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## DEVELOPING TAILORED CLOTHING FOR CHILDREN WITH SPECIAL NEEDS

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**Abstract.** This article provides an analysis of the development clothing systems effectiveness that are tailored to preventive interventions for premature babies. An analysis of the clinical trials conducted has been framed in a contemporary development model that emphasizes the role of clothing and its requirements for the characteristics of premature babies. The products used suggested that positive outcomes could be understood in terms of improving the development pathways associated with parental sensitivity and their participation in intensive care of children. The conceptually described products have all the features recommended to premature babies depending on the degree of gestation.

**Keywords:** *clothes for baby, preterm birth, intervention effectiveness, developmental mechanisms.*

### Introduction

In many foreign countries, the notion of adaptive clothing is increasingly used. These items of clothes help to facilitate the development and growth of children with special needs, to offer ergonomic and functional products, adaptable and transformable clothing for children with special needs, especially those born prematurely, can facilitate the process of medical procedures, education and care, meeting the requirements of a group of consumers for this type of clothing.

Existing clothing products do not take into account the physiological characteristics and affect the lives of children, their special needs and the gestation age. The using of existing clothes every day and in the process of treating a child makes it extremely difficult to take care of him.

Prematurity is defined as an underdeveloped newborn child with a low birth weight that is born before 37 weeks of gestation [1,3]. Other terms used to describe prematurity are: "preterm" and "preemie." Infants having a gestational age of 35 and 37 weeks are termed 'moderately premature', those born between 29 and 34 weeks of gestation are termed 'very premature', and those born at 28 weeks of gestation or less are termed 'extremely premature'.

More than 2000 premature babies are born every year in the Republic of Moldova (figure 1). In Romania, 18,000 children are born prematurely, that is, every 30 minutes, a child is coming faster in the world. After maternity critical days, a preterm needs permanent visits

to physicians and specialists at shorter intervals than a child born on time. According to statistical data recorded over 5 years (Figure 1), there are a large number of premature births; the data are taken from the National Bureau of Statistics of the Republic of Moldova and Romania.



**Figure 1.** The number of children born prematurely during 5 years (2012 – 2016).

Products for premature babies should be developed taking into account medical indications and changes to the child's body, which affects the constructive and functional structure of the garment. When designing clothes, ergonomic, aesthetic and technological parameters should be considered. This type of product will help reduce the feeling of discomfort, increase motor and cognitive activity, improve the quality of life of the child and their parents (easy of child care, parental moral satisfaction). Designed products will help prevent traumatization of the child when dressed to reduce the painful effect. Parents will be able to spend less time on child care, get positive emotions from communication. In adaptive clothing it is necessary to use such closure systems so that the parent or physician can easily use the products.

### Conceptual development of clothing products

The product concept that has been developed has taken into account the suitability of the color range used, the assortment of products to ensure ease of use and appearance of the products developed.

When designing clothes for premature babies, it is necessary to ensure the ergonomics of clothing:

- to determine the characteristics of the child's body functioning, the nature and evolution of the developmental state, the age of gestation;
- identification of the working conditions of the garment (the conditions of operation determine the type of clothing, its parameters and basic elements, the principles of constructive and technological solutions);
- analyze the daily routine (identifying standard positions and movements);
- carry out anthropometric research and study changes in the body of a child;
- determining, if necessary, lightweight additions for dimensional characteristics;
- determining material requirements by type of prematurity.

The choice of constructive and technological solutions for the given clothing is based on the identification of the individual factors of the working conditions and the structural elements of the garment, as well as the search for innovative design solutions that ensure the necessary functionality of the garment.

To have aesthetic look, it is necessary: - to ensure artistic expression, harmony and stylistic unity; - perform, if necessary, correcting the proportions of the figure by using techniques based, for example, on visual illusions; - puts accents correctly in clothes; - use correctly the possibilities of modeling and aesthetics of materials; - to use soft materials, 100% cotton fiber, - to ensure the accuracy and attention of the technological processing and finishing of the structural elements accessible to the external perception; - to be a small number of stitches; - to use methods of smooth technological processing, not to affect the skin of children.

The constructive and technological features of the products should be developed taking into account the particularities of the functioning of the child's body. For children with certain groups of prematurity, it is recommended to use fully removable products (body, overalls figure 2). Fastening system: shoulder stitch and middle stitch sleeves, front middle, legs. These products will provide the comfort of parents' clothing and care staff.



**Figure 2.** Clothes for premature babies in therapy own designs.

Premature babies are very sensitive [4, 5], so they need clothes with a certain type of technological treatment (the stitches should not cause a child's skin irritation), made of soft natural fabrics without stiff parts. For this group of children, it is good to develop waterproof pillows that will be made of modern breathable materials with a 100% cotton top layer.

For children who have undergone surgery or are connected to medical devices (figure 3), it is necessary to make a sufficient number of connectors in the garment designed for easy dressing. At the outlet of the tubes there is provided a removable special detachable window and detachable part. This will provide easy access to the tube and the necessary handling as well as aesthetic appearance.

Clothes for premature infants in the intensive care unit [6] should be designed to be very small, easy to use, 100% cotton. The clothing will serve as psychological help for parents. An important point is the use of the psychological characteristics of the color, which can be used according to the state of health to calm or increase the activity of the child.

At present, in our country, the development of children's clothing with special destination is strictly individual. Parents adapt to the use of existing products, in some cases children are not dressed due to the lack of these adapted products.

### **Methods and materials**

The main goal of the study is to develop comfortable neonatal textile products for premature babies. The design methodology was focused on the use of particular

anthropomorphic data, and on the overall characteristics of the shape of the finished product, as well as on technical and compositional requirements for children's clothes. To achieve this goal, some survey methods and expert assessments have been used, and anthropometric studies have been carried out for the development of the prototypes. During the work, a number of tasks were solved, such as: the definition of the conditions for the use of clothing for premature babies in medical incubators; the study of clothing analogy for premature infants; the requirements for children's clothing materials; the development of a draft design that meets the requirements; the constructive design of the functional clothing models for premature infants in the intensive care unit. The practical importance of this work lies in a multifaceted theoretical approach based on the study of bibliographic resources on these specific topics, and in further practical applications of the acquired knowledge with the goal of creating functional clothing for premature infants in the intensive care unit [1].

## Conclusion

A conceptual approach of adaptive clothing for this category of children with special needs was developed in collaboration with neonatologists from the Republic of Moldova. These products have ergonomic, operational and aesthetic properties in combination with functional, design and technological factors. For the first time, these products [2] were tested in the reanimation and intensive care units in Chisinau. The results of the project will ensure the development of a range of adaptive and reusable clothing for the identified category of children, requirements for materials and structures, as well as the creation of an information base for clothing design. As the groups of prematurity are different and depend on several factors, for each child will be able to choose the required clothing range based on recommendations for a particular type of medical investigation.

In the context of experimental researches there have been designed several types of products that can be used for the babies placed in the incubator (Figure 2). Some products designed for premature babies have been defined, which are folded to form holes for head, arms and legs. These products resemble sacks, involving the attachment of some elements to form holes for head and arms covering the legs like coveralls. The dimensions of the products have been designed to ensure hygienic product usage.

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