

Possibility of using of international classification of functioning in rehabilitation of patients with cataract

E. V. Klyushnikova

North-Western State Medical Mechnikov University,
41, Kirochnaya ul., St Petersburg, 191015, Russian Federation

For citation: Klyushnikova E. V. Possibility of using of international classification of functioning in rehabilitation of patients with cataract. *Vestnik of Saint Petersburg University. Medicine*, 2021, vol. 16, issue 4, pp. 246–254. <https://doi.org/10.21638/spbu11.2021.403>

The problem of rehabilitation of patients with cataract, analysis of effectiveness of surgical treatment, restoration of professional activity and obtaining a high quality of life after cataract surgery is of great medical and social importance. The basic principles of modern medicine are patient orientation, personalized and multidisciplinary approach. Attention is focused not on an individual disease and its symptoms, but on the patient as a whole person with all life's concerns and problems. The study of the quality of life (QOL) of the patients with cataract allows us to assess the influence of cataract and surgical treatment on the psychological, emotional state of the patient, his functioning in the social environment. However, cataract surgery is a rehabilitation treatment aimed at restoring functions lost due to cataract. International classification of functioning (ICF), limitation of vital activity and health is a generally accepted classification in rehabilitation medicine. In accordance with new trends, the possibility of using ICF for the study of visual impairments and limitation of vital activity in patients with cataract before and after surgical treatment is becoming relevant.

Keywords: cataract, quality of life, rehabilitation of patients with cataract, international classification of functioning (ICF), limitation of vital activity and health.

Actuality

Cataracts are one of the leading causes of low vision and reversible blindness in the world. Patients with cataracts are people of the older age group, pensioners, the poor, the disabled. Therefore, solving the problem of providing medical care to patients with cataracts acquires great social significance. The expected increase of average life expectancy by 5–7 years in the next 2 decades will contribute to increase of the number of patients with cataracts and to increase of requirement for treatment of this disease. According to the Decree of the President of the Russian Federation of May 7, 2018 No. 204 “About national goals and strategic objectives for the development of the Russian Federation for the period up to 2024”, one of the main goals is to ensure sustainable natural growth of the population in the Russian Federation and increase of expected life expectancy to 78 years. In addition, the retirement age has been increased. An increase in the length of the working age will exacerbate this problem, because people with a lot of professional experience and potential lose their ability to work due to cataracts. Therefore, the problem of rehabilitation of patients with cataracts of the older age group, especially of pre-retirement age, assessment

of rehabilitation treatment and restoration of working capacity and obtaining a high quality of life after cataract surgical treatment are the great medical and social importance [1].

The epidemiology of cataracts is associated with various factors, including, in particular, race, diet, environmental pollution (including salts of heavy metals), composition of drinking water, smoking, pathological changes in the microelement composition of the lens, ionizing radiation, use drugs and premature aging of the body. However, the main risk factor is age, since it has been found that after 65 years, half of the population has some degree of lens opacity, although this could not lead to visual impairment. The risk of cataracts also increases with long-term smoking history, diabetes mellitus lasting more than 10 years, bronchial asthma or chronic bronchitis, cardiovascular diseases, eye injuries, inflammatory eye diseases, taking corticosteroids, etc.

The growth rate of the incidence of age-related cataract is twice as fast as the growth rate of the total population, which is associated with improvement of information transfer, ensuring of production processes and the economic situation. An increase in the incidence of cataracts is noted in almost all countries of the world [2; 3]. According to the UN Population Division, by 2025, about 50 million people aged 60 will have varying degrees of lens opacity.

In Russia, the incidence of cataracts is estimated at 320.8 newly diagnosed cases per 100 thousand of the population annually, with age-related cataracts for more than 90 % of all cases. According to published data, the overall prevalence of cataracts in the Russian Federation is 3.36 % for the urban population and 3.63 % for the rural population. The calculated indicators of the number of persons suffering from cataracts and characterizing the significance of the problem are presented in the Table 1.

Table 1. The proportion of patients with cataracts of varying degrees of maturity and pseudophakia in different age groups in % and absolute numbers in Russia in 2020

Situation (%)	Age				
	50–54	55–64	65–78	≥75	≥45
Without cataract (<1.5)	79.7	52.3	27.3	13.2	48.4
Initial cataract (≥1.5<2)	12.2	26.7	23.5	8.3	18.8
Immature cataract (≥2<3)	2.3	12.0	23.1	20.2	13.0
Mature cataract (≥3)	0.2	0.6	8.3	16.9	4.8
Pseudophakia	0.3	0.8	5.7	16.0	4.2
Quantity (calculated)	50–54	55–64	65–78	≥75	≥45
Without cataract (<1.5)	8 551 045	10 747 267	3 792 626	1 162 565	24 253 503
Initial cataract (≥1.5<2)	1 308 943	5 486 655	3 264 714	731 006	10 791 319
Immature cataract (≥2<3)	246 767	2 465 912	3 209 145	1 779 077	7 700 901
Mature cataract (≥3)	21 458	123 295	1 153 069	1 488 435	2 786 258
Pseudophakia	32 187	164 394	791 866	1 409 170	2 397 618

Source: [4].

In medical sciences patient focus, personalized and multidisciplinary approaches are gaining priority. The attention of physicians is increasingly focused not on an individual disease and its symptoms, but on the patient as a whole person with all his life's concerns and problems. There is an intensive search and development of new measurers of the health status of the population, complementing such traditional indicators as morbidity and mortality. Among these new indicators assessments of the quality of life occupy one of the first places [5–10]. On the other hand, surgical treatment of cataracts is a rehabilitation treatment; an ophthalmologist restores the lost visual function of the patient due to the development of cataracts. In 2001, World Health Organization (WHO) proposed the International Classification of Functioning (ICF) of limiting life activity and health for assess approaches to treatment, rehabilitation and medical and social expertise of patients of any profile [11–15]. In accordance with new trends, it becomes relevant to study visual impairments in patients with cataracts before and after surgical treatment, in the light of the limitations of life activity from the perspective of the ICF.

Purpose

To study the possibility of using ICF and study the abilities and barriers for patients with cataract before and after surgical treatment.

Material and methods

The study was performed in Department of Ophthalmology of North-Western State Medical Mechnikov University in 2020. The 40 patients were tested after prior informed consent. The average age of patients was $72,6 \pm 8,2$ years (Table 2).

Table 2. The groups of patients with cataracts of varying degrees of maturity and age

Ko Age	50–54	55–64	65–78	79–87	≥75	≥45
Initial cataract ($\geq 1.5 < 2$)	1	2	8	3	5	14
Immature cataract ($\geq 2 < 3$)	–	2	14	5	6	21
Mature cataract (≥ 3)	–	–	3	2	5	5
Total	1	4	25	10	16	40

There were 16 men and 24 women. The survey of patients was performed twice: before and after surgical treatment of cataract. The domains were selected on 2 groups. 1 group was about mobility: the patient's movement in their home and outside, the ability to go store, the ability to drive a car, the ability to do housework. 2 group was about environmental factors: the using of technologies of communication, the help of family and near persons and the help of social and professional medical services. The second test was performed 1 month after operation during a control examination.

For survey we used specially created questionnaires. The patient surveys were conducted in compliance with the ethical principles of medical studies with the participation of a person as subject on the basis of the Helsinki Declaration of the World Medical Association (last changes in 2013 y.) All patients signed informed paper before testing.

The International Classification of Functioning, Disability and Health (ICF) is an internationally recognized classification of constituents of health and health-related factors. It was recommended for international use by the 54th World Health Assembly in 2001. The ICF belongs to the international classifications developed by the World Health Organization (WHO), which are applicable to various aspects of health together with the ICD. The International classifications provide a standard framework for describing health indicators. This allows communication on health-related issues around the world, across disciplines and branches of science.

In the ICF, human functioning is viewed from several perspectives. Body structures (s) are the anatomical parts of the body such as organs, limbs and their elements. Body functions (b) are the physiological functions of body systems, including psychological functions. Activity (d) is the performance of a task or action by an individual. Activity limitations are difficulties that an individual may experience in performing actions in daily activities. Participation means being involved in a particular area. Environmental factors (e) take into account the factors of the person's environment that affect his health and activities.

A domain from the perspective of the ICF is a practical and meaningful set of inter-related physiological functions, anatomical structures, actions, tasks and spheres of life. Domains are described by means of two lists: 1) functions and structures of the organism, 2) activity and participation. Classification using a set of domains describes the individual's situation. The description is always given in the context of environmental and personal factors.

Visual dysfunction in the ICF is found in the section vision and visual function (b210-b229). The visual functions of patients were analyzed with traditional ophthalmologic methods. For patients were performed measuring visual acuity, intraocular pressure, fields of view, biometry, autorefractometry, optical coherent tomography of the retina, check of the periphery of the retina with mydriasis. We used ICD (H25.0 — H26.3) for clinical diagnosis. The varying degrees of maturity of cataract were initial, premature and mature cataracts.

Statistical analysis was performed with Microsoft Excel 10. The author of the article had no financial interest and sponsors.

Results

The obtained patient testing data for domains (d) mobility and activity and (e) environmental factors are summarized in Tables 3, 4.

Thus, cataracts of varying degrees of maturity affect to the persons daily activities. When moving inside (in the home) before surgery (d4600) — 80.0 % of patients had medium, hard and absolute difficulties, after surgery only — 2.5 %. When moving outside (d4601) before the operation — 92.5 % of patients had medium, hard and absolute difficulties, after the operation — 17.5 %. When driving a car (d 4751) — all patients — 52.5 % had some difficulties, 47.5 % — had no experience of driving a car. After the operation only 10.0 % of patients had light difficulties with driving a car. When making shopping (d6200) before surgery — 85.0 % of patients had medium, hard and absolute difficulties, after surgery — 32.5 %. When performing housework (d6408) before surgery — 90.0 % of patients had medium, hard and absolute difficulties, after surgery — 30.0 % of patients.

Table 3. The mobility and activity (d) of the patients with cataract before and after surgical treatment

	d4600 the patient's movement in their home abs. (%) before/after	d4601 the patient's movement outside abs (%) before/after	d4751 the ability to drive a car abs (%) before/after	d6200 the ability to go store abs (%) before/after	d6408 the ability to do housework abs (%) before/after
The determinant of the possibility 0 — NO difficulty (0–4%)	8 (20.0%) /39 (97.5%)	3 (7.5%) /33 (82.5%)	0 (0%) /17 (42.5%)	6 (15.0%) /27 (67.5%)	4 (10.0%) /30 (75.0%)
1 — LIGHT difficulties (5–24%)	13 (32.5%) /1 (2.5%)	9 (22.5%) /5 (12.5%)	3 (7.5%) /4 (10.0%)	9 (22.5%) /8 (20.0%)	8 (20.0%) /7 (17.5%)
2 — MEDIUM difficulties (25–49%)	10 (25.0%) /0 (0%)	17 (42.5%) /2 (5.0%)	4 (10.0%) /0 (0%)	15 (37.5%) /5 (12.5%)	17 (42.5%) /2 (5.0%)
3 — HARD difficulties (50–95%)	9 (22.5%) /0 (0%)	7 (17.5%) /0 (0%)	11 (27.5%) /0 (0%)	8 (20.0%) /0 (0%)	8 (20.0%) /1 (2.5%)
4 — ABSOLUTE difficulties (96–100%)	0 (0%) /0 (0%)	4 (10.0%) /0 (0%)	3 (7.5%) /0 (0%)	2 (5.0%) /0 (0%)	3 (7.5%) /0 (0%)
8 — not defined					
9 — not applied			19 (47.5%) /19 (47.5%)		

This survey showed that the majority of patients with cataract cannot perform everyday activities (move around the house, go outside, move through the street, go shopping, do housework) and all patients cannot driving a car. Abilities of the patients after surgery improved significantly ($p \leq 0.05$).

Thus, if we use questionnaires for different domains, we can get a complete description of the possibilities of a person with different disease, in this study with cataracts. For domains (d) mobility and activity also can use additional determinants of the possibility (0, 1, 2, 3, 4, 8, 9). The information about mobility and activity (d) of the patient can be — dXXX.0 (1, 2, 3, 4, 8, 9).

Here we have information about how environmental factors affect the life of the cataract patients. First, how much do communication tools (e1250) — telephone, voice recorder, computer, TV make life easier? Before operation 87.5% of the patients with cataracts had medium, hard and absolute barriers because they could not distinguish the buttons of the devices. After operation only 7.5% ($p \leq 0.05$).

The help of family and near persons (e310) — is very impotent and it helped to overcome vision problems before operation for 62.5% respondents (30.0% — had no barriers, 32.5% — had light barriers). After surgery, 88.0% of patients had no barriers with the help of relatives (62.5% — had no barriers, 25.5% — had light barriers), ($p \leq 0.05$).

Table 4. Environmental factors and possibilities of cataract patients before and after cataract surgery

	e1250 the using of technologies of communication abs (%) before/after	e310 the help of family and near persons abs (%) before/after	e340 the help of social services abs (%) before/after	e355 the help of professional medical services abs (%) before/after
The determinant of the barrier 0 — NO barriers (0–4%)	5 (12.5%) /32 (80.0%)	12 (30.0%) /25 (62.5%)	9 (22.5%) /18 (45.0%)	6 (15.0%) /19 (47.5%)
1 — LIGHT barriers (5–24%)	8 (20.0%) /5 (12.5%)	13 (32.5%) /10 (25.5%)	7 (17.5%) /11 (27.5%)	8 (20.0%) /12 (30.0%)
2 — MEDIUM barriers (25–49%)	19 (47.5%) /3 (7.5%)	8 (20.0%) /4 (10.0%)	12 (30.0%) /8 (20.0%)	15 (37.5%) /5 (12.5%)
3 — HARD barriers (50–95%)	6 (15.0%) /0 (0%)	5 (12.5%) /1 (2.5%)	5 (12.5%) /1 (2.5%)	6 (15.0%) /1 (2.5%)
4 — ABSOLUTE barriers (96–100%)	2 (5.0%) /0 (0%)	2 (5.0%) /0 (0%)	5 (12.5%) /0 (0%)	3 (7.5%) /1 (2.5%)
8 — not defined			2 (5.0%) /2 (5.0%)	2 (5.0%) /2 (5.0%)
9 — not applied				

The assistance of social services (e340) helped 40.0% of patients before surgery (they had no barriers or had light barriers). After surgery it helped 72.5% of respondents ($p \leq 0.05$).

And with the help of professional medical services (e355) before surgery — 15.0% of respondents did not have any barriers and 20.0% — had light barriers. After surgery — 47.5% and 30.0% respondents had no or light barriers ($p \leq 0.05$).

Using the determinant of the barrier, the information about environmental factors (e) and possibilities of the patient can be — eXXX.0 (1, 2, 3, 4, 8, 9).

Conclusions

From a practical point of view, the ICF concept reveals the idea that the cause of a malfunctioning can be at different levels: it can be caused by a disease, injury or congenital condition. That is, at the heart of the limitation of vital activity is a violation of functions and structures — a manifestation of the disease. To help the patient, it is necessary to carry out medical or surgical interventions, which will automatically lead to the restoration of health and functioning. Also, limitation of life activity can be associated with loss of functionality, that is, loss of everyday skills, self-care, work and leisure. Elimination or compensation of the emerging disorders by adaptation and adapting of the patient to society will allow solving his problems. In relation to the people around him, in the rejection by

people without disability his “defect”, the peculiarities of the structure, or behavior. To help the patient, it is necessary to work on social attitudes and stereotypes, to change the negative influence of the physical environment. The patient could function effectively and successfully, but the physical arrangement of the environment does not allow him to exist in it. To help the patient, it is necessary to change the environment at the psychological level. These can be negative attitudes of the patient, “benefit” from the disease, embarrassment, lack of motivation, lack of awareness about illness and disability, about the opportunity to help and rehabilitate. Patient assistance can be provided through competent information of patient from the rehabilitation team. Environmental factors may consist in the lack of material funds for treatment or in the inaccessibility of assistance for the patient, etc.

Thus, ICF improves the quality of diagnosis and rehabilitation due to a more holistic vision of the components of the patient’s health, describing not only the problems, but also the patient’s capabilities. The use of ICF allows a comprehensive view of the patient and the formulation of tasks for subsequent treatment. The ICF is a tool that has to be implemented on the recommendation of the Ministry of Health.

The use of the ICF for the work of doctors of different specialties will help to expand the possibilities for assessing the effectiveness of treatment. Together with the assessment of the quality of life, it will help to assess the impact of the treatment provided on the patient’s functions and his life in general. The professional community of rehabilitation specialists is actively discussing the use of collections of domains grouped by nosological principle. The idea of using such collections would mean simplifying the work by reducing the number of domains to lists of 30–40 domains. So, through extensive research, lists of the most common domains for common diseases and conditions (ICF-core-set) were created. It is possible to develop a list of domains based on the competencies of individual specialists (a list of domains for a psychologist, for a speech therapist, physical therapist, ophthalmologist, neurologist, etc.). Another alternative that allows you to reduce the number of domains for using ICF in clinical work is to create lists of domains grouped by impairment: a list for patients with mobility problems, for patients with problems of speech and communication, vision, swallowing, for patients with impaired consciousness and etc. This approach allows you to erase the differences in nosology and promotes a problem-oriented approach based on the main types of disorders and limitations.

This study showed that the majority of patients with cataracts cannot perform everyday activities (move inside the house — 80.0 %, move outside — 92.5 %, go shopping — 85.0 %, do housework — 90.0 %) and all patients (100 % who can drive a car) lost the ability to drive a car.

Also, 87.5 % of patients had difficulties with the use of communication tools (telephone, voice recorder, computer, TV). The family and near persons and relatives helped to overcome vision problems in 62.5 % of patients, the help of social services — in 40.0 % of patients and the help of professional medical services — in 35.0 % of patients. After surgery the abilities of respondents increased significantly: only 2.5 % of patients had problem moving inside the home, 17.5 % — moving outside, 10.0 % of patients had some problem driving a car, 32.0 % — going shopping and 30.0 % — doing housework. After surgery 7.5 % of patients had difficulties with communication tools, 80.0 % of respondents could overcome vision problems with the help of family, 72.5 % — with the help of social services and 77.5 % — with the help of professional medical services. Thus, we analyzed how the life of the patients with cataracts has changed after surgery.

Using the ICF, an ophthalmologist has new opportunities and ways to implement rehabilitation programs for patients with age-related cataract. A multidisciplinary, patient-centered and personalized approach is implemented. There is an assessment of not only the functions of the visual analyzer, but also the functioning of the body as a whole, an assessment of the patient's activity and participation in work and social life, the influence of environmental factors (the influence of the family, the availability of medical care) on the treatment. Together with the assessment of the quality of life, the ICF will give a complete picture of the patient's "portrait" before and after cataract surgery. In this regard, there is a advisability of using the ICF for narrow specialists, in particular ophthalmologists, in practical medicine. The use of ICF will allow analyzing the degree of dysfunction of the visual analyzer in cataracts, adjusting the treatment regimen, determining the effect of early surgical treatment, determining the effect of the type of implanted intraocular lens, the influence of age, concomitant diseases, analyzing the optimal timing, tactics and effectiveness of surgical treatment, etc.

References

1. Orlova O.M., Trubilin V.N. The surgery of cataract as a medical social problem. *Sotsiologiya meditsiny*, 2017, vol. 16, no. 2, pp. 119–122. (In Russian)
2. Foster P., Wong T., Machin D., Johnson G., Seah S. Risk factors for nuclear, cortical and posterior subcapsular cataracts in the Chinese population of Singapore: the Tanjong Pagar Survey. *British Journal of Ophthalmology*, 2003, vol. 87, pp. 1112–1120. <https://doi.org/10.1136/bjo.87.9.1112>
3. Theodoropoulou S., Theodossiadis P., Samoli E., Vergados I., Lagiou P., Tzonou A. The epidemiology of cataract: a study in Greece. *Acta Ophthalmol.*, 2011, vol. 89, pp. 167–173.
4. Nischler C., Michael R., Wintersteller C., Marvan P., Emesz M., Van Rijn L.J., van den Berg T.J.T.P., Wilhelm H., Coeckelbergh T., Barraquer R.I., Grabner G., Hitzl W. Cataract and pseudophakia in elderly European drivers. *Eur. J. Ophthalmol.*, 2010, vol. 20 (5), pp. 892–901.
5. Javed U., McVeigh K., Scott N.W., Azuara-Blanco A. Cataract extraction and patient vision-related quality of life: a cohort study. *Eye*, 2015, vol. 29, no. 7, p. 921.
6. Evseeva A.A., Kuznetsov S.L. Methods of study of life quality in ophthalmologic patients. *Prakticheskaya meditsina*, 2012, no. 4 (59), pp. 224–228. (In Russian)
7. Heemraz B.S., Lee Ch. N., Hysi P.G., Jones C.A., Hammond Ch. J., Mahroo O.A. Changes in quality of life shortly after routine cataract surgery. *Canadian Journal of Ophthalmology*, 2016, vol. 51, no. 4, pp. 282–287. <https://doi.org/10.1016/j.cjco.2016.02.004>
8. Donovan J.L., Brookes S.T., Laidlaw D.A.H., Hopper C.D., Sparrow J.M., Peters T.J. The development and validation of a questionnaire to assess visual symptoms/dysfunction and impact on quality of life in cataract patients: the Visual Symptoms and Quality of life (VSQ) Questionnaire. *Ophthalmic Epidemiol.*, 2003, vol. 10, pp. 49–65. <https://doi.org/10.1076/oep.10.1.49.13775>
9. Lundström M., Pesudovs K. Catquest-9SF patient outcomes questionnaire: nine-item short-form Rasch-scaled revision of the Catquest questionnaire. *J. Cataract. Refract. Surg.*, 2009, vol. 35, no. 3, pp. 504–513. <https://doi.org/10.1016/j.jcrs.2008.11.038>
10. Luján S., Alburquerque M., Pizango O. Use of quality of life questionnaires for the evaluation of patients subjected to cataract surgery. *Archivos de la Sociedad Española de Oftalmología*, 2013, vol. 88, no. 4, pp. 162–163. <https://doi.org/10.1016/j.oftale.2012.04.020>
11. Stokes E.K. International classification of functioning, disability, and health (ICF). *Rehabilitation Outcome Measures*, 2011, pp. 13–16. <https://doi.org/10.1016/b978-0-443-06915-4.00002-4>
12. Stucki G., Kostanjsek N., Cieza A. The International Classification of Functioning, Disability and Health: A Tool to Classify and Measure Functioning. *Handbook of Disease Burdens and Quality of Life Measures*, 2010, pp. 1–34. https://doi.org/10.1007/978-0-387-78665-0_1
13. Rauch A., Escorpizo R., Riddle D.L., Eriks-Hoogland I., Stucki G., Cieza A. Using a Case Report of a Patient With Spinal Cord Injury to Illustrate the Application of the International Classification of Functioning, Disability and Health During Multidisciplinary Patient Management. *Physical Therapy*, 2010, vol. 90, pp. 1039–1052. <https://doi.org/10.2522/ptj.20090327>

14. Shoshmin A. V., Ponomarenko G. N., Besstrashnova Ya. K., Cherkashina I. V. Application of the International Classification of Functioning, Disability and Health to evaluate the effectiveness of rehabilitation: methodology, practice, results. *Voprosy kurortologii, terapii i lechebnoi fizicheskoi kul'tury*, 2016, vol. 93, no. 6, pp. 12–20. <https://doi.org/10.17116/kurort2016612-20> (In Russian)
15. Ponomareva I. P., Proshchaev K. I., Il'nitskiy A. N., Butikova E. S., Zlobina I. A. Applicative value of the International Classification of Functioning, Disability and Health in palliative geriatrics. *Sovremennye problemy nauki i obrazovaniia*, 2015, vol. 5, p. 42. <https://doi.org/10.17513/spno.128-21623> (In Russian)

Received: November 19, 2021

Accepted: December 27, 2021

Author's information:

Elena V. Klyushnikova — MD; elena.klyushnikova@szgmu.ru, klyushnikova@yandex.ru