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Introduction of successful breastfeeding principles to the system of medical care delivery to premature infants

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Optimal feeding in the early postnatal ontogenesis is especially important for premature infants with overlapping perinatal pathologies. As is known, unique properties of breast milk ensure adequate physical and neuropsychic development of children, as well as balanced development of metabolism; this is especially important for premature infants. The article presents the main stages of securing priority of breastfeeding for healthy infants: the history of development of the commonly known "ten steps" of breastfeeding for obstetric institutions and the objective impediments to implementation of these steps at neonatal resuscitation and intensive care units (NRICUs) and neonatal pathology units. A group of experts of the World Health Organization summarized experience of several neonatal inpatient hospitals in the framework of the Baby Friendly Hospital Initiative and formulated the basic principles of breastfeeding support for implementation at NRICUs. The experts emphasize utmost importance of a long-lasting contact with the mother (skin-to-skin) and teaching lactation preservation methods to mothers for the support of breastfeeding of premature infants. An attitude toward withdrawal from other feeding methods, rubber teats and pacifiers, as well as organization of breastfeeding "upon request" from premature infants is restricted due to peculiarities of health status and physiological maturity of such children. The experts state that mothers must remain with premature infants around the clock and the necessity of contact with other family members. They also emphasize the importance of preparation of parents to breastfeeding maintenance after discharge from hospital. Implementation of these modified approaches is expected to contribute to successful prolonged breastfeeding of premature infants.
Keywords: *breastfeeding, breast milk, premature infants, breastfeeding support, family-targeted aid.*

HISTORICAL BACKGROUND

In 1992, a joint program of the WHO/UNICEF (World Health Organization/an international organization operating under the auspices of the UN) came out to protect, promote and support breastfeeding for maternity facilities [1]. The development of this program was due to the prevalence of artificial infant feeding in most industrialized countries, given that breast milk substitutes were actively used in the first days of life. This has resulted in reducing the frequency and duration of breast-feeding and early introduction of supplementary and complementary feeding, associated by many researchers with long-term health problems - excess weight, gastroenterological diseases. In this context, a group of WHO experts stressed the importance of the initial phase of breastfeeding in the maternity ward and developed the basic principles (steps) to successful breastfeeding [2].

1. Strictly adhere to the prescribed rules of breastfeeding, regularly inform the staff and the mothers about them.
2. Train the medical staff in breastfeeding.
3. Inform the pregnant women about the benefits and techniques of breastfeeding.
4. Help the mother latch on in the first 30 minutes after the birth.
5. Train the mother in breastfeeding techniques and maintaining lactation, even if she is temporarily separated from the child.
6. Give the newborn infants nothing but the mother's breast milk (not another food or drinks), except for those who need that for medical reasons.
7. Ensure that the infant stays with the mother all day.
8. Encourage the baby to be latched on demand rather than on a schedule.
9. Give the newborn infants that are breastfed no breast simulating devices (pacifiers).
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital.

All these principles have been developed and implemented for healthy mothers and healthy mature infants. Naturally, paragraph 6 of these rules limits their use in newborn infants with different pathologies, especially in preterm infants. For these children, the determining factors in choosing the breastfeeding method is the degree of maturity and the character of perinatal pathology [3].

In real practice, both term infants with severe diseases and premature infants are much less likely to be breastfed in the first days than healthy children, although it is for this category of patients that the importance of human milk is particularly high, and individual approaches to its introduction are developed [3]. This is why based on improvements in neonatal care technology in 2009 [4], the WHO / UNICEF experts recommended partial use of the principles of successful breastfeeding in Intensive care unit "to support the most vulnerable mothers and babies."

In the past decade, the "Ten Steps" concept has proven effective for ensuring the optimal duration of breastfeeding and the prevention of long-term health problems [5-14], and although this provision has been used to support breastfeeding in healthy full-term infants, it indirectly contributed to increase in the frequency of use of breast milk at neonatal resuscitation and intensive care units [15-17].

It has been established that the use of breast milk in feeding premature infants in the first days and weeks of life is especially important, as in premature babies it features protective properties in terms of preventing necrotizing enterocolitis and neonatal sepsis; in addition, it has been proven that breastfed premature infants have a lower risk of developing retinopathy and bronchopulmonary dysplasia, and it has been observed that they have a more harmonious physical and psychomotor development [18-21].

THE MAIN OBSTACLES TO THE IMPLEMENTATION OF BREASTFEEDING IN NICU AND SECOND PHASE DEVELOPMENTAL CARE INSTITUTIONS

The reasons for the insufficient use of breast milk in NICU and neonatal pathology units (developmental care) are medical, biological, as well as medical social [22-24]:

• The medical and biological factors include the mother's health condition (impossibility of effective lactation) and pathology in infants (impossibility of early enteral feeding);
• The medical and social factors include the separation of the mother and the baby in the vast majority of the NICU and neonatal pathology units in Russia and abroad [25, 26].

In addition, there are psychological factors that hinder breast-feeding (or expression) at hospital significantly, including, as mentioned by the foreign authors, the mother's psychological discomfort, lack of confidentiality [26], as well as the objective reasons for the formation of late lactation in women who gave birth prematurely [27].

In 2009, WHO adopted an expanded version of the Baby Friendly Hospital Initiative [25], which includes a reference to the neonatal intensive care and the need to support mothers, especially at the stage of discharge from the hospital.

GUIDELINES DEVELOPED BY WHO EXPERT GROUP FOR THE SUCCESSFUL PROMOTION OF BREASTFEEDING IN NEONATAL HOSPITALS

For their strategy to promote breastfeeding in the NICU, the World Health Organization used the experience of individual neonatal care hospitals that took part in the Baby Friendly Hospital program [28-31] in Canada, Norway, Denmark and Sweden.

Rooming the mother with the sick newborn, skin-to-skin contact ("kangaroo care"), effective psychological help for mothers are of particular significance for the support of breastfeeding in NICU [32-34]. For premature babies, these approaches are particularly important: they contribute to the early initiation of breastfeeding in infants that were on long-term parenteral feeding [35-37]. Foreign experts emphasize the particular need to support a family in which the child was born prematurely. For this purpose, a group of WHO experts from Northern Europe and Canada prepared an addition to the program to promote breastfeeding in the NICU and neonatal pathology units [38].

This addition includes three guiding principles:

1) individual approach of the medical staff towards every mother;
2) organization of family-oriented support for nursing mothers;
3) continuity of pre-, peri- and post-natal care of the infant and help after the discharge from the hospital.

It should be noted that the above principles have long been implemented in practice of many local newborn and premature infants care units [39].

Principle No. 1: Individual approach to every mother

In addition to neuroendocrine and somatophysical reasons preventing the timely establishment of lactation in mothers who gave birth prematurely, there are also psychological factors that hinder lactogenesis: as a rule, these women are in a constant state of emotional stress and anxiety for the health of the premature infant [40-42]. The mother's posttraumatic stress may have long-term adverse effects, hinder the formation of infant-mother attachment [43-45]. In this case, the main obstacle in strengthening mother-infant contacts in the NICU is the separation of the child from the mother, her limited presence at hospital and preventing the child from seeing other relatives [46], which is why the principle known as non-separation in the English literature is important [38]. This principle of the mother staying together with the baby at hospital is also important because it allows us to train the mother in the methods of care for the weak infant and reduce her anxiety about the forthcoming discharge from the hospital.

Mothers of premature infants describe their idea of their milk as the relationship between them and the baby, they strongly associate lactation with the concept of "motherhood", and if it is impossible to start breastfeeding, they perceive their psychological state as inability to feel a mother [47, 48].

Realizing the benefits of breastfeeding for the infant’s development, the mother may feel obliged to provide a certain amount of milk. Inability to meet the expectations implied in the initiation and/or volume of lactation can lead to feelings of failure, frustration and shame. A woman may perceive breastfeeding only as a necessary task, losing the sense of mutual pleasure of communicating with the child [49].

Due to the lack of lactation, many mothers experience depression and guilt before the child [47-50]. The most "vulnerable" (i.e. prone to depressive states) are nulliparous mothers of sick and premature babies, as well as multiparous mothers with long intervals between births, women with low socioeconomic status, drug and nicotine addiction, as well as young mothers [51]. Each of these mothers needs special medical and psychological counseling on lactation in a fiduciary relationship to her special problems [42, 52]. Women emphasize that support at the beginning of lactation and breastfeeding should be offered with compassion and respect, in an ethically and psychologically acceptable way.

Special needs of the mother should be considered when developing and implementing clinical practice guidelines, particularly with regard to those who:

— Failed to initiate lactation;
— Failed to provide the required amount of milk to her child;
— Decided not to breastfeed at all [38].

Principle No. 2: Family support: family-oriented nursing of sick newborns

The concept of family-oriented care in neonatology is based on the recognition of the important role of parents and their active participation in the nursing of the sick newborn.

This concept involves a trusting cooperation of NICU and neonatal pathology units medical personnel with the parents, mutual informing on the infant's reaction, the organization of hosting not only the mother but also other family members, especially the infant's father, which requires not only the relevant living conditions but also quite a high level of general culture from both the parents and the medical personnel [53, 54].

The rights and obligations of both parents are enshrined in the famous UN Convention on the Rights of the Child [55, 56] For example, Article 7 states that the child has an inborn right to know his or her parents and a right to their care; Article 9 states that the child should not be separated from his or her parents against his or her will, except when competent authorities determine that such separation is necessary in the interest of the child.

The concept of family-oriented care is becoming more common in the leading neonatal clinics around the world and is based on the understanding that parents are the most important people in the life of their baby, and should act as primary caregivers (taking into account the child's condition and medical care provided).

The main components of family-oriented care are dignity and respect, information sharing, participation and collaboration.

It is necessary to take into account not only the rights of the mother, but also of the father, to contact with the child and participate in nursing, especially in those frequent cases where the condition of the mother after birth does not allow her to be around the baby: the fathers can have (if the necessary conditions are provided) skin-to-skin contact with the baby ("kangaroo care"), study methods of baby care, prepare the child for meeting the mother [57-60].

At NICU, it is difficult to create the conditions necessary for a confidential (isolated) stay of the parents with their baby because of the need for constant monitoring of the infant's condition, numerous diagnostic and therapeutic procedures, but comfortable conditions for parents are something we should aim at: placing the appropriate furniture (comfortable armchairs), equipment, including equipment for breastfeeding [61].

The privacy of nursing mothers and parents in NICU should be protected by screens or curtains; the levels of light, sound and intensiveness of health care must be modified according to the needs of the baby and the parents.

The units hosting sick newborns together with their mothers successfully implemented the principles of the programs for individual gentle and developmental care of the newborn (Newborn Individualized Developmental Care and Assessment Program, NIDCAP), through which the children previously transferred from tube feeding to breastfeeding [61-63].

Principle No. 3: The need to ensure continuity of medical care for the newborn at all stages, starting with prenatal observation.

For NICU and second phase developmental care units staff, it is particularly important to ensure continuity in the nursing of newborns between these stages, as well as the provision of adequate care for the baby after discharge from the hospital.

I.e., the medical care must be provided continuously to the child; awareness-building of family members by physicians is to address the most troublesome problem for the parents, including the prenatal period [63-66]: the situations of risking to bear a sick or a premature child (sudden start of premature labor, complications during childbirth), the first minutes and hours of life, revealing a perinatal pathology, the need for prolonged resuscitation and intensive care; the necessity and possibility of transporting a child to an institution of higher level or from a NICU to the second

stage developmental care unit, the need to re-transport the newborn to a specialized hospital for expert care.
Continuity of care is achieved when childbirth is consistent with the changing needs of the infant and the family [67]. In addition, at any time of medical care provision, the parents need to understand that its activities are based on a policy shared by all the staff, and they do not get any conflicting information or advices.
Mothers describe the conflicting advice of different health care professionals as the leading cause of the "barrier" on the path to successful breastfeeding; frequent changes of feeding methods and premature infant care strategies, as well as the practical approach to counseling on breastfeeding, associated with condemning, critical or uncaring attitude and lack of empathy.
On the contrary, the continuity care provided by medical staff/experts on breastfeeding improves the woman's perception of activities aimed at supporting breastfeeding.
The approach to family-oriented care also includes assistance in ensuring the presence of parents and providing them with the main role in baby care.
Parents should be sure that the medical staff is caring, aware of the medical case of the child and the amount of medical care, and that they will be continuously informed about the current situation by the staff.
The continuity of the physical environment of the child in NICU (nursing care, parents room and other family-oriented facilities) should also be provided.
In second phase developmental care institutions, it is particularly important to provide contact with parents during the preparatory period of discharge, including communication with the relevant parental health social structures, if the infant's condition requires further intensive treatment at home (supply of oxygen, enteral feeding) to gradually prepare the infant for the implementation of breastfeeding.
In this context, educational programs for parents, individual and group training sessions acquire crucial importance [67]. A continued promotion of the benefits of breastfeeding by health professionals at all the stages of the observation of the infant is necessary [68]. Continuous participation of parents in baby care helps optimize their psycho-emotional status and increases the possibility of full breastfeeding [69].

4. Modification of the "Ten Steps to Successful Breastfeeding" program for NICU conditions

In 2013, taking into account the new approaches and opportunities for nursing critically ill and premature infants, a group of WHO experts that formulated the three leading principles of breastfeeding stated above, introduced the formulations of the "Ten Steps to Successful Breastfeeding" adapted for NICU conditions [70].
In general, these formulations are characterized by a clear specification of each of the principles for promoting breastfeeding.
Step 1 consists in a written clearance of the priority of breastfeeding among health workers (the unit personnel).
Step 2 provides specific preparation (training) for NICU staff to implement the breastfeeding program.
Step 3 declares the mandatory informing of hospitalized pregnant women at risk of premature birth or mature birth defects about the priority of breastfeeding for weak infants and the methods for ensuring lactation.
Step 4 is especially important to prepare for breastfeeding in preterm infants. It declares the mandatory implementation of the neonatal prolonged contact with the child's mother, skin-to-skin contact, or "kangaroo care", at hospitals. The authors point out that in a well-equipped NICU, this method can be used in preterm infants with postmenstrual age of as early as 28 weeks with birth weight of 600g, if the child's condition is stable. It has been established that this method increases the amount of lactation, accelerates initiation of breastfeeding and

prolongs its duration, especially if the mother continues to practice such contact with the child and after discharge from the hospital.

Step 5. Oblige medical personnel to teach mothers how to maintain lactation, including using a manual decantation and breast pump. The only criterion for determining the date of commencement of applying a premature baby to the breast should be the stability of its state.

Step 6 regulates abandoning any food or drink (other than breast milk). This step imposes restrictions on patients and premature infants or babies with severe condition at birth (requiring a long-term full or partial parenteral nutrition or a special nutritional formula due to such conditions as galactosemia, or oral administration of formulae based on amino acids, or drinking a lot of liquid in connection with exsiccosis or jaundice, or due to lack of breast milk, the mother's reluctance to breastfeed, or rejection of the donated breast milk). It is specifically stated that receiving fortifiers with breast milk by preterm infants is considered breastfeeding. No distribution of promotional materials from companies producing formulae of breast milk substitutes is allowed at hospitals.

Step 7 provides day and night rooming for mothers and infants in the NICU and nursing units (joint hospitalization, the unit organization based on "Mother and Child" principle), ideally single rooms for infants and their families. It has been established that this working arrangement at hospitals promotes a more rapid increase in weight gain in premature infants and a higher frequency of breastfeeding at discharge from hospital.

Step 8 regulates feeding healthy term infants "on demand"; in sick and premature infants it requires that the restriction of its use be specified in conjunction with the clock method of feeding (partly baby-led feeding), as well as control over the resulting amount of food (weighing) and, if necessary, using other methods for introducing milk (enteral and bottle feeding). It is necessary to provide psychological support and assistance to mothers when latching on a premature infant, an explanation of the provisionary need for supplementing, the duration of which is determined by individual characteristics and the child's degree of maturity.

Step 9 allows the minimal use of cup feeding with expressed milk and pacifiers during the transition to full sucking in sick and premature babies, and a limited use of pacifiers to soothe the baby. Foreign pediatricians suggest that "cup feeding" has less negative impact on the habituation of the child to the breast than bottle feeding.

Step 10 provides training for and preparation of the parents to continue breastfeeding after discharge from the hospital, as well as communication with breastfeeding support groups (School for mothers at hospital, individual or group training sessions, interviews with a psychologist); as well as informing mothers about the possibilities of expert supported breastfeeding.

CONCLUSION

Because there are specific benefits of breast milk and breastfeeding for preterm infants and their mothers, it is important to ensure that lactation and breastfeeding are supported professionally, and all the assistance and information provided should be conclusive, individualized and consistent.

All the health care workers at different stages of premature infants care should be aware of the basic principles of the "Ten Steps" of successful breastfeeding, modified with a consideration of the special needs of sick and premature babies.The implementation of these modified approaches is expected to contribute to successful prolonged breastfeeding of premature infants.

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