

Some assessment results of the medical care for newborns

Algunos resultados de la evaluación de la atención médica para los recién nacidos

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Abstract

In order to assess the state of medical care for newborns in organizations of obstetric care in 2013-2017, the official statistical reports of the Ministry of Healthcare of Russia and publications of the Federal State Statistics Service were analyzed. It was found that during the study period, the provision of neonatologists increased by 2.8%, and the provision of beds for pathology of newborns and premature infants fell by 2.9%. The incidence of newborns born with a body weight of 1000 g and more decreased by 5.0%, and the incidence of newborns born with extremely low body weight increased by 14.1%. Mortality of mature and premature newborns in obstetric organizations as a whole decreased by 43.7%. From 2013 to 2017 in Russia there was a decrease in the share of level 1 organizations (by 5.6%) and the growth of level 2 and 3 organizations (by 4.2% and 25.0%, respectively). Due to the regionalization of obstetric and perinatal care, the proportion of live births in level 1 maternity hospitals (departments) decreased by 33.6% and 6.1% in level 2 obstetric hospitals, but increased by 26.7% in level 3 obstetric care organizations. The same trend was observed in the distribution of newborns' deaths by levels of hospitals: in obstetric hospitals of level 1 and 2 there was a decrease of 47.4% and 40.9%, respectively, in perinatal centers - an increase of 44.0%. Thus, the increase in the level of medical care for newborns led to a decrease in the mortality of mature and premature newborns in obstetric hospitals, but led to a simultaneous increase in morbidity due to the nursing of newborns born with extremely low body weight.

Keywords: newborns, premature newborns, the obstetric organization, neonatal morbidity, neonatal mortality.

Resumen

Para evaluar el estado de la atención médica para los recién nacidos en las organizaciones de atención obstétrica en 2013-2017, se analizaron los informes estadísticos oficiales del Ministerio de Salud de Rusia y la publicación del Servicio Federal de Estadísticas del Estado. Se encontró que, durante el período de estudio, la provisión de neonatólogos aumentó en un 2.8%, y la provisión de camas para la patología de los

recién nacidos y los bebés prematuros se redujo en un 2.9%. La incidencia de niños nacidos con un peso corporal de 1000 gramos y más disminuyó en un 5.0%, y la incidencia de recién nacidos con un peso corporal extremadamente bajo aumentó en un 14.1%. La mortalidad de los recién nacidos maduros y prematuros en las organizaciones obstétricas en su conjunto disminuyó en un 43.7%. De 2013 a 2017 en Rusia hubo una disminución en la participación de las organizaciones de nivel 1 (en un 5,6%) y el crecimiento de las organizaciones de nivel 2 y 3 (en un 4,2% y 25,0%, respectivamente). Debido a la regionalización de la atención obstétrica y perinatal, la proporción de nacimientos vivos en hospitales de maternidad de nivel 1 (departamentos) disminuyó en un 33,6% y 6,1% en los hospitales obstétricos de nivel 2, pero aumentó en un 26,7% en las organizaciones de atención obstétrica de nivel 3. La misma tendencia se observó en la distribución de las muertes de recién nacidos por niveles de hospitales: en los hospitales obstétricos de nivel 1 y 2, hubo una disminución de 47,4% y 40,9%, respectivamente, en los centros perinatales, un aumento de 44,0%. Por lo tanto, el aumento en el nivel de atención médica para los recién nacidos condujo a una disminución en la mortalidad de niños maduros y prematuros en hospitales obstétricos, pero condujo a un aumento simultáneo de la morbilidad debido a la lactancia de los recién nacidos con un peso corporal extremadamente bajo.

Palabras clave: recién nacidos, recién nacidos prematuros, la organización obstetrica, morbilidad neonatal, mortalidad neonatal

Introduction

Organization of medical care for newborn newborns in Russia is based on the principles of continuity of obstetric and pediatric services^{1,2}. The objectives of the modern neonatology service in the Russian Federation are to create comfortable conditions for a newborn child in an obstetric facility; to organize the joint stay of the newborn with the mother; to provide support for breastfeeding; to conduct screening studies and vaccination; to organize the process of treatment and nursing of sick or premature newborns^{3,4}.

The newborn period (neonatal period) is the period of adaptation of the child to the conditions of extra uterine life, which begins from the moment of his birth and ends when he reaches 28 days⁵. There are early (0 -7 days) and late (8-28 days) neonatal periods. In the neonatal period, a small circle of blood circulation starts, the lungs begin to breathe, the intestinal tract is populated by microorganisms, adapt to the new conditions of the thermoregulation system⁶⁻⁹. Therefore, the child during this period is very vulnerable and dependent not only on the mother, but also on the level of medical assistance and care, which is carried out by the staff of organizations of obstetrics, where he spends most of the early neonatal period^{10,11}. Accordingly, the organization of medical care for newborns is of great importance for its further physical and neuromental development¹².

Depending on the material and technical equipment and training of medical personnel to provide medical care to newborns in critical condition, all organizations of obstetric care are divided into three levels¹³. Most physiological and part of specialized maternity hospitals and departments belong to 1st level organizations. Maternity hospitals or maternity wards, profiled by type of pathology, the structure of which includes neonatal resuscitation department (the first stage of nursing) can be attributed to level 2. The 3rd level organizations are perinatal centers that have a neonatal intensive care unit and departments of the second stage of premature infants nursing^{14,15}.

For the purpose of international comparability of Russian statistics in the field of perinatology and in connection with the transition to the criteria of live birth and stillbirth adopted by the WHO, in 2012, all newborns born after 22 weeks of pregnancy with a body weight of 500 g were registered in Russia^{16,17}. Thus, it becomes expedient to study the state of medical care for newborns in the dynamics over the past five years, since 2013, in accordance with the new accounting standards.

Research objective

To assess the state of medical care for newborns in the Russian Federation in 2013-2017.

Materials and methods

In the course of this study, the official statistical reports and publications of the Federal State Statistics Service for 2013-2017, collections of "Basic indicators of maternal and child health, the activities of the service for child protection and obstetric care in the Russian Federation", of the Central Research Institute for the Organization and Informatization of Health Care of the Ministry of Healthcare of Russia for 2014-2018¹⁸⁻²⁰ were analyzed. In order to assess the state of medical care for newborns in the Russian Federation in 2013-2017, the indicators of fertility, provision of neonatologists and beds in pathology of newborns and premature babies, regionalization of obstetric and perinatal care in maternity hospitals (departments) and perinatal centers, morbidity and mortality of newborns in organizations of obstetric care were studied.

The regionalization of obstetric and perinatal care was assessed on the basis of an analysis of the distribution of ob-

stetric hospitals by levels of obstetric care organizations, born alive and deceased newborns, including those who died in the first 168 hours of life. In addition, the incidence of newborns born with a body weight of 500-999 and 1000 or more was assessed. The morbidity of newborns born from 1000 g and more was studied in both mature and premature infants.

Research results and their discussion

One of the indicators characterizing the availability of medical care is the provision of the population with medical personnel and beds of a certain profile. The provision of neonatologists in 2013 amounted to 31.0 per 10,000 newborns under the age of 1 year, in 2014 - 30.1 (-2.9%); in 2015 - 30.5 (+1.3%); in 2016 - 31.3 (+2.5%); in 2017 - 31.9 (+2.6 %). The positive dynamics of the indicator for five years was 2.8%.

The provision of beds for pathology of newborns and premature infants in 2013 amounted to 69.9 per 10 thousand newborns under the age of 1 year, in 2014 - 65.2 (-6.7%); in 2015 - 65.6 (+0.6%); in 2016 - 68.0 (+3.5%); in 2017 - 67.6 (-0.6%). In general, from 2013 to 2017, the provision of beds for pathology of newborns and premature babies decreased by 2.9%.

However, the assessment of the availability of neonatal care cannot be carried out without taking into account the availability of doctors and beds with a birth rate. The study showed that the dynamics of the birth rate in the Russian Federation in 2013-2017 was generally negative and during the study period the birth rate in Russia decreased by 12.9%. In 2013, the birth rate was 13.2%, in 2014 it slightly increased to 13.3% (+0.7%), in 2015, the birth rate remained at the level of 13.3%. Since 2016, the indicator began to decline to 12.9% (-3.0%), and in 2017 - to 11.5% (-13.5%).

The main objective of the neonatology service is to preserve the health of every child born, so the analysis of the morbidity of newborns in obstetric organizations is one of the main indicators of its work. It was established that for 2013-2017 the dynamics of the morbidity rate of newborns born with a body weight of 1000 g and more, was consistently negative. In 2013, the incidence of neonates per 1000 live births was 335.2 in 2014 - 331.4 in 2015 - 319.2, in 2016 - 319.1 and in 2017 - 318.3. During the study period, the value of the indicator decreased only by 5.0%.

However, the assessment of the overall morbidity rate of newborns with a body weight of 1000 g and more, does not give a complete picture of the health of newborns of this age, so it is advisable to study it for mature and premature newborns separately. Also, to create an overall picture, it is necessary to assess the incidence of newborns born with extremely low body weight. The level and dynamics of neonatal morbidity in Russia in 2013-2017 are shown in table 1.

Evaluation of the morbidity of mature newborns born with a body weight of 1000 g and more showed that it was lower than the overall figure and within five years fell by 6.3%. Accordingly, the greatest contribution to the increase in the incidence of newborns born with a body weight of 1000 g and more made the incidence of prematurity, which was more than 3 times higher than maturity. The dynamics of the indi-

cator in the studied years was multidirectional, but in general, the incidence of premature infants born with a body weight of 1000 g and more increased slightly (by 1.1%).

The morbidity of newborns with a body weight of 500-999 g in 2013-2017 was by 10 times higher than the morbidity of mature ones and by 3 times higher than the morbidity of premature newborns born with a body weight of 1000 g and more. In five years, the incidence of extremely low birth weight infants increased by 14.1%.

It is impossible to assess the state of neonatal care without studying the regionalization of medical care in obstetric care organizations. The system of regionalization of neonatal care is based on the principle of its provision, taking into account the corresponding risk to the life of the child, which contributes to efficiency and resource savings through the concentration of expensive technologies and highly qualified specialists in perinatal centers. The assessment of the distribution of obstetric care organizations by levels of obstetric hospitals revealed that from 2013 to 2017 there was a decrease in the share of level 1 organizations by 5.6% and an increase in level 2 and 3 organizations by 4.2% and 25.0%, respectively (table 2).

The analysis of the distribution of live births by levels of hospitals showed that in 2013-2017 there was a stable decrease in the proportion of newborns born alive in organizations of obstetric care of levels 1 and 2 (by 33.6% and 6.1%, respectively), and growth in organizations of level 3 (by 26.7%). The distribution of live births by hospital levels is shown in table 3.

The assessment of the distribution of deceased infants by hospital levels showed that in the studied years there was a decrease in the proportion of deceased newborns in hospitals of levels 1 and 2 (by 47.4% and 40.9%, respectively) and an increase in the proportion of deaths in hospitals of level 3 (44.0%). The distribution of deceased newborns by levels of obstetric hospitals in dynamics is shown in table 4.

The assessment of the distribution of deceased newborns in the first 168 hours of life by hospital levels showed that in the studied years there was also a decrease in the proportion of newborns in hospitals of levels 1 and 2 (by 42.6% and 36.4%, respectively) and an increase in hospitals of level 3 (46.8%). The dynamics of the proportion of deceased newborns in the first 168 hours of life depending on the level of obstetric hospitals is presented in table 5.

Table 1. Dynamics of morbidity of newborns in the Russian Federation in 2013-2017 (per 1000 newborns born alive)

Year	Morbidity of mature newborns born with a body weight of 1000 g and more	Dynamics (in %)	Morbidity of premature newborns born with a body weight of 1000 g and more	Dynamics (in %)	Morbidity of newborns born with a body weight of 500-999 g	Dynamics (in %)
2013	297,7	-	925,9	-	2872,6	-
2014	293,8	-1,3	920,1	-0,6	2924,5	+1,8
2015	280,7	-4,4	928,9	+0,9	3089,3	+5,3
2016	279,3	-0,5	937,3	+0,9	3243,8	+4,8
2017	279,0	-0,1	936,4	-0,1	3343,9	+3,0

Table 2. Distribution of obstetric care organizations by levels of obstetric hospitals in 2013-2017 in the Russian Federation (in %)

Year	Share of level 1 hospitals	Dynamics	Share of level 2 hospitals	Dynamics	Share of level 3 hospitals	Dynamics
2013	60,2	-	34,1	-	5,7	-
2014	60,1	-0,2	34,1	0,0	5,8	+1,7
2015	59,0	-1,8	34,9	+2,3	6,1	+4,9
2016	58,1	-1,5	34,9	0,0	7,0	+12,8
2017	56,8	-2,2	35,6	+2,0	7,6	+7,9

Table 3. Distribution of live births by hospital levels in the Russian Federation in 2013-2017 (in %)

Year	Share of live births in level 1 hospitals	Dynamics	Share of live births in level 2 hospitals	Dynamics	Share of live births in level 3 hospitals	Dynamics
2013	12,5	-	65,3	-	22,2	-
2014	11,7	-6,4	64,3	-1,5	24,0	+7,5
2015	10,4	-11,1	63,9	-0,6	25,7	+6,6
2016	9,6	-7,7	62,2	-2,7	28,1	+9,3
2017	8,3	-13,5	61,3	-1,4	30,3	+7,2

Table 4. Distribution of deceased newborns (total) by hospital levels in the Russian Federation in 2013-2017 (in %)

Year	Share of deceased infants in level 1 hospitals	Dynamics	Share of deceased infants in level 2 hospitals	Dynamics	Share of deceased infants in level 3 hospitals	Dynamics
2013	13,7	-	51,3	-	35,0	-
2014	10,8	-21,2	49,1	-4,3	40,2	+14,8
2015	9,6	-11,1	45,0	-8,3	45,4	+12,3
2016	8,8	-8,3	37,1	-17,5	54,1	+19,2
2017	7,2	-18,2	30,3	-18,3	62,5	+15,5

Table 5. Distribution of deceased newborns in the first 168 hours by hospital levels in the Russian Federation in 2013-2017 (in %)

Year	Share of deceased infants in level 1 hospitals	Dynamics	Share of deceased infants in level 2 hospitals	Dynamics	Share of deceased infants in level 3 hospitals	Dynamics
2013	15,7	-	54,4	-	30,0	-
2014	12,8	-18,5	52,2	-4,0	35,1	+14,5
2015	11,5	-2,7	47,6	-8,8	40,9	+14,2
2016	11,2	-2,6	40,1	-15,7	48,6	+15,8
2017	9,0	-10,6	34,6	-13,7	56,4	+13,8

Conclusions

1. There is a decrease in the morbidity of mature newborns by 6.3% and a slight increase in the morbidity of premature infants born with a body weight of 1000 grams or more (by 1.1%). However, the incidence of newborns born with a body weight of 500-999 grams is consistently high and has a negative growth rate of 14.1% over five years, due to the nursing of premature babies with extremely low birth weight.
2. The mortality rate of newborns in obstetric organizations in the Russian Federation during the study period decreased by 41.9% among mature infants, and by 46.2% among premature infants.
3. Despite the decline in the birth rate in recent years, access to health care for newborns has generally increased. This is evidenced by a slight fluctuation in the provision of neonatologists and beds of pathology of newborns and premature babies (not more than 3%) and a decrease in mortality in obstetric hospitals.
4. Due to the regionalization of obstetric and perinatal care in 2013-2017, the share of maternity hospitals (departments) of level 1 decreased by 5.6%, and the share of maternity hospitals (departments) of level 2 and perinatal centers increased by 4.2% and 25.0%, respectively.
5. The increase in the role of perinatal centers with neonatal resuscitation units and second-stage nursing units led to a marked increase in the proportion of newborns born alive, but also, as a consequence, to an increase in the proportion of deceased newborns, including in the first 168 hours of life.
6. The provision of more highly qualified and highly specialized medical care for newborns in obstetric care organizations led, on the one hand, to a decrease in neonatal mortality, and on the other hand, to a simultaneous increase in morbidity, which in the future requires significant resources to ensure the health of the child population.

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