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Study of clinical conditions that complicated birth in women in OSH region in 2016-2021

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***Abstract*---**Strengthening the national health programs of the Kyrgyz Republic is aimed at reducing maternal morbidity and mortality in the country. The total number of births directly depends on the normal conditions during pregnancy and childbirth. Clinical conditions such as abnormal labor, edema, proteinuria, hypertension, and bleeding are life-threatening during the onset of labor. Factors complicating pregnancy and childbirth in the Kyrgyz Republic include edema, proteinuria and hypertensive disorders during pregnancy, childbirth and the postpartum period; childbirth and delivery, complicated by bleeding during childbirth and violations of labor activity. The purpose of the study: To study and evaluate the dynamics of trends in diseases that complicate childbirth in 8 territorial maternity hospitals in the Osh region from 2016 to 2021.

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Keywords---pregnancy, childbirth, risk factors, Osh region, motherhood, dynamic analysis, method of variation statistics.

1 Introduction

Maternal mortality is a criterion for the socio-economic development of society, which determines the quality and level of organization of maternity institutions (Galina et al., 2011). Around 830 women worldwide die every day from complications related to pregnancy or childbirth. An estimated 303,000 women died during and after pregnancy and childbirth in 2015. Almost all of these deaths occur in low-income countries, and most of them are preventable (World Health Organization, 2019). Slowdowns in access to quality health care have been identified as one of the important determinants of maternal death (Chavane et al., 2018). Maternal mortality is defined as the death of a pregnant woman or within 42 days of termination of pregnancy, regardless of the date and place of pregnancy, from any cause associated with or aggravated by pregnancy or its management, but not from an accidental or accidental cause (Sitaula et al., 2021).

Pregnant women are more susceptible to complications from COVID-19 due to physiological and immune changes. According to the Centers for Disease Control and Prevention, pregnant women who are more likely to be infected with COVID- 19 should be hospitalized and placed in a ventilator-assisted intensive care unit (Aly Syed Anwar et al., 2021). Since the day of independence of the Kyrgyz Republic, special attention has been paid to the issues of protecting the health of motherhood and childhood. In this regard, targeted state programs were implemented aimed at implementing tasks within the framework of national programs, such as "Manas" in 1996-2006 (Ministry of Justice of the Kyrgyz Republic, 1996), "Manas Taalimi" in 2006-2010 (Ministry of Justice of the Kyrgyz Republic, 2006), "Densooluk" for 2012-2018 (Legislation of the CIS countries, 2022).

Table 1. Maternal mortality (per 100,000 live births)

Name of territories	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Kyrgyz Republic	**54,8**	**49,1**	**36,0**	**50,1**	**38,5**	**30,3**	**31,9**	**28,6**	**24,8**	**36,1**
Batken oblast	66,9	43,5	42,0	108,7	26,1	41,9	51,9	33,6	25,8	28,3
Dzhalal-abad oblast	36,5	55,9	33,0	53,7	53,3	33,5	53,6	38,2	37,2	53,2
Issyk-kul oblast	62,6	97,2	37,2	55,3	26,7	34,7	37,0	71,2	28,4	70,4
Naryn oblast	83,3	56,2	29,0	135,7	30,6	43,7	-	105,7	16,6	52,6
Osh oblast	**62,5**	**58,1**	**42,8**	**43,4**	**43,4**	**24,9**	**25,6**	**19,5**	**25,5**	**24,5**
Talas oblast	40,9	14,1	14,8	44,6	15,1	-	-	-	16,6	69,1
Chui oblast	69,0	41,2	50,4	44,4	40,3	47,9	22,9	16,1	32,5	32,2
Bishkek city	43,3	18,0	26,1	16,4	30,5	17,6	13,4	18,0	16,9	19,1
Osh city	35,7	60,3	15,0	-	40,9	13,5	64,9	8,3	-	25,2

The maternal mortality rate in 2011 decreased from 54.8 to 36.1 in 2020, and in Osh region it decreased by 2.5 times. A normal pregnancy is characterized by changes in blood clotting and thrombotic fibrinolysis, often referred to as physiological hypercoagulability. The results of many studies have shown that increased thrombotic activity during pregnancy is characterized by severe hyperfibrinogenemia, an increase in the activity of plasma coagulation factors. An increase in thrombotic risk most often occurs in pregnant women with cardiovascular risk factors (nicotinism, diabetes mellitus, arterial hypertension, overweight and obesity), with prolonged immobilization, the use of hormonal oral contraceptives before pregnancy with pathological factors of pregnancy such as premature placental insufficiency, abruption placenta and preeclampsia (Siennicka et al., 2020). Clinical manifestations that complicate childbirth in the Kyrgyz Republic include edema, proteinuria and hypertensive disorders during pregnancy, childbirth and the postpartum period; childbirth and delivery in case of violation of labor activity.

Changes in blood pressure are accompanied by changes in cardiac output, peaking between the 16th and 20th weeks of pregnancy. Stroke volume and heart rate are increased to achieve this significant increase in the amount of blood pumped into the pulmonary and systemic circulation (Luft et al., 2009). The incidence and consequences of cord hemorrhage immediately after birth due to cord clamping errors are not well covered in the literature or current clinical practice guidelines (Singh & Suresh, 2013). Despite the great importance of postpartum hemorrhage, little is known about the factors that contribute to postpartum hemorrhage, especially in less developed areas where 99% of maternal deaths occur. Severe anemia can impair uterine muscle strength and resistance to infectious diseases, contributing to postpartum hemorrhage and subsequent maternal death (Rush, 2000). However, the severity of anemia, which puts a woman at increased risk of postpartum haemorrhage or debilitating and clinically significant blood loss, has not been fully explored, as the effect of anemia on blood loss during labor and the postpartum period has not been identified (Kavle et al., 2008).

In the Kyrgyz Republic, the pathology of pregnancy and childbirth in the form of obstetric bleeding during childbirth and the postpartum period, hypertension disorders, the need for a caesarean section in 2007 was determined in 57.3%, and in 2011 - in 65.3% of women who gave birth. Thus, only a third of births were characterized by a normal course (Atambaeva & Mingazova, 2015). Placental abruption is defined as the premature separation of the placenta from the uterine wall before the birth of the fetus. Criteria for defining placental abruption as "severe" must be clinically significant and include at least 1 complication (intravascular coagulation, hypovolemic shock, blood transfusion, hysterectomy, renal failure, or in-hospital death), intrauterine (unsatisfactory fetal condition, intrauterine growth retardation or fetal death) or neonatal (neonatal death, preterm birth, or small-for-gestational-age birth) complications (Mikuscheva et al., 2021).

The most significant risk factors for discoordinated labor in women are determined by the state of the birth canal, the fetoplacental complex before the onset of labor, and the use of measures aimed at “ripening” of the cervix (Petrich & Novikova, 2021). In pregnant women whose delivery was complicated by discoordination of labor activity, “stratification” of the myometrium into two layers was revealed: against the background of hypoechoic myometrium, a hyperechoic line is visualized approximately in the middle, which, apparently, is the vascular layer of the myometrium (Zlobina et al. 2012). Although physicians have recognized preeclampsia for thousands of years, relatively little is known about its pathogenesis and prevention. The main concern about high blood pressure is related to the potential harmful effects on both the mother and the fetus. These potential side effects range in severity from trivial to life- threatening (Mustafa et al., 2012). Preeclampsia is an early disorder of placentation leading to defects in blood supply and hypoxia, causes dysfunction of the maternal endothelium and is manifested by various clinical symptoms (Schleissner, 2010).

Gestational edema is a fairly common symptom in pregnant women, especially in the third trimester of pregnancy, and often their appearance is the initial manifestation of such a severe pregnancy complication as preeclampsia. Edema is an increase in the extravascular component of the fluid, the external manifestation of which is peripheral edema, which is characterized by a visible, palpable pathological accumulation of fluid in the subcutaneous connective tissue (Khaskhachikh & Streltsova, 2014).

2 Materials and methods

An analysis was made of the dynamics of trends in maternal risk factors in maternity hospitals and general medical practice centers in the Osh region for the period 2016 to 2021 in conjunction according to the statistics of the Ministry of Health of the Kyrgyz Republic and the Osh Regional Medical Information Center. The digital material was processed by the method of variation statistics. Emergency care statistics per population were analyzed according to the data of the National Statistical Committee of the Kyrgyz Republic and the Osh Medical Information Center on the number of hospitalizations of patients in regional hospitals and a literature review based on previously published materials (Abdirasulova et al., 2022). Statistical analysis showed that the average absolute number of births decreased by 92 births, and analysis of the variation in the number of births in Osh region for 2016-2021 showed that in 2021 the total number of births was 29902 and 31000 in 2020, which can be explained by the impact of COVID infection -19 per population. The number of births is 182,971, and the average annual number of births is 30,495 (Abdirasulova et al., 2022).

3 Results

Table 2. Dynamic analysis of childbirth in Osh region for 2016-2021

Year	Number of births	Absolute growth	Growth rate (basic)%	Growth rate (chain)%	The growth rate %	Absolute value of 1% increase
2016	30457	------	100.0	-----	-----	-----
2017	31106	649.0	102.1	102.1	2.1	309.0
2018	31386	280.0	103.1	100.9	0.9	311.1
2019	28682	-2704.0	94.2	91.4	-8.6	314.4
2020	31438	2756.0	103.2	109.6	9.6	287.1
2021	29902	-1536.0	98.2	95.1	-4.9	313.5
	182971	-555	229	-----	-----	-----
	30495, 1	38	-----	-----	-----	-----

Source: Osh Regional Medical Information Center and stat.kg

From the calculations made in Table 2, the following can be drawn: In the base year, that is, in 2016, the number of births in Osh region amounted to 30457, and by the end of 2021 the figure was 29902. Compared to the base year, the number of births decreased by 555 or 98 .2% and decreased by 1.8%. For 6 years of the analyzed period in the Osh region, the number of births was 182,971 and the average annual number of births was 30,495. The annual average absolute increase was reduced by 92 births.

Table 3. Data on the main factors complicating pregnancy and childbirth, where group 1 - edema, proteinuria and hypertensive disorders during pregnancy, childbirth and the postpartum period; Group 2 - childbirth and delivery, complicated by bleeding during childbirth and group 3 - violations of labor.

Years	Total number of births	I	II	III
2021	29902	607	1983	356
2020	31438	1935	650	538
2019	28682	1467	659	481
2018	31386	2158	748	561
2017	31106	2086	830	537
2016	30457	1674	944	514
	182971	9927	5814	2987
	30495,2	1654,5	969	497,8

 - total; - average over 6 years.

From the data in Table 3, we can conclude the following: in 2016, the number of diseases that complicate childbirth such as edema, proteinuria and hypertensive disorders accounted for 5.5% of the total number of

births, then by 2021 cases increased by 1.1% and amount to 6 .6%; in violation of labor, if in 2016 it was 1.7% of the total number of births, and by 2021 it was 1.2%; also decreased cases of childbirth, complicated by bleeding during childbirth, if in 2016 they amounted to 3.1%, then in 2021 the number of cases decreased by 1% and amounted to 2.1% of the number of births of the same year.

Table 4. Trends in risk factors at the onset of labor

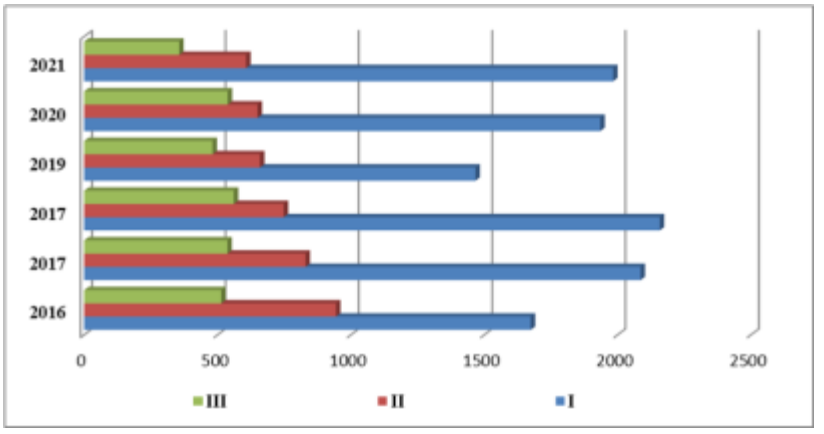

Table 5. Ratio of disease factors per 100 deliveries

Years	I	II	III
2021	2	6,6	1,2
2020	6,2	2,1	1,7
2019	5,1	2,3	1,7
2018	6,9	2,4	1,8
2017	6,7	2,7	1,7
2016	5,5	3,1	1,7

Calculation Of Dynamic Series Of Diseases Complicating Birth

Table 6. Edema, proteinuria and hypertensive disorders during pregnancy, childbirth and the postpartum period

Years	Number of births	Absolute growth	Growth rate (basic)%	Growth rate (chain)%	The growth rate %	Absolute value of 1% increase
2016	1674	-----	100.0	-----	-----	-----
2017	2086	412.0	124.6	124.6	24.6	16.7
2018	2158	72.0	128.9	103.5	3.5	20.6
2019	1467	-691.0	87.6	68.0	-32.0	21.6

2020	1935	468.0	115.6	131.9	31.9	14.7
2021	1983	48.0	118.5	102.5	2.5	19.2

4 Discussion

Correlation-regression analysis was carried out. Correlation coefficient (r) is equal 0.798; the relationship between the studied characteristics is direct, tightness (strength) of connection according to the Chaddock scale is high. Paired Linear Regression Equation: y = -4116.91654 + 0.19678 * x Determination coefficient r^2 is equal 0.637 (factor sign x determines 63.7% dependent feature variance y). The average approximation error (which characterizes the adequacy of the regression model) is 7.1%.

Table 7. Childbirth and delivery, complicated by bleeding during childbirth

Years	Number of births	Absolute growth	Growth rate (basic)%	Growth rate (chain)%	The growth rate %	Absolute value of 1% increase
2016	944	-----	100.0	-----	-----	-----
2017	830	-114.0	87.9	87.9	-12.1	9.4
2018	748	-82.0	79.2	90.1	-9.9	8.3
2019	659	-89.0	69.8	88.1	-11.9	7.5
2020	650	-9.0	68.9	98.6	-1.4	6.4
2021	607	-43.0	64.3	93.4	-6.6	6.5

Correlation coefficien (r) is equal 0.285. The relationship between the studied features is direct, the tightness (strength) of the relationship on the Chaddock scale is weak. Paired Linear Regression Equation: y = -305.39648 + 0.03427 * x Determination coefficient r^2 is equal 0.081 (factor sign x determines 8.1% dependent feature variance y). The average approximation error (which characterizes the adequacy of the regression model) is 12.2%.

Table 8. Violations of labor activity

Years	Number of births	Absolute growth	Growth rate (basic)%	Growth rate (chain)%	The growth rate %	Absolute value of 1% increase
2016	514	-----	100.0	-----	-----	-----

2017	537	23.0	104.5	104.5	4.5	5.1
2018	561	24.0	109.1	104.5	4.5	5.3
2019	481	-80.0	93.6	85.7	-14.3	5.6
2020	538	57.0	104.7	111.9	11.9	4.8
2021	356	-182.0	69.3	66.2	-33.8	5.4

The correlation coefficient (r) is 0.583. The relationship between the studied features is direct; the tightness (strength) of the relationship on the Chaddock scale is noticeable. Paired linear regression equation: y = -744.67484 + 0.04074 * x The coefficient of determination r2 is 0.340 (factorial attribute x determines 34% of the variance of the dependent attribute y). The average approximation error (which characterizes the adequacy of the regression model) is 9.4%.

5 Conclusion

Among the causes of complications during the onset of labor and the postpartum period are 3 clinical conditions that tend to be: edema, proteinuria and hypertensive disorders during pregnancy, childbirth and the postpartum period; childbirth and delivery, complicated by bleeding during childbirth and violations of labor activity. From the calculations, it can be concluded that complications such as edema, proteinuria and hypertensive disorders during pregnancy are a frequent occurrence during childbirth. Childbirth and delivery, complicated by bleeding during childbirth, remain at a stable level. Violations of labor activity at this time, according to calculations, is going to reduce the number of registrations.

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