

ADHERENCE TO TREATMENT IN VISUALLY IMPAIRED INDIVIDUALS

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Adherence to treatment is one of the major challenges posed by modern medicine. Today, cataract is the leading cause of reversible blindness and visual disability. The study was aimed to assess adherence to timely surgical treatment in individuals with cataract. The data of the cross-sectional, population-based Ural Eye and Medical Study were assessed. Among 546 participants, there were 46.3% men and 53.7% women, 59.6% urban residents, 40.4% rural residents. Their average age was 66.36 ± 9.47 years (40–88 years). Statistical data analysis was performed using the IBM SPSS Statistic software package. The findings showed that the lack of awareness of the disorder and low interest in surgery were the main factors, affecting the patients' motivation for cataract treatment. At the same time, the frequency of ophthalmology visits was inversely related to the patients' age (OR 1.24; 95% CI 1.04–1.49) and the duration of vision loss (OR 1.08; 95% CI 0.81–1.43), and directly related to the cataract diagnosis age (OR 1.20; 95% CI 1.04–1.38), the presence of ophthalmologist in the community clinic (OR 1.71; 95% CI 1.29–2.26), trust in the doctor (OR 3.62; 95% CI 3.02–4.35), ophthalmologist's explanation of the cataract complications and advanced treatment methods (OR 1.62; 95% CI 1.34–1.97). Understanding the main factors, contributing to low treatment adherence in patients with cataracts, would make it possible to optimize the measures to improve healthcare delivery to such patients, associated with the increased coverage of surgical treatment.

Keywords: adherence to surgical treatment, cataract, awareness, quality of life

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Compliance with ethical standards: the study was approved by the Ethics Committee of the Ufa Eye Research Institute and conducted in accordance with the fundamental ethical principles of the Declaration of Helsinki, GCP (Good Clinical Practice) principles, and current regulatory requirements; the informed consent was submitted by all study participants.

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ПРИВЕРЖЕННОСТЬ К ЛЕЧЕНИЮ ЛИЦ С НАРУШЕНИЕМ ЗРЕНИЯ

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Проблема приверженности к лечению — одна из наиболее значимых для современной медицины. На сегодняшний день основной причиной обратимой слепоты и инвалидности по зрению является катаракта. Целью исследования было оценить приверженность к своевременному хирургическому лечению у лиц с катарактой. В работе использованы данные поперечного популяционного исследования «Ural Eye and Medical Study». Из 546 участников 46,3% мужчин и 53,7% женщин, жителей города — 59,6%, жителей села — 40,4%, средний возраст которых составил 66,36 ± 9,47 года (диапазон 40–88 лет). Статистический анализ данных проводили с использованием пакета прикладных программ IBM SPSS Statistic. Результаты исследования показали, что основной фактор, влияющий на мотивацию пациента к лечению катаракты, — недостаточная информированность о заболевании и заинтересованность в хирургическом лечении. При этом частота посещений офтальмолога находится в обратной зависимости от возраста пациентов (ОШ 1,24; 95% ДИ 1,04–1,49), длительности снижения зрения (ОШ 1,08; 95% ДИ 0,81–1,43) и в прямой зависимости от длительности времени с момента установления диагноза катаракты (ОШ 1,20; 95% ДИ 1,04–1,38), наличия офтальмолога в поликлинике по месту жительства (ОШ 1,71; 95% ДИ 1,29–2,26), доверия врачу (ОШ 3,62; 95% ДИ 3,02–4,35), разъяснения офтальмологом осложнений и современных методов лечения катаракты (ОШ 1,62; 95% ДИ 1,34–1,97). Понимание основных причин, снижающих приверженность пациентов с катарактой к лечению, позволит разработать наиболее эффективные мероприятия по совершенствованию медицинской помощи, связанной с увеличением охвата хирургическим лечением пациентов с данной патологией.

Ключевые слова: приверженность к хирургическому лечению, катаракта, информированность, качество жизни

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Соблюдение этических стандартов: исследование одобрено этическим комитетом Уфимского НИИ глазных болезней; выполнено в соответствии с основополагающими этическими принципами Хельсинкской декларации, правилами GCP и действующими нормативными требованиями; все участники подписали добровольное информированное согласие на участие в исследовании.

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The term "adherence to treatment" emerged in the domestic scientific literature about 20 years ago, but it has become widely used recently, in the last 5–6 years. According to the World Health Organization (WHO), adherence to treatment is the degree to which a patient's behavior matches the doctor's prescriptions for taking medications, following dietary recommendations and/or lifestyle changes. It is believed that the patients' non-compliance with medical recommendations results from the lack of effective doctor–patient communication. The patients' personal and psychological characteristics, clinical features

of the disease, treatment type, socio-economic factors, and the features of healthcare delivery in different countries are the other reasons for low treatment adherence [1]. This issue is particularly relevant for eye diseases, since eye lesions are not potentially fatal, especially when the lesions could be removed. Many patients pay little attention to cataracts, since they usually have no prominent subjective symptoms for a long time. However, even the treatable eye lesions constitute a major medical and social challenge. The patient's psychology in terms of the cataract treatment and prevention is one of the

leading causes of blindness and low vision in the world [2]. High medical and social significance of cataracts is determined by a number of factors: high levels of blindness (reversible) and vision disability, significant direct (expenses for surgery, conservative treatment, and management of postoperative complications) and consequential (loss of labor potential of the society, traffic accidents, injuries, and falls due to visual impairment) economic losses, high prevalence of the disorder, clear upward trend in the number of individuals with reduced lens transparency of both retirement and working age [3–7].

It should be noted that the treatment success depends not only on the properly constructed healthcare system, but also on the patient's compliance with the recommendations on the prevention and treatment of the disease, given by healthcare professionals [8, 9]. Poor adherence is a proven risk factor of any disorder, which reduces the effectiveness and increases the cost of treatment, increases the risk of various complications, worsens the outcome, and reduces the patients' quality of life [10, 11]. Experts from the WHO have identified a large number of factors that affect the patient's adherence to treatment. According to the WHO classification (2003), the factors are divided into five interconnected groups: 1) patient-related factors; 2) factors related to medical personnel and healthcare system organization; 3) factors associated with ongoing therapy; 4) factors associated with the patient's condition (disease); 5) socio-economic factors [12]. In this regard, the papers, which propose structured approach to describing the causes of low treatment adherence, are of great interest. The causes are divided into five major categories: socio-demographic; psychological; resulting from the disorder or the disease treatment; economic; related to the healthcare system [1].

Filling the gap in studying various factors, negatively affecting the capability of overcoming the treatment adherence-related barriers in patients with cataracts, would result in the significantly decreased incidence of this socially significant disorder. This is especially important in terms of improving the cooperation between the doctor and the patient, which contributes to faster recovery, improved quality of life and healthy lifestyle creation, and makes it possible to develop the measures to improve the quality of care provided to patients with cataracts.

For that reason, identification and analysis of the existing factors, including the psychological factors, which affect treatment adherence in patients with cataract, seem to be relevant.

The study was aimed to assess the attitude towards factors, affecting adherence to timely surgical treatment, in individuals with cataracts.

METHODS

Data of the cross-sectional, population-based Ural Eye and Medical Study (UEMS), conducted in 2015–2017 in the Ufa Eye Research Institute, were assessed. Currently, UEMS is the largest ophthalmological population-based study in the Russian Federation, which is aimed at studying the prevalence of socially significant eye diseases and associated risk factors.

The stages of the study were in line with the generally accepted standards. The study included the following: protocol development and the research instrument selection, data acquisition, scaling and database creation, statistical processing, analysis, and interpretation of the results [13, 14]. Inclusion criteria: voluntary consent to participate in the project; age over 40; permanent residence in the studied urban and rural areas.

To assess alterations in lens transparency, we used the LOCS III grading scale (Lens Opacities Classification System, 1993), according to which three types of lens opacification were distinguished: nuclear, cortical, and subcapsular [15]. According to this classification, nuclear lens opacities were divided into six grades. It should be noted that the most important are the changes in the lens nucleus, corresponding to grade 3 and above. For that reason, in the paper we link the nuclear cataract to these changes.

To study the respondents' awareness of the lens disorder and their adherence to timely treatment, we conducted a questionnaire survey among people diagnosed with cataracts. The study was carried out by the written survey using the specially compiled questionnaire, which contained 25 questions concerning demographic information (gender, age), socio-economic data (level of education), the frequency and the possibility of ophthalmology visits, individual's awareness of the disease, risk factors, and treatment methods, as well as the questions to assess the reasons, preventing the timely cataract surgery.

The study involved 546 individuals: 253 men (46.3%) and 293 women (53.7%), 325 urban residents (59.6%), 221 rural residents (40.4%). The average age was 66.36 ± 9.47 years (40–88 years). The number of observations required was justified using the method, developed by Otdelnova KA [16].

Statistical analysis was carried out using the IBM SPSS Statistic software package, version 23.0 (SPSS: An IBM Company; USA). The methods of descriptive and comparative statistics for quantitative characteristics were selected based on the distribution type assessment using the Shapiro–Wilk test. The groups were compared based on the qualitative characteristics using the Pearson's chi-squared (χ^2) test or Fisher's exact test (in case there were less than five observations in at least one cell of the contingency table). To characterize the univariate regression models and assess the degree of influence of each predictor on the disease development (outcome), the following parameters were calculated: regression coefficient (β), standard error of the coefficient (SE), Wald chi-square statistics (W), Odds ratios (OR), 95% confidence intervals (CI) for OR, and predictor significance were calculated based on these data. When performing statistical analysis, the achieved significance level (p) was calculated; the differences were considered significant at $p < 0.05$.

RESULTS

The analysis revealed that the majority of the respondents (60.85%) noted they had a secondary specialized education. A total of 21.70% respondents had higher education, 13.62% had secondary general education, and only 3.83% had incomplete school education. A survey of people over 40 years of age on their health-related behaviour showed that 39.2% of respondents got their ophthalmic checkups annually, 33.7% visited a doctor twice a year or more frequently, and 27.1% visited a specialist less than once a year. It should be noted that women were much more likely to seek ophthalmological care within a year (78.9 vs. 66.4%, $\chi^2 = 8.34$; $p = 0.01$). Furthermore, almost all patients (68.9% of men and 71.9% of women, $\chi^2 = 6.51$; $p = 0.04$) noted that they needed constant medical supervision. Among rural residents, characterized by the lack of healthcare access, the proportion of those who contacted a healthcare institution throughout the year was slightly less than among urban residents (71.6 and 73.6%, respectively, $\chi^2 = 1.13$; $p = 0.2$). Thus, rural residents remain active in applying to healthcare institutions.

Table 1. Reasons preventing the cataract patients from ophthalmology visits

Reasons of non-attendance for ophthalmologic examination	Answers, n (%)
Was unaware of the need to see a doctor	29 (19.6)
Being busy (due to employment, household activities, agricultural activities, etc.)	27 (18.2)
No visual impairment	22 (15.2)
No ophthalmologist in the community clinic	20 (13.4)
Long queue to ophthalmologist	12 (8.2)
No accompanying person	9 (6.3)
Transport problems	8 (5.8)
Other	21 (14.1)
Total responses	148

It was found that the lack of knowledge about the need to see a doctor (19.6%) because of reduced vision was the main reason, preventing the respondents with cataracts from visiting an ophthalmologist on the annual basis. According to the respondents, the equally important reasons were as follows: being busy (18.2%), and no specialist physician in the community clinic (13.4%) (Table 1).

Patients with cataracts are characterized by low anxiety, and often by the condition severity underestimation. They do not consider their disorder to be the condition, significantly limiting their daily living activities, and assume that surgical treatment is fully capable to restore visual functions.

To investigate the respondents' knowledge about cataract, the questions were included in the questionnaire, allowing us to assess the respondent's awareness of the features of his/her eye disorder. The survey revealed a good knowledge on the disorder in the majority of respondents (60.2%); 17.8% of individuals had some ideas about the cataract, 5.9% were completely unaware, and 16.1% found it difficult to answer the question.

At the same time it should be noted that a large proportion of patients took an active stand on the matter. Thus, 60.4% of patients would like to know as much as possible about their disorder; 25.1% of individuals thought it was enough that the doctor was aware of the disease. The majority of patients (65.6%) would like to receive additional information about the disease from an ophthalmologist, as from a competent specialist. Furthermore, 19.3% of respondents would obtain

such information from the online resources, 11.1% would get information in healthcare institutions (stands, brochures), 2.6% would read popular science magazines, and 1.4% would discuss the matter with their friends.

The doctor's high professional level and positive personal qualities are essential for the patients' compliance with recommendations, and the lack of this component increases the likelihood of self-treatment [10, 20]. The survey showed that the majority of the respondents (63.6 %) fully trusted their attending physicians and highly appreciated the physicians' professional level. One third of the respondents (27.9%) noted the doctor's high professional qualification and good personal qualities. The minority of respondents (1.4%) seemed not to fully trust their doctors and did not consider them to be the highly qualified professionals. Only 7.1% of respondents found it difficult to express their attitude. The following factors were among the reasons for "dissatisfaction" with the doctor: insufficient attention paid by the doctor (52.7%), the doctor's inability to win over the patient (14.9%), and the doctor's low level of competence (12.4%). However, the findings might indicate the high level of confidence in the doctors' professional qualification and personality.

When a patient comes to see an ophthalmologist, it is extremely important for a doctor to explain the clinical features of cataract, such as functional vision impairment, which reduces the quality of life, and to provide information about the modern personalized treatment methods in case of reversible vision loss. Thus, 70.3% of individuals in the studied group indicated

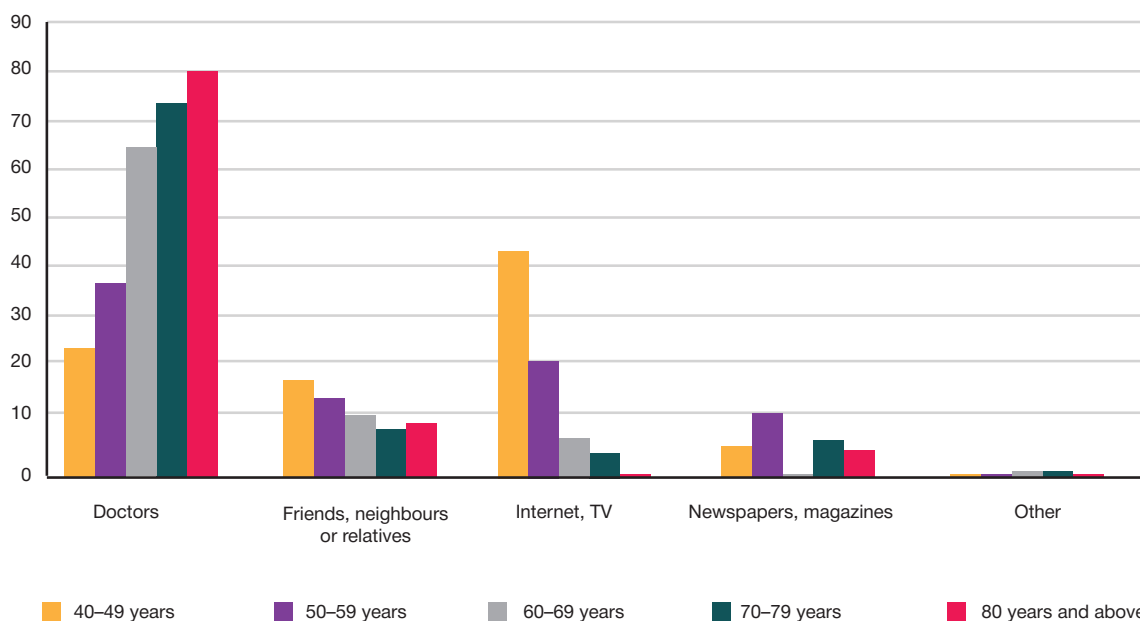
**Fig. 1.** Age distribution of respondents taking into account the source of information about cataracts

Table 2. Factors associated with the frequency of ophthalmology visits in patients with cataracts

Indicator (factor)	β	W	p	OR	95% CI
Age (years)	-1.54	22.54	< 0.001	1.24	1.04–1.49
Duration of vision loss (years)	-0.39	8.26	0.004	1.08	0.81–1.43
Time since the diagnosis of cataract (years)	0.59	6.39	0.01	1.2	1.04–1.38
Presence of ophthalmologist in the community clinic (1 — present, 2 — absent)	0.55	13.54	< 0.001	1.71	1.29–2.26
Confidence in the doctor (1 — yes, 2 — no)	0.33	19.248	< 0.001	3.62	3.02–4.35
Have the ophthalmologist explained about cataracts and treatment methods (1 — yes, 2 — no)	0.48	23.63	< 0.001	1.62	1.34–1.97

Note: β — regression coefficient; SE — standard error of the coefficient, W — Wald chi-square statistics, OR — odds ratio, 95% CI — two-sided 95% CI for OR.

that they learned about their eye disease when talking with the doctor; 15.2% of individuals got information from their friends and relatives, and 14.5% of respondents obtained information from mass media, such as TV, Internet, and press. Younger patients more often received information from the online resources, friends or relatives, while the respondents of the older age groups received information from ophthalmologists (Fig. 1).

We have defined the frequency of ophthalmology visits depending on the duration of visual impairment, the patients' age, and the presence of ophthalmologist in the community clinic (Table 2).

The analysis revealed the impact of the patients' age on the frequency of ophthalmology visits. Thus, every one-year increase in age reduces the probability of visiting a specialist physician by 1.24 times. Longer time since the diagnosis of cataract in the surveyed patients results in the 1.2 higher frequency of visits to ophthalmologists. Among individuals, who have ophthalmologists in their community clinics, the probability of annual ophthalmology visits is 1.71 times higher compared to individuals, having no ophthalmologists in their community clinics.

Studying the trust towards doctors as a factor affecting the patients' adherence to regular medical visits, and their willingness to comply with the specialists' recommendations, revealed the direct relationship. The calculated odds ratio (OR — 3.6) indicates that the chances to undergo ophthalmic examination are higher in individuals, who trust their doctors. A significant relationship has been also found between the frequency of ophthalmology visits and explaining the existing

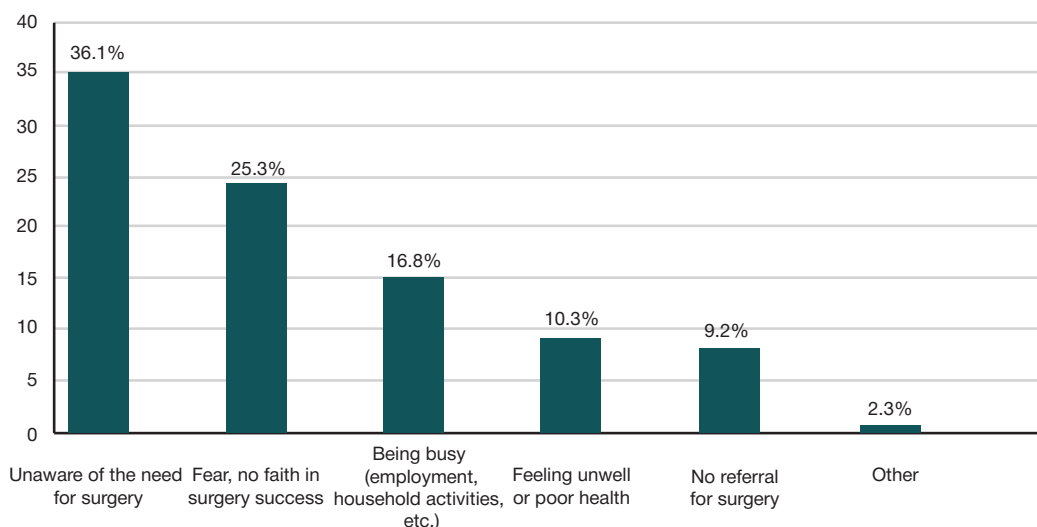
eye disorder. Thus, individuals, to whom the the specialists explain the course and complications of cataract, as well as the advanced treatment methods, have a 1.6 times higher probability of the ophthalmology visits.

We have ranked the factors that, according to the respondents, prevent the timely cataract surgery (Fig. 2). It was found that 36.1% of respondents were unaware of the need for cataract surgery. In every fourth respondent, his/her professional or household activity was one of the key factors, constraining the decision on the timely cataract surgery. A total of 16.8% individuals reported they were afraid of the forthcoming treatment; 10.3% of individuals postponed surgical treatment due to the concomitant somatic disease.

These findings indicate the lack of the patients' awareness of the disease and modern treatment methods. In this regard, informing the population, especially people over the age of 40, about cataract as a serious disease, which contributes to reversible blindness, is an urgent task.

DISCUSSION

The study has shown that insufficient awareness of the disease and the lack of interest in surgical treatment are the major factors, which reduce the patient's motivation for cataract treatment. At the same time, ophthalmology visit frequency is inversely related to the patients' age and the duration of vision loss, and is directly related to the presence of ophthalmologist in the community clinic, trust in the doctor, and ophthalmologist's explanation of the cataract complications and advanced treatment methods. It should be noted that the lack of knowledge about the need

**Fig. 2.** Distribution of reasons for refusal of the cataract surgery

for cataract surgery has been the main obstacle to timely cataract surgery according to 36.1% of respondents, being busy due to employment or household activities was identified by 25.3%, being afraid of the forthcoming treatment was reported by 16.8%, and concomitant somatic disorders were mentioned by 10.3%. These findings are in line with the results of studying the patients' treatment adherence in certain areas of medicine. Thus, a survey of patients with cardiovascular diseases revealed that the key factors contributing to low treatment motivation were as follows: misunderstanding of the doctor's instructions (33.7%), fear of side effects or building up a tolerance (40.2%), comorbidity (35.9%) [17], no symptoms of the disease [18], patient's refusal to depend on drugs or medical personnel, denial of the disease [19].

When studying dental patients, the key factors, negatively affecting the treatment motivation, were as follows: patients' age (the vast majority of individuals were 35–49 years old); gender (women sought medical attention more often than men) [20]; quality of dental care [21]; underestimation of the condition severity by the patient; treatment costs [22]; painful procedure-related fear. In most cases the need for visiting a dentist is associated with acute pain (58.9%), 31.1% of patients schedule their dental visits, and only 22.8% of respondents would have routine check ups [23].

Thus, the study has shown that the factors associated with the patient's personality (lack of awareness, being busy,

fear, etc.), including psychosocial factors (beliefs, perceptions, lack of motivation), as well as the lack of trust in the doctor-patient communication, are the most significant barriers for the cataract treatment adherence. The patient's limited knowledge about cataract and its sequelae together with the lack of motivation and positive preoperative expectations, as well as limited awareness of the advanced treatment methods, result in the delayed application for effective surgical intervention, and reduced quality of life.

CONCLUSIONS

To date, strengthening the prevention and treatment of sociomedical conditions, being the main cause of blindness and low vision, is a major challenge posed by the healthcare system. At the current stage, increasing the patients' adherence to treatment is one of the main factors of improving the health status and the quality of life of the population. When analyzing attitudes towards factors that affected adherence to timely treatment in individuals with cataracts, it was found that the patient-related factors were the most significant (lack of awareness of the disorder, low patient's interest). The findings make it possible to optimize the measures to improve healthcare delivery to patients with cataracts in order to increase the coverage of surgical treatment in such patients.

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