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ORGANIZATION OF MEDICAL ASSISTANCE TO NEWBORN IN THE CONDITIONS OF THE PERINATAL CENTER: STATE, ADVANTAGES AND PROBLEMS

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ABSTRACT. The organization of medical care for newborns in Russia is based on the continuity of obstetric and pediatric services. In modern conditions the main principle of providing medical care to women during pregnancy, childbirth, the postpartum period, and newborns in the Russian Federation is its regionalization. The regionalization of obstetric and perinatal care involves the division of obstetric and gynecological hospitals into three levels, each of which has specific tasks and powers. In modern conditions, the regional perinatal centers, whose work is coordinated by the perinatal centers of the federal level, have become the leaders of the service for the protection of motherhood and childhood of the constituent entities of the Russian Federation. The activities of perinatal centers make it possible to concentrate in one place the most hardcontingent of pregnant women, women in childbirth, puerperas, newborns, who, based on the use of modern preventive and therapeutic and diagnostic technologies, are provided with timely highly qualified specialized medical care. Thanks to the introduction of a three-level system of medical care for pregnant women, women in childbirth, puerperas and newborns and the effective functioning of perinatal centers, it became possible to reduce perinatal, early neonatal and infant mortality. Thus, the introduction of perinatal centers at the federal and regional levels determined the procedure for transforming the obstetric service in our country and made it possible to significantly influence the demographic situation.

KEY WORDS: perinatal center; newborns; pregnant women; specialized medical care; regionalization of obstetric and perinatal care.

ОРГАНИЗАЦИЯ МЕДИЦИНСКОЙ ПОМОЩИ НОВОРОЖДЕННЫМ В УСЛОВИЯХ ПЕРИНАТАЛЬНОГО ЦЕНТРА: СОСТОЯНИЕ, ПРЕИМУЩЕСТВА И ПРОБЛЕМЫ

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РЕЗЮМЕ. Организация медицинской помощи новорожденным в России базируется на преемственности акушерской и педиатрической службы. На сегодняшний день основным принципом оказания медицинской помощи женщинам в период беременности, родов, в послеродовом периоде и новорожденным в Российской Федерации является ее регионализация. Регионализация акушерской и перинатальной помощи предполагает разделение акушерско-гинекологических стационаров на три уровня, для каждого из которых определены специфические задачи и полномочия. В современных условиях во главе службы охраны материнства и детства субъектов Российской Федерации встали региональные перинатальные центры, работа которых координируется перинатальными центрами федерального уровня. Деятельность перинатальных центров позволяет сконцентрировать в одном месте наиболее тяжелый контингент беременных женщин, рожениц, родильниц, новорожденных детей, которым на основе использования современных профилактических и лечебно-диагностических технологий оказывается своевременная высококвалифицированная специализированная медицинская помощь. Благодаря внедрению трехуровневой системы оказания медицинской помощи беременным, роженицам, родильницам и новорожденным и эффективной деятельности перинатальных центров удалось добиться снижения перинатальной, ранней неонатальной и младенческой смертности. Таким образом, внедрение перинатальных центров федерального и регионального уровня обусловило порядок преобразования службы родовспоможения в нашей стране и позволило существенно повлиять на демографическую ситуацию.

КЛЮЧЕВЫЕ СЛОВА: перинатальный центр; новорожденные; беременные; специализированная медицинская помощь; регионализация акушерской и перинатальной помощи.

The leading organisational model for the development of obstetric and perinatal care, recognised and used in the most developed foreign countries, is the three- level system of medical care for mothers and children. The three-level system implies the availability of a sufficient number of beds for the pregnant women, women in labour and newborns; a system for monitoring the health status of pregnant women and newborns and remote counselling systems; and the use of mobile forms of medical care, including medical evacuation, depending on geographical conditions and transport availability by the road or by the air transport [3, 36].

The organisation of medical care for newborns in Russia is based on the continuity of

obstetric and paediatric services. Today, the main principle of medical care for women during pregnancy, labour, postpartum period and newborns in the Russian Federation is its regionalisation. Regionalisation is the organisation of the stages of medical care, which ensures its maximum timeliness, adequacy, efficiency and safety at the most rational and low cost for the health care system [17, 42].

Regionalisation of the obstetric and perinatal service involves the division of obstetric and gynaecological hospitals into three levels, each with specific tasks and powers [17, 29]. This organisation of the service ensures continuity of care based on uniform standards for all levels and on uniform criteria for hospitalisation and transfer of complicated cases. Under the conditions of the formed three-level system of neonatological care at the regional level, a clear scheme (an algorithm) of routing of sick newborns to intensive care units, neonatal pathology units, as well as routing of newborns with congenital pathology and/or infectious and inflammatory diseases is approved [23–26].

The routing of pregnant women depending on the degree of perinatal risk was an indicator of the three- level system formed. All obstetric hospitals in the Russian Federation are divided into levels depending on their bed capacity, equipment and personnel support, according to their ability to provide medical care to pregnant women, women in labour and newborns. The criteria for assigning obstetric hospitals to the first, second and third groups are given in the order of the Ministry of Health of Russia from the 20th of October 2020 No. 1130 "On approval of the Procedure for the provision of medical care in the profile of "obstetrics and gynecology" [25].

The first level: obstetric departments of district hospitals that do not have a 24-hour on-call service of an obstetrician-gynaecologist, neonatologist, or intensive care physician, as well as medical organisations that have an emergency maternity ward. The first level organisations include the majority of physiological maternity hospitals (MH) and maternity departments (MD) with neonatology beds, including neonatal intensive care beds. Obstetric hospitals at the first level are used for the hospitalisation and delivery of patients of low obstetric risk group. Births at the first level are: premature (gestational age 37–40 weeks); with one foetus; and in a head position. The procedure for providing medical care to the newborn after delivery is the same regardless of the level of obstetric care organisation. All first-level obstetric care organisations are attached to second- and third-level obstetric care organisations.

The second level may include MHs (MDs), including those profiled by type of pathology, which have in their structure neonatal and premature babies' pathology departments, as well as neonatal intensive care wards. In addition, this includes the inter-district (inter-municipal) centre with a neonatal intensive care unit (NICU). Obstetric hospitals at this level deliver low- and medium-risk pregnant women. The functions of second-level obstetric hospitals include referral of high-risk pregnant women to a perinatal centre(PC). Second-level obstetric care organisations ensure cooperation with first-level medical organisations in the attached districts. Each subject of the Russian Federation appoints an obstetric hospital from second-level obstetric care organisations, which performs the functions of a third-level obstetric care organisation in the event of the closure of a PC.

The third level: obstetric hospitals with a department of anaesthesiology and resuscitation for women, a neonatal intensive care unit, a neonatal pathology department (stage II of nursing) and an obstetric distant consultation centre (ODCC).

Third-level obstetric hospitals are responsible for the hospitalisation and delivery of patients of any obstetric risk group. However, they will largely concentrate all pregnant and postpartum women with a high perinatal risk, including those with premature births (65 per cent or more) at 22 weeks' gestation and above, with the risk group being determined on the basis of the results of monitoring of pregnant women. The main contingent of pregnant women, women in labour and newborns: Severe extragenital diseases; severe pre-eclampsia and eclampsia; placenta previa and detachment; pregnancy complications contributing to hemostasis disorders and obstetric haemorrhage; preterm birth from 22 to 37 weeks of gestation; congenital malformations of the fetus requiring surgical correction; high obstetric and perinatal risk; critically low birth weight. It should be noted that in distributing pregnant women for delivery in obstetric hospitals, depending on the level, the condition of the mother that is of primary importance. Even with a healthy baby, the presence

of obstetric risk is a reason for admission to the next level of obstetric care [21]. Third-level organisations are perinatal centres (PCs) or MHs performing their functions, which have neonatal intensive care units and neonatal pathology units (stage II of nursing). The third level is divided into sub-levels A and B. The third A level is obstetric hospitals at the level of the constituent subject of the Russian Federation, which include regional PCs, and the third B level is obstetric hospitals of federal medical organisations providing specialised, including high-tech, medical care for women during pregnancy, childbirth, postnatal period and newborns (federal PCs) [22].

The establishment and development of a three-level model of obstetric and perinatal care in our country began in the early 2000s, when the problems of population reproduction were seriously discussed, and the level of maternal and infant mortality became a national problem. In this direction, various federal and regional programmes were developed and introduced into the activities of practical healthcare, which were supposed to significantly affect the reduction of these indicators. However, a stable normative and legal basis for the modern system of medical care for pregnant women, women in labour and newborns was formed somewhat later. In order to ensure the availability and quality of medical care for mothers and children, the Programme for the Development of Perinatal Centres in the Russian Federation was approved by the Russian Government Order No. 2302-p of the 9th of December 2013 [29]. The programme provided for the construction of 32 regional perinatal centres (PCs) in 30 of the most urgently needed regions of the Russian Federation over the next five years. The main objectives of this programme were to improve the territorial model of obstetric and neonatal care, to increase the efficiency of perinatal care and to reduce maternal and infant mortality, etc. As a result of the implementation of the programme, by 2018, most constituent regions of the Russian Federation had fully completed the formation of a three-level system of medical care for pregnant women, women in labour and newborns. Nevertheless, the Russian Federation Government Decree No. 1640 of the 26th of December 2017 approved the State Programme of the Russian Federation "Health Care Development" [20], which was to continue the Programme for the Development of PCs in the Russian Federation in 2013–2017, to improve the results achieved during its implementation. Among other goals, the new programme aimed to reduce infant mortality to 4.5 cases per 1,000 live births by 2024.

The main functions of the centres are: to provide consultative, diagnostic, therapeutic and rehabilitative care, mainly to the most difficult contingent of pregnant women, women in labour, newborn children and women with reproductive disorders through the use of modern preventive and therapeutic diagnostic technologies; to carry out interaction between maternal and child health care institutions; to carry out rapid monitoring of the condition of patients in need of intensive care; and to ensure the timely delivery of medical care to the most vulnerable groups of pregnant women, women in labour, newborn children and women with reproductive disorders. In addition, the functions of federal PCs include the development and replication of new methods of diagnosis and treatment of obstetric, gynaecological and neonatal pathology and monitoring and organisational and methodological support of obstetric hospitals in the constituent entities of the Russian Federation [14, 29, 40].

The structure of the PC should include:

1. The consultative-diagnostic department (polyclinic), including consulting rooms for pregnant women, office for non-pregnancy, consulting rooms for couples with impaired reproductive function, family planning office, offices of a general practitioner and other specialist doctors, office of medical-genetic counselling, office (room) of physio-psychoprophylactic preparation of a pregnant woman and her family for childbirth and partner labour, offices of anesthesiology and rehabilitation, offices of medical-psychological and socio-legal assistance to women, treatment room, small operating rooms, outpatient department (office) for young children in need of dynamic supervision and rehabilitation, department of assisted reproductive technologies, office of functional diagnostics, a physiotherapy department (office), a dental office, a day hospital with 10–15 beds (with a boarding house for visitors).
2. An obstetric hospital with a pregnancy pathology department; a labour ward (individual labour rooms) with operating rooms;

an anaesthesiology department with intensive care wards for women with a biochemical and functional monitoring group; an obstetric physiological department with joint stay of mother and child; an obstetric observation department (boxed wards, in their absence — isolation ward; wards for mother and child); a department of extracorporeal methods of haemocorrection; remote consultation center with anesthesiological and resuscitation obstetric emergency medical teams.

3. Paediatric hospital with neonatal departments of obstetric physiological and obstetric observation wards; neonatal intensive care unit with express laboratory; remote consultative centre with on-site anaesthesiology and resuscitation neonatal teams of emergency medical aid; neonatal and premature babies pathology department (stage II of nursing).
4. The gynaecological department.
5. The clinical-diagnostic department with clinical-diagnostic and bacteriological laboratories; with molecular diagnostics laboratory (if it is necessary).
6. The organisational and methodological department.
7. The administrative-economic unit with auxiliary services [14].

In modern conditions, the effectiveness of perinatal centers in Russian regions has been proven. A significant number of scientific studies covering federal districts and subjects of the Russian Federation have been devoted to this [5, 11, 13, 39]. The study conducted in the regional perinatal center of the Moscow Region allowed to identify reserves for improving the quality of medical care, which included: improving preventive care and medical examination of the female population; improving the links between the perinatal center and women's clinics, children's polyclinics and hospitals in the region; more vigorous use of modern technologies and medical and economic standards; improving the qualifications of medical workers, etc. The data obtained made it possible to develop and implement a number of measures aimed at improving the health status of mothers and infants. As a result, the availability and quality of obstetric and gynecological care for women increased, which had a positive impact on maternal and perinatal mortality rates. The morbidity of pregnant women has significantly decreased. The number of PC visits and bed occupancy per year increased, which led to an increase in its turnover [9].

The transformation of the municipal maternity hospital into the regional RC of the Kola North allowed for a complete change in the work of the obstetric hospital: the number of births increased, the share of non-resident women increased, the frequency of caesarean sections increased, etc. The introduction of the PC allowed to reduce infant and perinatal mortality rates (primarily due to early neonatal mortality). The maternal mortality rate has significantly decreased (6.5-fold reduction). It should be noted that the vast majority of women (97.9%) are fully satisfied with the medical care received at the PC [27].

A marked decrease in perinatal, early neonatal, and infant mortality (which had a favorable impact on the demographic situation in the Murmansk Region) was achieved due to the introduction of a three-level system of medical care for pregnant women, women in labor and delivery, and newborns, as well as the effective activity of the regional PC [15].

Analysis of the work of the Primorye Territory PC allowed the research team to identify both the strengths and weaknesses of its work. The strengths include the introduction of antenatal clinics into the structure of the PC, which allowed for continuity of care for pregnant women and gynecological patients. Due to social support from the state under the "Maternity Certificate" program, the number of births has increased. The opening and functioning of a neonatal pathology department, a neonatal intensive care unit, a rehabilitation department for children under three years of age, a consultative and diagnostic department for women with reproductive health disorders, and a gynecological department at the health center has made it possible to reduce fetoinfant losses and improve the quality of life of patients. One of the weaknesses is the shortage of highly qualified medical personnel (doctors, nurses and medical assistants). Thus, only 63.5% of all doctors had categories, and 56.6% of nursing staff had categories [6].

As a result of PC activity in Yaroslavl Region, the proportion of preterm births at the first and second levels decreased 2-fold. During the 4 years of PC operation, the birth of extremely low birth weight babies (ELBW) increased sig-

nificantly, which allowed to raise the proportion of their survival rate in obstetric hospitals in the region to 82.1% [7, 37].

The organization of a three-level obstetric care system in the Orenburg Region allowed to reduce infant mortality in the perinatal, early neonatal and neonatal periods of life. It is noted that further development of this system of obstetrics care will be facilitated by increasing the network of PCs and coordinated routing of pregnant women [2, 8].

However, in addition to perinatal centers, the activities of neonatal centers, neonatal pathology departments with intensive care units in multidisciplinary and specialized hospitals play a huge role in combating neonatal mortality [4, 33, 38, 43].

The formation of a modern system of emergency care for newborns began in Leningrad as early as 1978. The city's first neonatal intensive care unit was organized and opened in the multidisciplinary children's city hospital No. 1. At the same time, a specialized children's emergency medical aid substation was established on the territory of this hospital, which included teams providing reanimation and consultative care for newborns and working in close cooperation with this department. Already after 7 years of work of this substation on its base was organized a reanimation and advisory center for newborns, which made it possible to establish a system of monitoring of threatened conditions of newborns in the city. At the same time with the analysis of the work on rendering emergency care to newborns, the Resuscitation and Consultative Center performs the functions of a regional bureau of hospitalization of this contingent of patients. The main goals of this Center are: obtaining information about the newborn and completing a formalized medical history; assessing the severity of the patient's condition, the level of transportability and the profile of his pathology; consulting on the medical care of the infant before the arrival of the specialized ambulance; determining the urgency of its arrival and managing the visiting teams; determining the most appropriate mode of hospitalization; compiling a list of newborns in a threatened state; remote monitoring of infants who are in a threatened state. Specialized ambulances have life support systems, ventilators, incubators, infusion pumps, oxygen tanks and patient monitors. Each year, specialized teams transport more than 4000 newborns, of which half are critical infants [12, 13, 28, 37].

Over the last ten years, several more specialized neonatal intensive care units have been opened in children's city hospitals in St. Petersburg. All units have modern equipment and highly qualified staff [1, 10, 16]. The system of emergency and urgent care for newborns operating in St. Petersburg has proven to be highly effective in reducing early neonatal, neonatal and infant mortality [32].

One of the important functions of the maternity hospital/birth center is to increase breastfeeding rates. The value of natural breastfeeding is undeniable for any child, whether premature or premature, healthy or sick. Despite the fact that the third level, unlike the first and second level, contains the most difficult newborns who stay there for long periods of time, work to support, promote and protect natural feeding should be actively pursued. Since the PC is the leading medical organization at the third level of the obstetric care system, one of its main tasks is to promote and encourage breastfeeding among the mothers there. This work should be carried out in all units of the primary care center in accordance with the principles of objective evidence and continuity [19, 30, 34, 41].

For the PC, the implementation of the task of stimulating the breastfeeding should start from its consultative and diagnostic department. When a healthy newborn baby is born, its first breastfeeding is carried out in the delivery room, where counseling and assistance to the birthing woman on breastfeeding should be provided [26]. Continued promotion of natural breastfeeding and training of mothers in the correct feeding of their children continues in the postnatal ward. The organization of breastfeeding for premature and sick newborns in the intensive care unit and the neonatal pathology unit requires special attention [14, 28, 31, 33, 39, 42, 44].

The main indicators of breastfeeding assessment in obstetric hospitals are:

- "skin-to-skin" contact between mother and newborn in the delivery room during the first 5 minutes after birth and lasting at least 1 hour;
- putting the baby to the mother's breast during the first hour of the early neonatal period;
- the proportion of newborns who were exclusively breastfed from birth to discharge home from the hospital;

- the proportion of breastfed newborns at the time of discharge home [41].

A modern perinatal center provides highly qualified and highly specialized medical care to pregnant women, women in labor and delivery, and newborn babies [35]. Currently, 98 perinatal centers are functioning in Russia. Since they are the head institutions in the territory, it is necessary to organize and maintain close contacts of their leading specialists with medical organizations providing obstetric-gynecological and neonatological care at the first and second levels. To this end, constant methodological assistance, staff rotation and, according to some authors, revival of the institution of curation should be carried out [18, 28, 36, 40, 42, 43].

Thus, the introduction of new PCs at the federal and regional levels, where specialized, including high-tech medical care should be provided to pregnant women, women in labor and children of the first month of life, has determined the order of transformation of obstetrics service in our country. In the context of the ongoing reform of the maternal and child health care service, it is very important to constantly analyze the results obtained on perinatal care during its regionalization.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

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