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V. A. OHNIEV, K. G. ПОМОХАЙВО

DEFINITION OF MEASURES TO REDUCE THE OBESITY LEVEL IN CHILDREN BASED ON RESEARCH RESULTS OF PREVALENCE AND RISK FACTORS

Kharkiv National Medical University, Kharkiv, Ukraine

Purpose: to study prevalence and main risk factors for overweight and obesity in children and adolescents aged 6–17 and develop appropriate prevention measures.

Materials and Methods. Bibliographic, statistical and sociological methods.

Results. It is noted an insufficient level of registration of obesity among children. During the study it was found that true prevalence of obesity and overweight in children and adolescents in Kharkiv is significantly different from the official statistics in Kharkiv region ((151.0±5.2)%). 22 factors of risk had a reliable impact on the development of overweight in children and adolescents. The main risk factors for the formation of the overweight were biological and social and hygienic. Based on the results of the research it was proved that the key measures to reduce the prevalence of obesity and its consequences should be aimed at modifying risk factors, namely: changing stereotypes and habitats that contribute to pathology and at improving the quality of health care, basically at the primary level. Thus priority measures for improvement the quality of health care for children and adolescents with obesity should include: mandatory monitoring of body mass index among children from the age of 3 and assessment of the harmony of physical development; introduction of an information system for accounting, monitoring of obesity and overweight and the main risk factors (electronic medical record of the patient); introduction of patient registers at the territorial and regional level; preferential supervision by the family doctor, involvement of all experts; raising public awareness at the group, individual level; timely identification of risk factors, formation of risk groups, organization of dynamic monitoring, creation of differentiated prevention programs and study of public awareness of the main risks of overweight; advanced training of doctors, conducting training seminars on nutrition.

Conclusions. Thus, to solve the problem of obesity in children such structures as local governments, educational institutions, healthcare institutions and public organizations should be obligatory involved. Special attention is paid to measures to optimize medical care at the primary level for such children.

KEY WORDS: **overweight; obesity; children; prevalence; risk factors; medical care.**

Introduction. Obesity in children is one of the main problems of contemporary Health care due to its high prevalence, complex adverse health effects, the risk of complications and low effectiveness of existing treatments.

It is important to note that childhood obesity often leads to overweight in adults and entails not only health problems but also economic consequences, both for the individual and for society as a whole. This is due to the disability of patients of working age and the reduction in overall life expectancy, which is a consequence of severe comorbidities and disorders.

Being overweight in childhood and adolescence causes both short-term and long-term adverse effects on physical and psychosocial health. Systemic hormonal and clinical disorders associated with childhood obesity are combined into a metabolic syndrome.

In addition, obesity causes digestive, endocrine, orthopedic and other disorders, sleep apnea, reduces resistance to colds and infectious diseases and dramatically increases the risk of complications from surgery and trauma. Psychological aspects of

overweight and obesity in childhood are also very important. They are associated with low self-esteem, dissatisfaction with own body, depression, up to suicidal thoughts. Such adolescents are stigmatized by peers and have fewer friends than children with normal body weight. This, in turn, can affect school performance. In the future, obese young people are more prone to social exclusion, early school leaving, exacerbation of existing eating disorders [1–5].

In 2016, the WHO, together with experts from Imperial College London, conducted a study of the prevalence of overweight and obesity in the world. This study is the most comprehensive in the last 40 years. According to the results, it was found that more than 1.9 billion adults over the age of 18 were overweight and obese.

It is noted that the country with the largest number of overweight people is the United States (38.2%), and the smallest – Japan (3.7 %). At the same time, WHO experts predict a further significant increase in the number of obese people by 2025.

The most worrying situation is the growing number of overweight and obese children and the shift in the peak of childhood obesity in early age compared to

previous years. According to a 2016 study, the prevalence of overweight and obesity among children aged 5 to 19 years increased sharply from 4 % in 1975 to 18 % in 2016 [6–7].

This trend exacerbates the obesity epidemic in adults and poses a growing threat to the health of the next generation.

Therefore, a comprehensive study of the main aspects of children obesity and the development of measures aimed on solution of this problem is an important task for modern health care of all countries including Ukraine.

Purpose: to study prevalence and main risk factors for overweight and obesity in children and adolescents aged 6–17 years and develop appropriate prevention measures.

Materials and Methods. During the study bibliographic, statistical and sociological methods were used.

Results. It is noted that due to the low level of alertness and awareness of the population and the Health care in Ukraine there is an insufficient level of registration of obesity among children (13.50 per 1.000 children aged 0–17 years inclusive (or 1.3 %) and often these patients first time seek medical care because of complaints related to the development of obesity complications, so not on yearly stage of disease.

The prevalence of obesity and overweight in children and adolescents in Kharkiv was studied. The information base of the study were the results of copying the necessary data from the official medical records of the clinic institution (polyclinic) of a representative sample of 4789 children aged 6–17 inclusive. The processing of the data was performed by calculating and evaluating the BMI according to age and sex using the method recommended by WHO experts. The general and special relative indicators for 1 thousand children population were calculated.

According to the analysis, it was found that true overweight prevalence among children and adolescents exceeds official statistics in the Kharkiv region (15.10) ‰. Thus, the level of excess body weight and obesity was (151.0±5.2) ‰, in boys and girls – (164.5±7.6) ‰ and (136.3±7) ‰, respectively. It was found that the highest prevalence of overweight and obesity among boys and girls was observed in the age group of 6–9 (189.9±9.6) ‰, and the lowest in the age group of 14–17 (109.5±9.0) ‰, respectively.

The identification of risk factors of overweight development was carried out according to a sociological survey of 809 children and adolescents with their parents of the main (413 overweight and obese persons) and control group (396 normal persons who belonged to a group of practically healthy children).

During the processing of the obtained results it was found that 22 factors had a significant impact on the development of excess body weight. Among

them biological and social and hygienic factors were the major.

Obesity is a chronic non-specific disease, and hereditary factors play an important role in the occurrence and development of this pathology. It is known that the probability of developing the studied condition in a child increases in the presence of excess body weight, obesity or other chronic diseases, especially the endocrine system, in relatives. The results of the study indicate that on the development of excess weight in children and adolescents, biological factors had a significant impact. It was found that patients in the main group were much more likely to be overweight in one or two parents compared with the control group – (64.4±2.4) % and (34.3±2.4) %, respectively ($\eta=9$ %; $p<0.001$; OR=3.5; CI=2.6–4.6).

Aggravated heredity of hypertension, diabetes mellitus and other endocrine pathology was found in (59.3±2.4) % of relatives of patients in the main group and only in (34.3±2.4) % of relatives of patients in the control group ($\eta=6$ %; $p<0.001$; OR=2.8; CI=2.1–3.7).

According to experts, it is important to pay attention to the general obstetric problems of pregnancy, including overweight, anemia, preeclampsia, and the pathology of childbirth (premature, late or rapid birth, weakness of labor), as such conditions can cause inadequate weight gain in children and adolescents in the postnatal period. The obtained results confirm the significant influence of perinatal factors on the development of excess body weight. Thus, in the analysis of pregnancy it was noted that preeclampsia, threats of abortion, extragenital pathology and overweight during pregnancy were observed in (41.2±2.4) % of mothers of obese children and overweight and in (24.7±2.2) % of mothers of children with normal body weight ($\eta=3$ %; $p<0.001$; OR=2.1; CI=1.6–2.9). According to the obstetric anamnesis, the frequency of complications in childbirth in mothers of obese patients and overweight was (26.2±2.2) %, and in mothers of children with normal body weight – (14.1±1.7) % respectively, which also indicates a probable difference of indicators ($\eta=2$ %; $p<0.001$; OR=2.2; CI=1.5–3.1).

When evaluating anthropometric data at birth and the dynamics of weight gain of children during the first year of life, it was found that (39.5±2.4) % of children in the main group had a birth weight of more than 3500 g and/or there was excessive weight gain at the first year of life. In the control group, the corresponding indicator was significantly lower and amounted to (22.5±2.1) % ($\eta=3$ %; $p<0.001$; OR=2.2; CI=1.7–3.1). We analyzed data that reflect the characteristics of children's nutrition during the first year of life. It was found that (33.7±2.3) % of children in the main group were on artificial, mixed feeding and/or there was an early introduction of complementary foods and a predominance in the structure of the diet

of semolina and cow's milk. In the control group of children, the value of the corresponding indicator was $(17.7 \pm 1.9) \%$ ($\eta = -3 \%$; $p < 0.001$; $OR = 2.4$; $CI = 1.7 - 3.3$) respectively.

Today, scientific and technological progress is the basis of modern society and civilization. However, its consequences are changes in diet and physical activity, which, in turn, lead to weight gain among both adults and children. This fact explains that the largest number of factors that according to the results of this study had a significant impact on the development of the studied pathology, belonged to the group of social and hygienic. It should be noted that the strength of the influence of two factors, namely, the consumption of high-calorie foods and non-compliance with the diet – significantly exceeded the strength of the influence of other factors in this group. According to a sociological survey of adolescents and their parents in the main group, it was found that $(55.2 \pm 2.5) \%$ of children almost daily in the diet was dominated by foods high in fat in the form of sausages, cheeses or offal and easily digestible carbohydrates in the form of bakery products and sweet desserts, as well as insufficient consumption of fish dishes, seafood, cereals, vegetables and fruits. Against this background, it was found that in the vast majority of cases, these children and adolescents preferred to quench their thirst with sweet carbonated drinks instead of ordinary water, juices and compotes $(63.9 \pm 2.4) \%$. In the control group, the indicator characterizing the diet was significantly lower – $(29.3 \pm 2.3) \%$, respectively ($\eta = -7 \%$; $p < 0.001$; $OR = 3.0$; $CI = 2.2 - 4.0$). In comparison with the quality, the amount of food consumed also had an impact on the development of the studied condition, but not so significant – $(45.3 \pm 2.5) \%$ in the main group against $(23.7 \pm 2.1) \%$ in the control group, ($\eta = -5 \%$; $p < 0.001$; $OR = 2.7$; $CI = 2.0 - 3.6$) respectively. When evaluating the diet, it was found that $(58.4 \pm 2.4) \%$ of children in the main group ate less than three times a day or did not have a certain time and frequency of meals during the day and often missed breakfast and/or ate just before bedtime. In the control group, these dietary features were observed only in $(32.3 \pm 2.3) \%$ of children ($\eta = -7 \%$; $p < 0.001$; $OR = 2.9$; $CI = 2.2 - 3.9$). At the same time, it should be noted that children with obesity and overweight significantly more often than children with normal body weight visit fast food enterprises – $(33.4 \pm 2.3) \%$ and $(17.2 \pm 1.9) \%$, respectively ($\eta = -3 \%$; $p < 0.001$; $OR = 2.4$; $CI = 1.7 - 3.4$). The study found that a sedentary lifestyle was an important factor. It was found that $(51.3 \pm 2.5) \%$ of children with obesity and overweight had reduced physical activity on weekends and/or they did not attend sports sections, physical education classes at school. In addition, it was noted that a significant proportion of patients in the main group do not perform morning exercise $(60.8 \pm 2.4) \%$, rarely walk $(47.9 \pm 2.5) \%$, climbs stairs

$(56.7 \pm 2.4) \%$ and more often $(67.3 \pm 2.3) \%$ prefer inactive leisure activities (reading, computer games, etc.). Lack of physical activity was observed only in $(28.5 \pm 2.3) \%$ of children with normal body weight ($\eta = -5 \%$; $p < 0.001$; $OR = 2.6$; $CI = 2.0 - 3.5$). Sedentary lifestyle, in turn, was complicated by two other factors in this group. This is a long time spent on electronic devices and a significant mental load. Thus, $(50.8 \pm 2.5) \%$ of children in the main group against $(32.1 \pm 2.3) \%$ of children in the control group noted that on average they spend more than 3 hours a day on electronic devices ($\eta = -4 \%$; $p < 0.001$; $OR = 2.2$; $CI = 1.6 - 2.9$). Intensive mental load, namely: training in gymnasiums, lyceums, additional classes – was found in $(24.5 \pm 2.1) \%$ of children in the main and in $(16.2 \pm 1.8) \%$ of children in the control group ($\eta = -1 \%$; $p < 0.01$; $OR = 1.7$; $CI = 1.2 - 2.4$).

Based on the results of the medical and social study, it was determined that the key measures to reduce the prevalence of obesity and its consequences should be aimed at modifying risk factors, namely: changing stereotypes and habitats that contribute to pathology, and improving the quality of health care, basically at the primary level.

In order to take action to eliminate adverse environmental factors in practice, it is necessary that based on laws and policies at the state level were coordinated action and produced a common tactic of the solving problem. On this basis, appropriate administrative decisions should be taken to control marketing activities and recommendations should be developed for all structures and organizations related to the area of nutrition, trade, planning and arrangement of adjacent territories for providing an environment conducive to a healthy lifestyle. Thus, to solve the problem of obesity in children such structures as local governments, educational institutions, healthcare institutions and public organizations should be obligatory involved.

The International Consensus on Childhood Obesity states that early intervention, including dietary change, and physical activity, is recommended to prevent the development of complications. So, family physician or district pediatrician should play a leading role in awareness, making up of treatment plans and recommendations for the optimal combination of diet and exercise for patients with the problem, as well as in monitoring (follow up) of such children starting from perinatal period.

Thus priority measures to improve the quality of health care for children and adolescents with obesity should include: mandatory monitoring of body mass index among children from the age of 3 and assessment of the harmony of physical development; introduction of an information system for accounting, monitoring of obesity and overweight and the main risk factors (electronic medical record of the patient); introduction of patient registers at the territorial

and regional level; preferential supervision by the family doctor, involvement of all experts; raising public awareness at the group, individual level; timely identification of risk factors, formation of risk groups, organization of dynamic monitoring, creation of differentiated prevention programs and study of public awareness of the main risks of overweight; advanced training of doctors, conducting training seminars on nutrition.

In addition, it should be noted that when providing medical assistance to obese children, it is necessary to take into account the psychological aspects of the disease. Therefore, psychological correction for this purpose recommended, using modern techniques such as motivational interviewing.

The combination of efforts of different parties related to the problem of childhood obesity and the implementation of comprehensive measures will improve the prevalence, modify risk factors and will facilitate the adaptation of children with this pathology in society.

Conclusions

1. The results of a comprehensive study of the main aspects of overweight and obesity among chil-

dren have revealed the following: the true prevalence of obesity among children and adolescents in Kharkiv is significantly different from the official statistics in Kharkiv region (151.0 ± 5.2) %; biological and social and hygienic factors were identified as the leading risk factors for the formation and development of overweight in children and adolescents ($p < 0.001$).

2. Thus, the key measures for solution the problem of children obesity should aim at changing the existing stereotypes, living environment and at improving the quality of medical care with the obligatory involvement of such structures as: local government, education institutions, health care institutions and public organizations. In particular, in order to optimize the quality of medical care, it is recommended implementation of obligatory monitoring of the BMI of children and adolescents, the overwhelming observation of such patients by family doctors and conducting of psychological correction.

Prospects for further research. There is a need for further study of the features of specialized and highly specialized types of medical assistance for obese children. It is planned to include these activities in the system of monitoring of overweight patients.

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ВИЗНАЧЕННЯ ЗАХОДІВ ЩОДО ЗНИЖЕННЯ РІВНЯ ОЖИРІННЯ СЕРЕД ДІТЕЙ НА ОСНОВІ РЕЗУЛЬТАТІВ ДОСЛІДЖЕННЯ ПОШИРЕНОСТІ ТА ФАКТОРІВ РИЗИКУ

В. А. Огнєв, К. Г. Помогайбо

Харківський національний медичний університет, м. Харків, Україна

Мета: вивчити поширеність та основні фактори ризику формування надмірної маси тіла і ожиріння у дітей та підлітків 6–17 років, розробити відповідні заходи щодо профілактики.

Матеріали і методи. Використано бібліографічні, статистичні та соціологічні методи.

Результати. Встановлено недостатній рівень реєстрації ожиріння серед дітей. У ході дослідження виявлено, що справжній рівень поширеності ожиріння та надмірної маси тіла у дітей та підлітків у м. Харкові суттєво відрізняється від офіційної статистики в Харківській області ((151,0±5,2) %). 22 фактори ризику мали достовірний вплив на розвиток надмірної маси тіла у дітей та підлітків. Основними факторами ризику формування надмірної маси тіла були біологічні та соціально-гігієнічні. На основі результатів дослідження доведено, що ключові заходи щодо зменшення поширеності ожиріння та його наслідків повинні бути спрямовані на модифікацію факторів ризику, а саме зміну стереотипів та середовища проживання, що сприяють розвитку патології, на покращення якості медичної допомоги, в основному на первинному рівні. Таким чином, пріоритетні заходи щодо поліпшення якості медичного обслуговування дітей та підлітків з ожирінням повинні включати: обов'язковий моніторинг індексу маси тіла серед дітей віком від 3 років та оцінку гармонійності фізичного розвитку; запровадження інформаційної системи обліку, моніторингу ожиріння та надмірної маси тіла та основних факторів ризику (електронна медична карта пацієнта); запровадження реєстрів пацієнтів на територіальному та регіональному рівнях; переважне спостереження сімейним лікарем, залучення всіх експертів; підвищення обізнаності громадськості на груповому та індивідуальному рівнях; своєчасне виявлення факторів ризику, формування груп ризику, організація динамічного моніторингу, створення диференційованих програм з профілактики та вивчення обізнаності населення про основні ризики надмірної маси тіла; підвищення кваліфікації лікарів та проведення навчальних семінарів із питань нутриціології.

Висновки. Для вирішення проблеми ожиріння у дітей обов'язково повинні бути залучені такі структури, як органи місцевого самоврядування, освітні установи, заклади охорони здоров'я та громадські організації. Особливу увагу приділяють заходам щодо оптимізації медичної допомоги на первинному рівні для таких дітей.

КЛЮЧОВІ СЛОВА: надмірна маса тіла; ожиріння; діти; поширеність; фактори ризику; медична допомога.

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Відомості про авторів:

Огнєв Віктор Андрійович – доктор медичних наук, професор, завідувач кафедри громадського здоров'я та управління охороною здоров'я Харківського національного медичного університету; тел.: +38(057) 707-73-20.

Помогайбо Катерина Георгіївна – кандидат медичних наук, доцент кафедри громадського здоров'я та управління охороною здоров'я Харківського національного медичного університету; тел.: +38(057) 707-73-20.