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THE DEGREE OF CHANGE IN ANTHROPOMETRIC INDICATORS OF SCHOOLCHILDREN UNDER THE INFLUENCE OF PASSIVE SMOKING LEADING TO EATING DISORDERS AND OPHTHALMOLOGICAL DYSFUNCTION

Babaev P.N., Mamedov F.F., Hajizade N.K., Musaev R.G.

Azerbaijan Medical University, department "Public Health and Healthcare Organization", Baku, Azerbaijan

Introduction: Nicotine and cyanide are the two main enemies of the visual organs, causing maximum damage [1,2]. Even without inhaling tobacco smoke directly, but simply being in a smoky room or in close proximity to a smoker, the body receives the same horrific set of poisons, soot, tar, and other harmful elements as the smoker themselves. Accordingly, the negative consequences of passive smoking are largely the same as the harm received by a smoker [3]. Gradually, this leads to the development of a pathological process in the eye tissues. Smoke, entering the organs of vision, provokes a sharp constriction of blood vessels, which disrupts blood circulation. This occurs not only with large arteries, but also with the smallest blood vessels responsible for blood supply to the eye [4-6]. This disrupts the nutrition and oxygen supply to the eye tissues, causing: redness, a burning sensation, profuse tearing, or, conversely, dry eyes. Irritation can be an independent ailment and disappear with the cessation of smoking, but with prolonged exposure to tobacco smoke, irritation and dryness lead to more severe infectious diseases due to mechanical rubbing of the eyes. If we assume that contact with the organ of vision occurs in unclean conditions and with unwashed hands, it is easy to guess how susceptible vision is to various types of infection [7-9]. Passive smoking can be a risk factor for the development of myopia in primary school-age children, causing nearsightedness (myopia) through several mechanisms: vasoconstriction due to nicotine impairs the nutrition of the retina and optic nerve, free radicals in tobacco smoke damage eye cells and promote aging, and changes occur in the corneal epithelium and the overall optical power of the eye. As a result, eye function is impaired, leading to a decrease in visual acuity [10]. Exposure to tobacco smoke causes thyroid dysfunction. The disease is accompanied by a whole range of dire consequences, of which ophthalmological ones are only one of many: the eyes swell; they "bulge", intraocular pressure increases, vision deteriorates, and even disappears completely. Other organs and systems are affected. Common complications include: infertility; problems with potency and impotence; diabetes; renal failure; cardiovascular dysfunction; pathological weight loss, dementia [11,12]. Adolescents exposed to passive smoking experience visual cortex damage. Visible colors may fade due to changes in visual color perception, and overall perceptual diversity may be reduced. Just as in children born to smoking mothers, young smoking adolescents lose sensitivity first to green, then to red, and finally to blue. Recently, ophthalmologists have coined a new term for blindness: tobacco amblyopathy, which occurs as a manifestation of subacute intoxication due to smoking abuse [13, 14, 15]. Initially, rapid fatigue is observed when reading. Then, flickering and double vision begin, and

finally, visual acuity decreases, as lacrimation, redness, and swelling of the eyelids caused by tobacco smoke lead to chronic inflammation of the optic nerve. Nicotine and other toxins found in tobacco smoke damage collagen and elastin, which are important for the structure of tissues, including the cornea, causing keratoconus, a disease caused by thinning and sharpening of the clear layer of the eye, namely the cornea, with progressive myopia and astigmatism. Light enters the eye through the cornea. It allows you to see clearly by refracting or focusing light rays. The disease, which typically begins in adolescence, is not discovered until patients are in their 20s [16]. It progresses between the ages of 20 and 40, becoming permanent after age 40. Keratoconus can make some activities difficult, such activities as driving, typing on a computer, watching television, or reading can cause changes in the retina, resulting in decreased sensitivity to light. The mucous membranes of the eyes in children and adolescents are particularly sensitive to contamination by tobacco smoke products. Nicotine increases intraocular pressure [17,18]. Anthropometric parameters such as height and weight can be associated with eye diseases, especially in the presence of systemic diseases. For example, diabetes mellitus and hypertension, which are often associated with excess weight, can lead to diabetic retinopathy and retinal vascular damage. Obesity can also be a risk factor for the development of some forms of glaucoma [19]. Smoking cessation in adolescence is one of the factors in preventing these types of diseases. Eye diseases negatively affect the academic performance of children, causing problems with reading, writing, concentration, leading to rapid fatigue and headaches, which reduces the child's self-esteem and desire to learn, slows down the development of anthropometric indicators, reducing their mental development and leading to the development of serious diseases [20]. Vision is a complex mechanism, controlled by our eyes and brain. Their combined function has a significant impact on a child's learning process. Many teachers and parents fail to realize that students' academic performance is often unrelated to their intelligence or how hard they try. They are simply unable to process incoming visual information. Adults thus place severe pressure on them, instead of promptly visiting an ophthalmologist and supporting their psycho-emotional state. This further reduces children's desire to learn and contributes to changes in their psycho-emotional state [21,22]. Children become shy, seek solitude, display aggression, refuse walks and sports, and limit their socialization. Children with high levels of stress or depression may use food as a way to cope with emotional difficulties, which over time can lead to the development of illness. It's also important to note the impact of traumatic events, such as physical or emotional abuse, which can contribute to disordered eating (DE), a serious mental health condition characterized by a pathological relationship with food. Normally, eating is aimed at satisfying hunger and providing the body with essential nutrients, which helps maintain energy balance. However, with disordered eating, this process is disrupted, and a person may either excessively restrict their diet or, conversely, overeat, experiencing obsessive thoughts about their weight and figure [23]. Social factors, such as societal pressure and beauty ideals promoted in the media, also play a significant role in the

development of the disease. In the modern world, thinness is often associated with attractiveness, success, and self-control, which leads many people to strive for unrealistic standards of appearance. Girls and adolescents are especially susceptible to this influence, as they may additionally face ridicule or criticism for their appearance, which contributes to the development of low self-esteem and disordered eating. In modern society, the problem of eating disorders is becoming increasingly relevant, as the number of people facing this problem increases every year [24,25]. People with eating disorders often experience excessive preoccupation with their weight, calorie intake, and diet, which leads to serious disruptions in normal eating behavior and can have serious health consequences. The main types of binge eating disorders include anorexia, bulimia, and binge eating disorder. Each disorder has specific symptoms and is characterized by various signs. Anorexia nervosa is one of the most well-known and dangerous eating disorders. People with anorexia strive for extreme thinness through severe calorie restriction, complete abstinence from food, and excessive physical activity [26]. Bulimia is characterized by binge eating episodes, when a person consumes a large amount of food in a short period of time and then tries to eliminate the food from the body by inducing vomiting or using other purging methods, such as excessive exercise, laxatives, or diuretics [27,28]. Binge eating disorder is a disorder in which a person cannot control the amount of food they consume. Unlike bulimia, binge eating disorder does not involve attempts to get rid of the food eaten [29,30]. People with this disorder often eat alone and experience feelings of guilt and shame after eating.

The purpose of the work. Study of anthropometric parameters of schoolchildren exposed to passive smoking as a result of visual impairment and eating behavior.

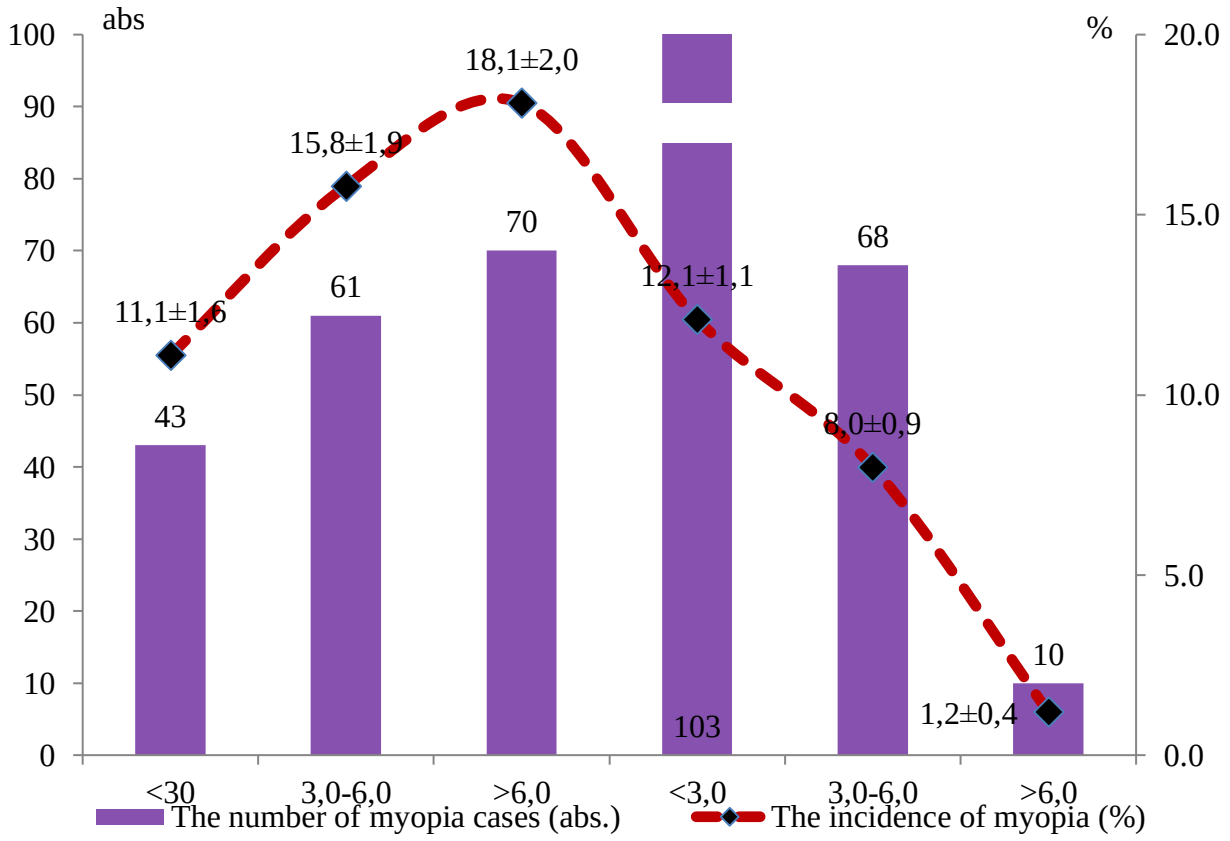
Keywords: passive smoking; tobacco smoke; eye diseases; myopia; eating disorders

Materials and methods. Basic physical parameters of the body: height, weight, and chest circumference. These indicators are measured to identify the physical characteristics of children exposed and unexposed to passive smoking. By examining anthropometric indicators, it is possible to assess physical development and its compliance with age norms. This is especially important in childhood. Identified deviations may be risk factors or signs of certain diseases. We decided to determine the measurements of height, weight, and chest circumference by dividing schoolchildren into two groups – those exposed and those not exposed to passive smoking. The study was conducted as part of a study of the impact of passive smoking in families on children's health and academic performance. We developed a questionnaire containing seven sets of questions on various social and hygienic aspects of passive smoking. The questionnaires were divided into two parts: one for students and the other for their parents. The study was conducted in five city secondary schools (Yasamal, Narimanov, and Sabunchi districts). To eliminate selectivity, we proceeded as follows. We decided to conduct and compare anthropometric measurements in a classroom of five children whose medical records were anonymously examined at district clinics for illnesses over the course of a year, as well as five children from the same class, randomly selected. Only fully

completed questionnaires were included in the study. A total of 6,000 questionnaires were distributed to schoolchildren. Of these, 2,363 fully completed questionnaires contained responses from 3,895 parents—1,885 fathers and 2,010 mothers. Each of the 2,363 questionnaires represented one schoolchild, meaning that 2,363 families were surveyed. Sixty-eight families also had other children, either high school graduates or preschool-age children. Depending on their smoking intensity, all families were divided into two groups: 818 families (tobacco-dependent) and 1,545 families (tobacco-nondependent, i.e., the control group). Based on passive smoking intensity, the tobacco-dependent group of families was divided into: Group 1 – 204 families, mild tobacco dependence, less than 5 cigarettes per day; Group 2 – 252 families, moderate tobacco dependence, 5-15 cigarettes per day; and Group 3 – 362 families, parents who smoked heavily, severe tobacco dependence, more than 15 cigarettes per day. Measurements were conducted separately for boys and girls. Observations were conducted in the most anthropometrically significant age groups of schoolchildren. Each anthropometric indicator—weight, height, and chest circumference—was analyzed separately and, where necessary, compared with others.

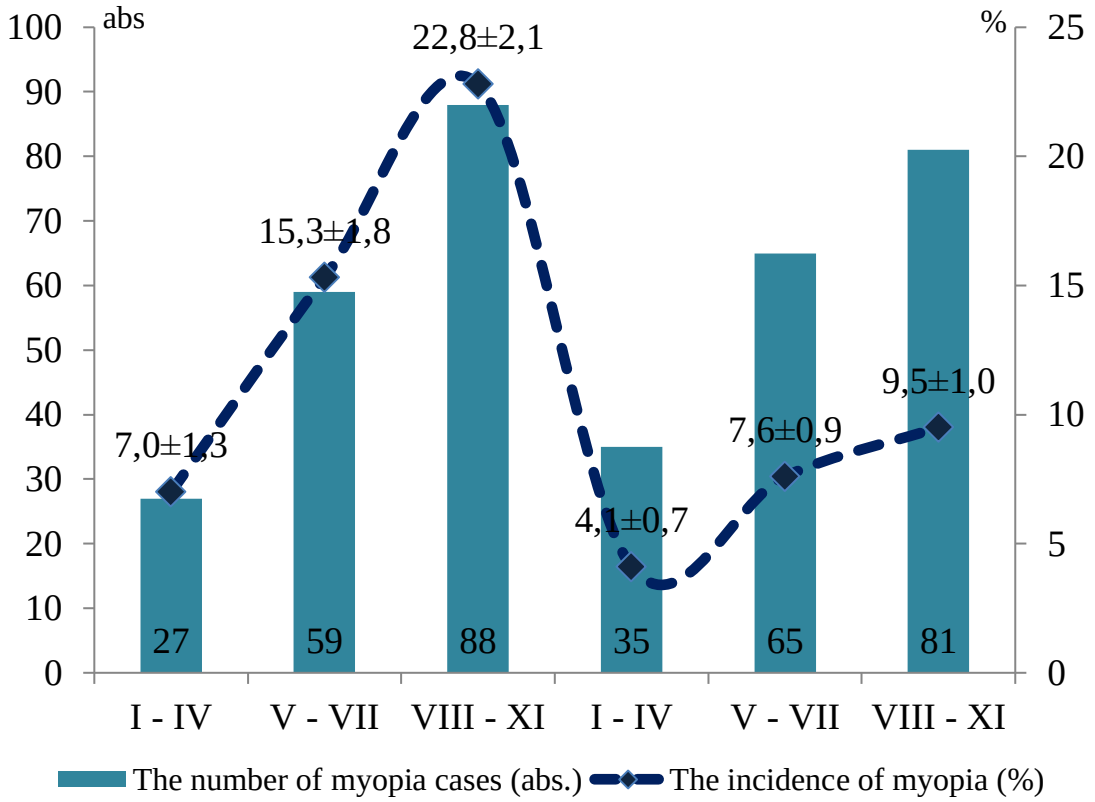
Results and discussions. Tobacco smoke is a toxin that has a detrimental effect on the nerve tissues of the eye. As a result, not only is the tear film that protects the cornea destroyed, but the lacrimal glands also malfunction. Dry eyes and oxygen deprivation develop, which together lead to structural damage to the eye. Substances found in tobacco smoke disrupt the body's production of antioxidants, leading to accelerated cataract progression. Cigarette smoke contains compounds that stimulate inflammation in blood vessels, which can ultimately lead to inflammation in the choroid. All these negative aspects disrupt the normal development of antropometric indicators in children. Furthermore, according to a survey analysis, exposure to secondhand smoke among schoolchildren was detected in 386 families (31.2±1.3%). These families accounted for 174 of the 355 cases of myopia among schoolchildren (45.1±2.5%), the remaining 181 cases of myopia were in 852 families in which schoolchildren were not exposed to passive smoking (21.2±1.4%; $t=8.33$; $p<0.001$). It was also necessary to clarify the frequency of myopia due to passive smoking among schoolchildren of different ages. We remind you that 559 of the 1238 surveyed schoolchildren studied in elementary grades (45.1 ± 1.4%), 328 schoolchildren, respectively, in middle grades (26.5 ± 1.3%, $t = 9.74$; $p < 0.001$) and 351 schoolchildren in high school (28.4 ± 1.3%; $t = 1.03$; $p > 0.05$). All degrees of myopia are observed in both groups of schoolchildren, but the following circumstances attract attention. For example, accordingly fig.1 mild myopia occurs at approximately the same level among schoolchildren from tobacco-dependent and non-smoking families, with rates of 11.1±1.6% and 12.1±1.1%, respectively ($t=0.52$; $p<0.05$). However, a significant gap exists in the moderate myopia rates, which are much more common among schoolchildren from tobacco-dependent families than among schoolchildren from non-smoking families – 15.8±1.9% and 8.0±0.9% ($t=3.71$; $p<0.001$). An even greater gap exists in the severe myopia rates among the same schoolchildren – 18.1±2.0% and 1.2±0.4% ($t=11.50$; $p<0.001$). The interpretation of the presented results allows us to state the fact

that the development of myopia in schoolchildren begins in all families, regardless of the impact of passive smoking. Constant direct (on the mucous membrane of the eye) and systemic (inhalation of tobacco smoke and dispersion of its metabolites in the organs) exposure to passive smoking increases the frequency and accelerates the rate of further deterioration of visual acuity in children. That is, for the detrimental effects of passive smoking on visual acuity in children to manifest, a certain time is required, and this is confirmed by an analysis of the obtained results in the age aspect of schoolchildren. In particular, correspondingly fig.2, the rates of average myopia among primary school children (7-10) years old from tobacco-dependent and tobacco-independent families were approximately the same and equal to 7.0 ± 1.3 and 4.1 ± 0.7%, respectively ($t = 1.96$; $p < 0.05$). However, already in the middle grades (11-13 years old) a gap is observed in the rates of moderate myopia, it is much more often detected among schoolchildren from first families than from second families - 15.3±1.8 and 7.6±0.9% ($t=3.77$; $p<0.001$).



The x-axis shows degrees of myopia.
The left side of the figure shows tobacco-dependent families.
The right side of the figure shows tobacco-independent families.

Figure 1. The ratio of different degrees of myopia among schoolchildren in tobacco-dependent (n=386) and non-tobacco-dependent (n=852) families



The x-axis shows the grade levels of schoolchildren (age).
The left side of the figure shows tobacco-dependent families.
The right side of the figure shows non-tobacco-dependent families.

Figure 2. Proportions of age groups of schoolchildren with myopia in tobacco-dependent (n=386) and tobacco-independent (n=852) families

The gap in the rates of severe myopia increases even more, but already among high school students (14-17 years old) 22.8±2.1 and ±9.5±1.0% (t=5.71; p<0.001). That is, the deterioration of visual acuity in schoolchildren occurs as a result of relatively long-term exposure to tobacco smoke products, which occurs in tobacco-dependent families.

Conclusion. It's safe to say that eye diseases and smoking are interconnected - in most cases, the habit triggers the development of these disorders. To improve vision, quitting smoking is essential. Preventive measures can also be incorporated: taking eye vitamins and a healthy diet, performing eye exercises, and taking breaks during visual stress. The study's results demonstrate the need for monitoring socially significant eye diseases to ensure timely detection, adequate treatment, and follow-up to reduce eye disease incidence and improve the quality of ophthalmological care for children and adults. It is important to increase access to medical care for patients with eye diseases and improve the quality of eye disease diagnosis by organizing screenings, implementing preventive measures, and using the media to promote rehabilitation among the population. When developing a national anti-smoking policy, as with any

policy aimed at promoting a healthy lifestyle, in addition to bans, a global shift in public consciousness or culture is required to prevent the recruitment of new smokers. Special attention should also be paid to cultural aspects and informational measures. However, the implementation and administration of government measures such as smoking bans in public places and anti-smoking campaigns involve budget expenditures. It is more effective to allocate these funds to measures aimed at disseminating traditional and family values. Even if they do not directly address a healthy lifestyle, such measures can have a significant impact on reducing the proportion of the population who smoke. This could include organizing various family events, such as festivals and fairs. This problem must be addressed comprehensively, beginning with the direct example of non-smoking parents and ending with government policies aimed at establishing a healthy lifestyle as a social norm among the population.

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Qida davranışın pozulmasına və oftalmoloji disfunksiyaya səbəb olan passiv siqaretin təsiri altında olan məktəblilərin antropometrik göstəricilərinin dəyişmə dərəcəsi

Babayev P.N., Məmmədov F.F., Hacızadə N.K., Musayev R.Q.

Azərbaycan Tibb Universiteti, "İctimai sağlamlıq və səhiyyənin təşkili" kafedrası, Bakı, Azərbaycan

Xülasə. Siqaret tüstüsü görmə sisteminə daxil olduqda, qan damarlarının kəskin daralmasına səbəb olur, qan axını pozur. Bu, yalnız böyük arteriyalara deyil, həm də gözün qan fəaliyyətini təmin edən ən kiçik qan damarlarına təsir göstərir. Bu, göz toxumalarına qidalanma və oksigen tədarükünü pozur, qızartı, yanma hissi, həddindən artıq göz yaşı və ya əksinə quru gözlərə səbəb olur. Qıcıqlanma müstəqil bir vəziyyət ola bilər və siqaretçəkməni tərgizən xalda, aradan qalxa bilər, lakin tütün tüstüsünə uzun müddət məruz qalma ilə qıcıqlanma və quruluq gözlərin mexaniki sürtülməsi nəticəsində daha ağır infeksiyalara səbəb ola bilər. Boy və çəki kimi antropometrik parametrlər, xüsusən də sistem xəstəliklərinin olması halında göz xəstəlikləri ilə əlaqələndirilə bilər. Məsələn, tez-tez artıq çəki ilə əlaqəli olan diabet və hipertoniya, diabetik retinopatiya və retinal damarların zədələnməsinə səbəb ola bilər. Piylənmə və qlaukoma bəzi formalarının inkişafı üçün, risk faktoru ola bilər. Yeniyetməlik dövründə siqareti tərgitmək bu xəstəliklərin qarşısını alan amillərdən biridir. Stress və ya depressiya səviyyəsi yüksək olan uşaqlar emosional çətinliklərin öhdəsindən gəlmək üçün yeməkdən istifadə edə bilərlər ki, bu da zamanla qida davranışının pozulmasına və inkişafına səbəb ola bilər. Fiziki və ya emosional

zorakılıq kimi travmatik hadisələrin təsirini də qeyd etmək lazımdır ki, bu da nizamsız qidalanmaya, qida ilə patoloji əlaqə ilə xarakterizə olunan ciddi psixi sağlamlıq vəziyyətinə səbəb ola bilər.

Степень изменения антропометрических показателей школьников под влиянием пассивного курения, приводящего к расстройствам пищевого поведения и офтальмологической дисфункции

Бабаев П.Н., Мамедов Ф.Ф., Гаджизаде Н.К., Мусаев Р.Г.

Азербайджанский медицинский университет, кафедра «Общественное здоровье и организация здравоохранения», Баку, Азербайджан

Резюме. Попадание сигаретного дыма в зрительную систему вызывает резкое сужение кровеносных сосудов, нарушая кровоток. При этом поражаются не только крупные артерии, но и мельчайшие сосуды, снабжающие кровью глаз. Это нарушает питание и поступление кислорода к тканям глаза, вызывая покраснение, жжение, слезотечение или, наоборот, сухость глаз. Раздражение может быть самостоятельным состоянием и

еским отношением к еде.

исчезать после отказа от курения, но при длительном воздействии табачного дыма раздражение и сухость могут привести к более тяжёлым инфекциям в результате механического трения глаз. Антропометрические параметры, такие как рост и вес, могут быть связаны с заболеваниями глаз, особенно при наличии системных заболеваний. Например, диабет и гипертония, которые часто сочетаются с избыточным весом, могут привести к диабетической ретинопатии и повреждению сосудов сетчатки. Ожирение и глаукома могут быть факторами риска развития некоторых форм глаукомы. Отказ от курения в подростковом возрасте является одним из факторов профилактики этих заболеваний. Дети с высоким уровнем стресса или депрессии могут использовать еду для преодоления эмоциональных трудностей, что со временем может привести к развитию и прогрессированию расстройств пищевого поведения. Важно также учитывать влияние травмирующих событий, таких как физическое или эмоциональное насилие, которое может привести к расстройству пищевого поведения – серьёзному психическому заболеванию, характеризующемуся патологич