child, such as asphyxia, hypothermia, hypoglycemia, polycythemia, immunodeficiency, increased morbidity, and perinatal death, and has numerous negative effects on the child's development. **Objectives:** This study was conducted to describe the clinical characteristics of maternal giving birth with fetal growth restriction at the Department of Obstetrics and Gynecology at Thai Nguyen National Hospital from May 2016 to December 2020. **Methods:** A cross-sectional description of 319 maternal who gave birth to infants with fetal growth restriction at the Department of Obstetrics and Gynecology at Thai Nguyen National Hospital from May 2016 to December 2020. **Results:** The average age of the pregnant group was 27.1 ± 5.8 years old; the 20–29-year-old group accounted for the highest proportion, accounting for 62.7%. The group of maternal living in rural areas accounts for 67.4%. The proportion of maternal with a history of giving birth to low-birth-weight babies is 57.3%. The most common maternal pathology related to fetal growth restriction is pre-eclampsia (9.4%). **Conclusion:** The risk of fetal growth restriction is increased if the maternal is young, lives in a rural area, has a history of low-birth-weight babies, and has comorbidities during pregnancy.

Keywords: Pregnancy; Fetal growth restriction; Preeclampsia

INTRODUCTION

Fetal growth restriction (FGR) or intrauterine growth restriction (IUGR) is defined as the failure of the fetus to develop to its full

capacity as determined by its genetic composition. When the fetus' estimated weight by ultrasound is below the 10th percentile for gestational age, fetal growth restriction is diagnosed. About 30 million neonates every year, or 23.8% of all births, are affected by intrauterine growth restriction¹. Fetal growth restriction is considered the main cause of stillbirth and the second leading cause of neonatal death. FGR causes many short-term and long-term consequences for the child, such as asphyxia, hypothermia, hypoglycemia, polycythemia, immunodeficiency, increased morbidity, and perinatal death, and has numerous negative effects on the child's development². Stillbirth due to intrauterine growth restriction can be prevented if the pregnancy is diagnosed early, monitored, and terminated at the appropriate time³. There have been a few study projects on the state of FGR in Vietnam up to this point, but none at Thai Nguyen National Hospital have thoroughly analyzed FGR. This study will help clinicians have evidence to diagnose FGR early, thereby improving obstetric outcomes. At the same time, it is also a premise for future larger studies on FGR at Thai Nguyen National Hospital. Therefore, we studied the subject "Situation of fetal growth restriction at Thai Nguyen National Hospital from May 2016 to December 2020". The aim of our study was to describe the clinical characteristics of maternal giving birth with fetal growth restriction at the Department of Obstetrics and Gynecology at Thai Nguyen National Hospital from May 2016 to December 2020.

METHODS

Study subjects, time, and place: All maternal with fetal growth restriction who delivered at the Department of Obstetrics and Gynecology at Thai Nguyen National Hospital from May 2016 to December 2020 met the research criteria.

Inclusion criteria:

Gestational age $\geq 28 \frac{0}{7}$ weeks (using estimated day of delivery by ultrasound in first trimester or determine the first day of last menstrual period if menstrual cycle is usually 28-30 days long).

There is one fetus, the fetus is alive.

Postpartum weight is below the 10th percentile according to gestational age (according to the weight percentile distribution chart according to gestational age by Ngo Thi Uyen)⁴.

Full information in medical records.

Exclusion criteria:

The fetus has congenital disorder.

Maternal gave birth elsewhere and transferred to.

The exact gestational age cannot be determined.

Methods

Study design: A cross-sectional description

Sample size: Convenience sampling

Variables, indicators:

Maternal age

Geographical distribution (Urban areas/rural areas)

History of giving birth with low birth weight of multiparous

Maternal pathology (Pre-eclampsia/Internal disease/Blood diseases/Gestational Diabetes Mellitus/Uterine malformations, uterine fibroids/Combined disease/ Other diseases/no disease)

Statistical analysis:

Retrospective review based on the collection of available data in medical records kept at the General Planning Department of Thai Nguyen National Hospital.

Data were analyzed using SPSS 18.0 software.

Research ethics

The study was carried out following approval by the Thai Nguyen National Hospital's biomedical research ethics committee.

RESULTS

Table 1. Age group distribution of the study population

Age	n	%
< 20	22	6,9
20 - 29	200	62,7
30 - 39	84	26,3
≥ 40	13	4,1
Mean ± SD	27.1 ± 5,8	
Min - Max	16 - 44	
Total	319	100

The study group's maternal had an average age of 27.1 ± 5.8 years, with the youngest being 16 and the oldest being 44. The age range of 20 to 29 years old has the highest prevalence (62.7%) and the lowest percentage is group of those under 40 years old (4.1%) (Table 1).

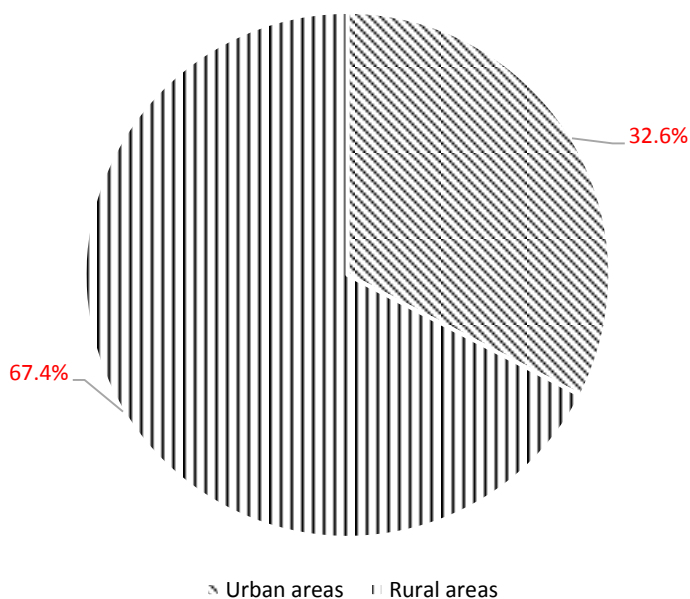


Figure 1. Geographic distribution of the study population

Compared to maternal in urban regions (32.6%), maternal in rural areas were more likely to give birth to infants with FGR (67.4%) (Figure 1).

Table 2. History of giving birth with low birth weight of multiparous

History of giving birth with low birth weight	n	%
Yes	67	42.7
No	90	57.3
Total	157	100

There are 57.3% of multiparous who have a history of giving birth to low-birth-weight infants (Table 2).

Table 3. Characteristics of maternal pathology

Diseases	n	%
<i>Pregnancy complications:</i>		
Pre-eclampsia	30	9.4
Gestational Diabetes Mellitus	7	2.2
<i>Chronic diseases in maternal:</i>		
Internal disease (Asthma, Heart, Kidney, Endocrine)	19	6.0
Blood diseases	10	3.1
Uterine malformations, uterine fibroids	4	1,3
Combined disease	4	1,3
Other diseases	6	1,9
No disease	239	74,9
Total	319	100

25.1% of maternal with the diseases have FGR. Pre-eclampsia had the greatest rate of the condition (9.4%) (Table 3).

DISCUSSION

Our research delved into 319 women who gave birth with FGR at the Department of Obstetrics and Gynecology at Thai Nguyen National Hospital from May 2016 to December 2020.

We noted that the average age of maternal in our study was 27.1 ± 5.8 years old, with the youngest is 16 years old and the oldest is 44 years old. Our findings are like Nguyen Tran Thao Nguyen's research in 2020, which also reported an average age of 27.3 ± 4.9 years old. This correlation could be attributed to our country's youthful population, which tends to marry at a young age⁴.

In our study, maternal aged 20 to 29 had the highest rate of giving birth with FGR (62.7%), followed by maternal aged 30 to 39 at 26.3%. Maternal groups aged < 20 and ≥ 40 have infant birth rates with FGRs of 6.9% and 4.1%, respectively. Our findings are like

Nguyen Tran Thao Nguyen's research (2020), in which maternal aged 20–24 account for 28.2%, maternal aged 25–24 account for 36.4%, maternal aged 30–34 account for 23.6%, and maternal aged 15–19 and ≥ 40 accounts for 3.6% and 1.8%, respectively⁴. Maternal between the ages of ≤ 20 and ≥ 40 require the most attention here. When a woman becomes pregnant at a young age, there is a lack of understanding about pregnancy care and management due to the decline in the function of the maternal's organs throughout pregnancy as well as incomplete body development. These are the factors that contribute to FGR. The link between maternal age and FGR could not be demonstrated in this study's results because our study subjects did not have a sufficient representation of the pregnant population's ages.

In this study, the rate of maternal giving birth with FGR in rural areas was 67.4%, which was more than double the rate of maternal giving birth with FGR in urban areas (32.6%). Our findings are consistent with those of other domestic authors. According to Nguyen Thi Huong Linh's (2006) findings on infants with FGR, the birth rate of infants with FGR in rural maternal is 2.2 times more advanced than the group of maternal living in urban areas (21 % vs. 9.6 %, $p < 0.001$) (OR = 2.52; 95% CI 2.02-3.13)⁵. Research results of Vu Quang Linh (2008) when assaying the relationship between where maternal live and infants with FGR set up that maternal living in rural areas are at risk for giving birth with FGR is 1.7 times more advanced than in the group women living in urban areas (41.6 % vs. 23.9 %, $p < 0.001$) (OR = 2.26; 95% CI: 1.76-2.92)⁶. Through this, the rate of births with FGR in maternal living in rural areas is high, which is related to heavy work, a lack of knowledge, profitable difficulties, and a lack of capability to manage gestation.

Our research results show that maternal with a history of low-birth-weight infants in previous pregnancies have a higher rate of giving birth with FGR than women without a history of giving birth underweight (57.3% vs 42.7%). Many domestic and foreign studies also show that women with a history of giving birth to low-birth-weight infants increase their risk of giving birth with FGR. Our research results are similar to the research results of Nguyen Tran Thao Nguyen et al (2020)⁴. This study found that in

the group of FGR, the proportion of maternal with a history of giving birth with FGR is 10.9%, while in the group with normal fetal development, the proportion of women with a history of giving birth with FGR is only 2.7%. Research by author Durousseau et al (2003) found that maternal with a history of giving birth to low-birth-weight infants have a six times higher rate of giving birth to infants with FGR than maternal without a history (11.1% vs 2.0%, OR = 6.1; 95% CI: 3.8–9.8)⁷.

In our study, the rate of births with FGR in the group of maternal without diseases was the highest, at 74.9%. This shows that the maternal's pathology during pregnancy is only one of the factors causing FGR. The group of maternal with diseases during pregnancy accounts for 25.1%. Among them, the group of women with preeclampsia giving birth with FGR accounts for the highest rate (9.4%). Preeclampsia is one of the most common maternal conditions during pregnancy related to FGR. To date, there are many hypotheses to explain the pathophysiology of preeclampsia, including the hypothesis that inadequate trophoblastic cell invasion is the pathological basis related to preeclampsia and FGR. According to domestic research and the research results of Nguyen Thi Huong Linh (2006), the group of maternal with preeclampsia has a rate of giving birth with FGR that is four times higher than the group of maternal without preeclampsia (50.9% vs 12.5%, $p < 0.01$) (OR = 7.27; 95% CI: 4.87–10.90)⁵. According to research by Nguyen Tran Thao Nguyen et al (2020), the rate of hypertensive disorders in the group of fetuses with FGR is 21.8%, while in the group of fetuses with normal growth, it is 11.8%⁴. Depending on the severity of the maternal's pre-eclampsia, the risk of the infants having FGR is greater or less. According to research results by Allen et al (2004) on 135,466 maternal in Canada, if all maternal with high blood pressure are included, the rate of giving birth with FGR is 1,6 times higher than maternal with normal blood pressure⁸. But if there is mild hypertension during pregnancy and no proteinuria, the risk of FGR is 1.5 times greater (RR = 1.5; 95% CI: 1.4–1.6). If accompanied by proteinuria at any level, the risk of FGR increases 3.2 times (RR = 3.2; 95% CI: 2.8–3.6). The risk of FGR in maternal with pre-pregnancy high blood pressure is 2.5 times (RR = 2.5; 95% CI:

2.2–3.0). Research by author Crispi et al (2008) showed that pre-eclampsia appeared at a high rate in the group with FGR compared to the group with normal fetal development⁹. Research by author Srinivas et al (2009) found that preeclampsia increased the risk of FGR by 2.73 times (OR = 2.73, 95% CI: 1, 94–3.86)¹⁰. The group of maternal with internal diseases (bronchial asthma, heart, kidney, and endocrine) accounts for 6.0%, ranking second after the group of maternal with preeclampsia. According to research by Nguyen Thi Huong Linh (2006), the group of maternal with heart disease has a 1.9 times increased risk of giving birth to a child with FGR compared to the group of maternal without heart disease⁵. Maternal with kidney disease have a 28.6% rate of giving birth with FGR, double the rate of maternal without kidney disease (13.9%). In the group of maternal with internal diseases, due to the difficulty in providing oxygen and nutrients for themselves, the body is weakened, especially when the pregnant woman has heart failure. Kidney failure will adversely affect the development of the fetus and is a risk factor leading to FGR. The group of maternal with blood diseases ranked third, with a rate of 3.1%. When suffering from blood diseases (thalassemia, thrombocytopenic purpura), it will lead to anemia during pregnancy. When a maternal is anemic, it will lead to a lack of oxygen for the maternal and underdeveloped organs, causing the fetus to suffer from a chronic lack of oxygen, leading to FGR.

CONCLUSION

The age range of women giving birth with fetal growth restriction is 27.1 ± 5.8 years on average, with the 20-29 age group having the most significant proportion at 62.7%. Maternal who reside in rural areas make up 67.4% of the total. 57.3% of the study population had previously delivered infants with low birth weights. Pre-eclampsia in maternal accounts for 9.4%.

RECOMMENDATION

Maternal who have a high risk of FGR should undergo early, stringent pregnancy care and modify their lifestyle to limit the development of FGR.

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