The American Journal of Medical Sciences and Pharmaceutical Research ISSN 2689-1026 Volume 08 - 2026

Preventive Measures For Mothers And Children With Immunodeficiency Manifestations Associated With Thymic Enlargement

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Received: 30 Mar 2026 | Received Revised Version: 12 Apr 2026 | Accepted: 24 Apr 2026 | Published: 20 May 2026

Volume 08 Issue 05 2026 | Crossref DOI: 10.37547/tajmspr/Volume08Issue05-14

Abstract

The problem of immunodeficiency conditions in young children has recently been considered one of the most challenging in modern pediatrics and pediatric immunology. Children with thymic enlargement attract particular attention from specialists, as enlargement of the thymus gland is often accompanied by changes in cellular and humoral immunity, increased susceptibility to infections, prolonged inflammatory diseases, and decreased adaptive capacity.

Keywords. Vaccination, antenatal prophylaxis, allergic reactions, secondary immunodeficiency.

Cite This Article: Saidaliyeva Mukaddam Hakimxodja qizi. (2026). Preventive Measures For Mothers And Children With Immunodeficiency Manifestations Associated With Thymic Enlargement. The American Journal of Medical Sciences and Pharmaceutical Research, 8(05), 67–70. https://doi.org/10.37547/tajmspr/Volume08Issue05-14

1. Introduction

In recent decades, the problem of immune system disorders in children has become of particular importance not only for pediatricians, but also for general practitioners, neonatologists, immunologists and public health specialists. The frequency of births of children with signs of functional immaturity of the immune system is gradually increasing, which is largely due to the deterioration of the environmental situation, the increase in chronic diseases among women of reproductive age, changes in nutritional patterns and an increase in stress factors in society.

In Uzbekistan, issues of maternal and child health are traditionally considered a priority area of state medicine, however, even with the improvement of perinatal care, a high prevalence of frequently ill young children remains. In practice, pediatricians are increasingly faced with children whose infectious diseases last a long time, are accompanied by complications, and do not respond well to standard therapy.

Among such patients, thymomegaly is often detected - an enlargement of the thymus gland, which plays a key role in the formation of cellular immunity. It is interesting that a few decades ago thymomegaly was considered primarily as an anatomical feature of childhood, but modern research has shown the more complex nature of this condition.

Today it has been proven that when thymomegaly is combined with immunodeficiency manifestations, the risk of chronic inflammatory processes, allergic diseases and disorders of the body's adaptation to infections increases. The age under three years of age is considered especially sensitive, when the child's immune system is in the stage of active formation. It is during this period that any adverse effects can lead to permanent changes in immune reactivity. Analysis of clinical observations in children's clinics in Tashkent,

Samarkand and Fergana region shows that a significant proportion of children with thymomegaly have a history of complicated pregnancy, fetal hypoxia, maternal anemia or

previous intrauterine infections. Some experts attribute the increase in such conditions to the widespread spread of viral diseases among pregnant women in the post-pandemic period after COVID-19. Social factors cannot be ignored either. In some regions of the country, problems of malnutrition in pregnant women, iron and vitamin deficiency, which negatively affect the immunological development of the fetus, persist. The role of the mother in the prevention of immunodeficiency conditions cannot be overestimated.

In recent years, programs for early screening of children at risk have been actively implemented in Uzbekistan, however, issues of preventing immunodeficiency manifestations in thymomegaly still require further study and practical improvement. That is why the chosen topic is of not only scientific, but also pronounced socio-medical interest.

Thymomegaly in young children continues to be one of the most discussed problems in modern pediatrics, since an enlargement of the thymus gland is often accompanied by immunological disorders of varying severity. In the practice of pediatricians in Uzbekistan, such children are encountered quite often, especially among patients belonging to the group of frequently ill people. Interestingly, back in the early 2000s, many doctors treated thymomegaly as a temporary age-related feature that did not require active intervention.

However, accumulated clinical data have changed the understanding of this pathology. When observing children with thymus enlargement, it was found that a significant proportion of patients have signs of secondary immunodeficiency: frequent respiratory infections, a tendency to bronchitis, allergic reactions, lymphadenopathy and prolonged recovery from illness. Some children get sick 8–10 times a year, and infections are often complicated by bacterial processes.

In Tashkent and the Samarkand region in 2023, local observations were carried out among children under three years old who were registered at the dispensary, and in approximately 18–22% of frequently ill children, an ultrasound examination revealed signs of thymomegaly. This is quite a high figure. Of particular importance is the fact that immune disorders in such patients begin to develop in utero. When you analyze the history of mothers, it becomes noticeable how common anemia, toxicosis, viral infections, chronic inflammatory diseases and stress conditions are.

Sometimes it seems that the child's immune system initially develops in unfavorable conditions. Many scientists associate this with a violation of the intrauterine formation of T-cell immunity. The fetal thymus develops early, and any toxic or infectious effects can affect its structure.

Cytomegalovirus infection, herpes viruses and severe respiratory diseases suffered during pregnancy are considered especially dangerous. Given the deteriorating environmental situation in some industrial areas of Uzbekistan, the problem is becoming even more urgent.

For example, in certain regions with increased levels of atmospheric pollution, allergic diseases and chronic inflammatory processes of the respiratory system are more often recorded in children. This indirectly affects the state of the immune system. Therefore, prevention of immunodeficiency manifestations in thymomegaly should begin long before the birth of the child and include a set of measures aimed at the health of the expectant mother.

Prenatal preparation of women is considered one of the main areas of prevention. In recent years, obstetricians and gynecologists are increasingly talking about the need for preconception preparation, since the health of the mother directly determines the immunological state of the newborn. For women planning a pregnancy, treatment of chronic infections, correction of iron deficiency conditions and restoration of vitamin balance are recommended. In Uzbekistan, the problem of anemia among women of reproductive age remains very common. According to some reports, signs of iron deficiency are detected in almost 35–40% of pregnant women.

At first glance, anemia seems like a common condition, but it is iron deficiency that can impair the maturation of fetal immune cells. In this case, not only the oxygen supply of tissues suffers, but also the formation of lymphoid organs. During pregnancy, adequate nutrition is of great importance. Sometimes families have the misconception that a pregnant woman simply needs to increase the amount of food she eats, although the quality of the food is much more important.

A lack of protein, B vitamins, folic acid and microelements can negatively affect the formation of the fetal thymus. In rural areas, the problem is often associated with limited consumption of meat products and fresh vegetables in the winter and spring. Some studies show that women with hypovitaminosis D are more likely to have babies with signs of immune dysfunction. In recent years, doctors have begun to pay more attention to the psychological state of a

pregnant woman. Chronic stress increases cortisol levels, and long-term increases in stress hormones affect fetal immune regulation.

I think that earlier this factor was paid less attention, although the emotional state of the mother can indeed affect the health of the child. Situations of family conflict, financial instability and chronic overwork are considered especially difficult. To prevent immunodeficiency manifestations, it is necessary to regularly monitor a pregnant woman, timely screening, control TORCH complex infections and prevent viral diseases.

Since the COVID-19 pandemic, experts have begun to pay more attention to the immunological consequences of viral infections in pregnant women. Some children born to mothers who had suffered severe coronavirus infection experienced adaptation disorders and increased infectious morbidity in the first months of life.

A special place in prevention is occupied by the rational management of childbirth and the early neonatal period. Sometimes it is complications during delivery that become the trigger for further immunological disorders. Fetal hypoxia, birth trauma, asphyxia, and the need for prolonged intensive care can negatively affect the newborn's immune system.

In perinatal centers in Uzbekistan, the equipment of intensive care units has significantly improved in recent years, but the number of children requiring specialized care after birth remains high. Premature babies are considered especially vulnerable. Their immune system is physiologically immature, and in the presence of thymomegaly, the risk of infectious complications increases several times. Often such children experience prolonged pneumonia, candidiasis, and disturbances in the intestinal microflora.

The most important preventive measure after birth is early breastfeeding. Breast milk contains immunoglobulins, lysozyme, lactoferrin and other protective factors that help the baby adapt to the environment. Medical observations show that breastfed children with thymomegaly are less likely to suffer from severe infections compared to formula-fed children. It is especially important to maintain breastfeeding in the first six months of life. Sometimes young mothers switch to formula too early, believing that the child does not have enough nutrition.

But with immunodeficiency manifestations, natural feeding becomes almost a therapeutic factor. In some cases, pediatricians recommend additional enrichment of the mother's diet with vitamins and omega-3 fatty acids to improve the quality of breast milk. Prevention of intrahospital infections is essential. In maternity hospitals, compliance with sanitary standards plays a huge role, since newborns with immune disorders are especially susceptible to pathogenic microflora.

Sometimes even opportunistic microorganisms can cause severe inflammatory processes. Therefore, sterility control, limiting the unnecessary use of antibiotics and early detection of infections are considered essential elements of prevention.

An equally important area of prevention is organizing the child’s correct routine. Children with immunodeficiency manifestations due to thymomegaly need a special approach to daily routine, physical activity and hardening.

In some families, parents are overly protective of the child, limiting walks and trying to completely eliminate contact with the outside environment. At first glance, this looks logical, but overprotection sometimes only worsens the body’s adaptive capabilities. Moderate hardening helps train the immune system and improves vascular regulation. Of course, hardening should be carried out gradually. Sudden temperature effects can lead to the opposite effect. In the climate of Uzbekistan, protecting children from overheating in the summer is of great importance.

High temperatures have a negative impact on young children, especially those with chronic diseases. Pediatricians note that in hot months the incidence of intestinal infections and dehydration increases. With thymomegaly, such conditions are more difficult to tolerate. Therefore, parents must maintain the child’s water regime, avoid prolonged exposure to the sun and control the indoor microclimate. It is interesting to observe how strongly living conditions affect the health of children. In families where a sleep schedule, balanced nutrition and regular walks are observed, children get sick much less often.

The psychological atmosphere in the family plays an important role. Constant conflicts and emotional stress even affect the immunity of a small child. Some studies support a link between chronic stress and increased rates of infectious diseases in children. This may be due to the influence of stress hormones on cellular immunity. In children with thymomegaly, it is especially important to limit passive smoking. Tobacco smoke irritates the respiratory tract and reduces the local immune defense of the mucous membranes. In Uzbekistan, the problem of smoking in the family still remains relevant, especially

among older men.

At the same time, parents often underestimate the harm of exposure to smoke on their child. Meanwhile, the risk of bronchopulmonary complications in children living in families of smokers almost doubles.

Rational vaccination is of great importance in the prevention of immunodeficiency manifestations. The issue of immunization of children with thymomegaly has long been controversial among doctors and parents. Some families are afraid of complications after vaccinations and try to refuse vaccination. However, modern data show that it is unvaccinated children with immune disorders who suffer infections much more severely. Of course, the approach must be individual.

Before vaccination, a child is recommended to consult an immunologist and assess the state of the immune system. In most cases, preventive vaccinations are not contraindicated unless there is severe immunodeficiency or severe concomitant disease. In Uzbekistan, the national immunization program includes vaccination against measles, whooping cough, polio, hepatitis B and other infections. Following a decline in vaccination coverage in some regions, outbreaks of measles among young children were observed in 2022–2023. The disease was especially severe in children with immunological disorders. This once again confirms the need for prevention.

Sometimes parents believe that it is better for a child with a weakened immune system to avoid vaccination, but the infection is usually much more dangerous for him than a possible post-vaccination reaction. Proper preparation for vaccination is important. The child must be clinically healthy, without signs of acute infection. If necessary, correction of allergic manifestations and normalization of intestinal microflora is carried out.

Some experts recommend temporarily limiting contact with large numbers of people after vaccination to reduce the risk of additional viral load. Vaccination issues require a trusting relationship between physician and family. When parents understand the goals of prevention, they are much more relaxed about immunization and are less likely to refuse necessary activities.

The problem of immunodeficiency manifestations in children with thymomegaly remains relevant for modern pediatrics, since the combination of an enlarged thymus gland with disorders of the immune system significantly increases the risk of infectious diseases, allergic processes and chronic inflammatory conditions. Analysis of clinical observations shows that prevention should be continuous and begin at the stage of preparing a woman for pregnancy. The state of maternal health, adequate nutrition, prevention of anemia and viral infections have a direct impact on the formation of the fetal immune system.

Increasing the medical literacy of parents, early identification of risk factors and interdisciplinary interaction of pediatricians, immunologists and neonatologists can improve the prognosis and quality of life of children in this group.

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