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## ORIGINAL

### DISCUSSION ON CATARACT SCREENING MANAGEMENT AND IMPLEMENTATION IN RETIRED ATHLETIC PATIENTS WITHIN A COMMUNITY HEALTHCARE SYSTEM

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## ABSTRACT

**Objective:** Based on a retrospective cohort study, the management, implementation and application value of cataract screening was explored for the retired athletic patients based on community health care system. **Methods:** During April 2018 to April 2021, a total of 300 elderly cataract patients treated were enrolled in our hospital retrospectively. The retired athletic patients who underwent general screening management were selected as the control group. The retired athletic patients who underwent screening management based on the community health care system were selected as the study group. The Posterior Capsular Opacification (PCO) classification, compliance behavior, psychological resilience score, self-efficacy score and quality of life score were compared. **Results:** The PCO grade of the study group was lower ( $P<0.05$ ). The number of regular re-examinations, drug treatment, regular dietary activities, eye hygiene, quitting smoking and drinking in the study group was remarkably higher ( $P<0.05$ ). The scores of optimism, strength, tenacity and psychological resilience in the study group were remarkably higher ( $P<0.05$ ). After intervention, the scores of self-efficacies augmented. The scores of self-efficacies in the study group were higher than those in the control group at 1 month, 2 months and 3 months after intervention ( $P<0.05$ ). The scores of distant visions, adjustment ability, reading and fine movements and activities of

daily living in the study group were remarkably higher ( $P < 0.05$ ). **Conclusion:** Cataract screening management in the elderly based on the community health care system can effectively enhance the condition, enhance medical compliance and self-efficacy, alleviate negative emotions and promote the quality of life.

**KEY WORDS:** Community health care system; Cataract; Compliance behavior; Quality of life

## 1. INTRODUCTION

Cataract refers to the pathological changes of lens transparency and color that lead to the decline of visual quality. There are many clinical types and age-related cataract is the most common one. The cataracts will eventually develop into severe visual impairment or even blindness (Liu et al., 2022). Cataract is the main eye disease causing blindness among the elderly in the world, and it has become a major public health problem (Kaya, Celebi, Debbag, Canbay, & Onal, 2022). Cataract can successfully recover vision loss associated with cataract by surgery (Tien, Crespo, Milman, & Syed, 2022). In many areas where medical resources are scarce, it is still difficult to obtain appropriate preventive eye care and surgical treatment (Absil, Diao, & Diallo, 2021). At the same time, there are also some problems in the field of cataract surgery, such as substandard diagnosis and treatment, poor postoperative visual effect and so on (Adham et al., 2022; Albert Chakona, 2022). In February 1999, the World Health Organization (WHO) and the International Association for the Prevention of Blindness launched the campaign "Vision 2020, the right to see for everyone" aimed at eradicating avoidable blindness globally (Fukuoka, Kojima, Iwama, Okumura, & Sotozono, 2022; Zeng, Ye, Chen, Jia, & Zhang, 2022). At the 66th World Health Assembly (WHA) in 2013, WHO released "towards universal eye health: there was a global action plan intended to reduce avoidable blindness and visual impairment from 2014-2019, which emphasized the need to reduce avoidable blindness and visual impairment repeatedly (Son et al., 2022). About 80% of visual impairment worldwide is avoidable (Gupta & Ionides, 2022). Our government has implemented a series of blindness prevention and blindness prevention projects (Günaydın & Oral, 2022). The implementation of the project has contributed to the prevention of blindness in China, especially cataract blindness prevention and made progress in reducing visual impairment. Nearly all areas experienced a notable reduction in the prevalence of blindness and moderate or severe visual impairment (Chung, Lee, Lee, Kim, & Tchah, 2022).

Through the screening and management of retired athletic patients based on community health care system, with the help of household health files to carry out community intervention, its clinical value is reflected in both individual level and community group level (Cui et al., 2022). At the individual

level, personal health records of residents are the basis for general practitioners to evaluate the health level of residents (Guo et al., 2022). According to the information recorded in the personal health records of residents, general practitioners can evaluate the dynamic changes of their health status in order to take corresponding intervention measures to control the occurrence and development of personal related diseases (Cardoso, Gomes, Fernandes, & Domingueti, 2017). At the group level, we can identify high-risk groups and understand the origin, disease composition and regional distribution of retired athletic patients. This enables effective organization of treatment services, rational allocation of health resources and the adoption of appropriate techniques and measures to control disease development (Kavitha & Heralgi, 2022). Nowadays, the work of community health service has also indicated the trend of informatization (Blackstone & Fuhr Jr, 2019). According to the survey of relevant data, some unique community health care systems have been developed and implemented in many areas of our country. It has improved the work efficiency of community health service staff (Jha & Kurumkattil, 2022; Regmi, 2022). On the basis of this, a retrospective study has been conducted to explore the management, implementation, and applications of cataract screening to the elderly in community health care (Allen, Jens, & Wendt, 2022).

## **2. Patients And Methods**

### **2.1 General information**

During April 2018 to April 2021, a total of 300 retired athletic patients treated were enrolled in our hospital retrospectively. The retired athletic patients who underwent general screening management were selected as the control group (n=150) and the retired athletic patients who underwent screening management based on the community health care system were selected as the study group (n=150). An average of (74.14  $\pm$ 2.55) years old was found in the control group, including 76 males and 74 females aged 60 to 89 years old. The course of disease ranged from 2 to 6 years with an average course of (4.12  $\pm$ 0.64) years with monocular disease in 98 cases and binocular disease in 52 cases. Disease types included cortical type 78 cases, nuclear type 30 cases, subcapsular turbidity 42 cases. LOCS II grade of lens nucleus hardness included grade II in 54 cases, grade III in 41 cases, grade IV in 30 cases and grade V in 25 cases. Education level was 87 in primary and junior high school, 41 in senior high school and technical secondary school, 22 in junior college or above. Complicated with underlying diseases: 41 cases were complicated with hypertension, 37 cases were complicated with diabetes, 30 cases were complicated with hyperlipidemia and 42 cases were complicated with coronary heart disease. Participants in the study ranged in age from 60 to 87 years old with an average age of (74.96 $\pm$ 2.44). There were 73 males and 77 females with a course of 2-6 years, which was an average course of (4.19 $\pm$ 0.67) years. Monocular disease occurred in 102 cases and binocular disease in 42

cases. The types of diseases were cortical type (n=73), nuclear type (n=36) and subcapsular turbidity (n=41). LOCS II grade of lens nucleus hardness included grade II in 56 cases, grade III in 42 cases, grade IV in 28 cases and grade V in 24 cases. Primary and junior high school students achieved an education level of 90, senior high school students achieved 39, and students in junior college or higher achieved 21. There were 46 peoples of hypertension, 39 peoples of diabetes, 26 peoples of hyperlipidemia and 39 peoples of coronary heart disease. There exhibited no statistical significance in the general data. A medical ethics committee approved this study, and all retired athletic patients gave their informed consent. The 42nd Japanese Cataract Society made guidelines for the diagnosis and treatment of cataracts, and the selected cases met these diagnostic criteria for cataract.

Inclusion criteria: 1) the subjects were retired athletic patients with senile cataract diagnosed for the first time; 2) the subjects with clear consciousness, unimpaired hearing, free language expression; 3) the subjects without other eye diseases or mental diseases; 4) informed consent according to the voluntary principle of the retired athletic patients. those who can complete the intervention. Exclusion criteria: retired athletic patients who could not answer questions correctly or could not cooperate to complete the intervention due to other reasons.

## 2.2 Treatment methods

Control group: health education and rehabilitation guidance on cataract related knowledge were carried out by medical staff in our hospital and telephone interviews were conducted at least once a month. The main contents of intervention include: cognitive education, diet, rest, medication and other matters needing attention, monitoring and correction of risk behaviors, correct methods of eye drops, mental health education. The degree of IOL was measured by IOLmaster500 (Zeiss, Germany). If the eye axis could not be measured by IOLmaster500, the eye axis was measured by A-mode ultrasound. The measured eye axis data were brought into IOLmaster500 to calculate the IOL degree. The research group carries on the screening management based on the community health-care system, the specific measures are as follows: preoperative examination: the personal health files of the retired athletic patients was established. All the case data of the retired athletic patients were filled in completely and the personal status of the retired athletic patients was evaluated by the community doctor. Before surgery, all retired athletic patients went through a complete ophthalmological examination, including uncorrected visual acuity (UCVA) measured by standard logarithmic visual acuity chart, subjective and objective refractive status and best corrected visual acuity (BCVA). Non-contact tonometer was used to analyze intraocular pressure (IOP). The anterior segment was examined under slit lamp. After the pupil dilated to 6mm, the severity of cataract was evaluated by slit lamp after illumination and

the severity of cataract was graded by lens opacity grading system (LOCS) and Emery lens nuclear grading system. Then, fundus examination was performed through the anterior lens to exclude vitreous and retinal diseases. Eye axis was measured by A-mode ultrasound, curvature was measured by keratometry and vitreoretinal diseases were excluded by fundus photography and B-ultrasound examination. Vitreoretinal diseases were excluded by B-ultrasound and optical coherence tomography (CIRRUSHD-OCT9.5). Postoperative follow-up: the subjects were followed up at 1- and 6- month operation and a complete eye examination was performed during the follow-up. The community medical staff shall complete the daily treatment, follow-up and health education of the retired athletic patients. The patients' behavior would be monitored as directed by the doctor in time. If the patients had complications or the vision recovery effect was not noticeable. The patients would be transferred to the outpatient clinic and adjust the treatment plan as appropriate. Every month, the medical staff of the operation hospital and the community hospital organized the experience exchange of participating in cataract management and gave lectures to the retired athletic patients and their families regularly (Pattanayak, Nanda, & Swain, 2022).

## **2.3 Observation index**

### **2.3.1 PCO grading**

According to the slit lamp examination and fundus visibility after mydriasis, the PCO grade was divided into 0-5 grades according to Odrich method: grade 5, dense pearlelike bodies with "shading" effect; grade 4, typical nacreous bodies or dense fibrous membrane; grade 3, honeycomb-like opacity and thicker lens epithelial cell mass or fibrous membrane in the posterior capsule of lens. Grade 2, involving the central 3mm optical zone, microwrinkles or thin masses of lens epithelial cells could be noticed in the posterior capsule of the lens, grade 1, microfolds or thin masses of lens epithelial cells could be noticed in the posterior capsule of the lens, not involving the central 3mm optical zone, and grade 0, there was no opacity.

### **2.3.2 Medical compliance behavior**

A self-made questionnaire was used to investigate retired athletic patients' compliance behavior with a reliability and validity of 0.875. The contents of the survey included: whether retired athletic patients were regularly reviewed, whether patients were treated with drugs, whether retired athletic patients' dietary activities were regular and whether patients quit smoking and drinking.

### **2.3.3 Psychological resilience score**

The resilience of the retired athletic patients was assessed by the

Resilience Scale (CD-RISC), which included 3 dimensions of optimism (4 items), strength (8 items) and tenacity (13 items). CD-RISC has 25 items scored between 0 and 4 points, for a total score of 0 to 100 points.

#### **2.3.4 self-efficacy score**

The general self-efficacy scale (GSES) was adopted to assess the retired athletic patients' self-efficacy. The scale included 10 items. There were four items, each worth 1-4 points, and the total score ranged from 10 to 40 points. The higher the score, the more self-efficacy the retired athletic patient had.

#### **2.3.5 Quality of life scale**

Quality of life assessment: The Chinese version of CLVQOL was adopted to assess the quality of life of retired athletic patients with low vision, which was divided into 25 items in four dimensions: distant vision, adjustment ability, reading and fine movements and activities of daily life (ADL).

All items were related to vision decline and were adopted to assess the quality of life of retired athletic patients with low vision. This scale had good reliability and validity and has been widely used in retired athletic patients with low vision.

### **2.4 Statistical analysis**

Using SPSS21.0 statistical software, a normal distribution and variance homogeneity analysis were used to determine whether the measurement data met the requirements of either a normal distribution or an approximate normal distribution. Repeated measurement analysis of variance was applied to the repeated measurement data. Comparing the two groups was performed using the T test, and n (%) was used as an example to represent the counting data.  $\chi^2$  test was employed to show that the difference exhibited statistically noticeable ( $P < 0.05$ ).

## **3. RESULTS**

### **3.1 PCO graded comparison**

The comparison of PCO grading showed that there were 84 cases of grade 0, 49 cases of grade 1, 12 cases of grade 2 and 5 cases of grade 3 in the study group. 56 cases of grade 0, 48 cases of grade 1, 32 cases of grade 2 and 14 cases of grade 3 were in the control group. Compared between groups, the PCO grade of the study group was lower ( $P < 0.05$ ). All data results are indicated in Figure 1.

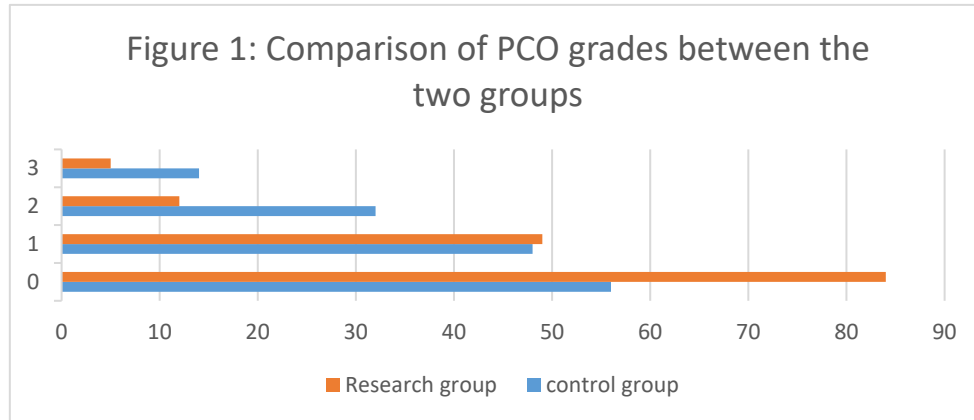


Figure 1: Comparison of PCO grades between the two groups

### 3.2 Comparison of medical compliance behavior

According to the comparison of medical compliance behavior, the number of regular re-examinations, drug treatment, regular dietary activities, eye hygiene, quitting smoking and drinking in the study group was remarkably higher ( $P < 0.05$ ). All the data results are indicated in Figure 2.



Figure 1: Comparison of compliance behavior between the two groups

### 3.3 Comparison of psychological resilience score

The scores of optimism, strength, tenacity and the total score of psychological resilience in the study group were remarkably higher ( $P < 0.05$ ). All the data results are indicated in Table 1.

Table 1 The psychological elasticity scores between the two groups [ $\bar{x} \pm s$ , points]

Group	N	Optimism	Strength	Tenacity	Total score of psychological elasticity
C Group	150	8.49±3.12	14.96±1.38	33.94±5.92	65.94±4.91
R Group	150	11.95±3.52	28.92±4.95	42.93±6.34	82.84±3.94
<i>t</i>		9.009	33.271	12.693	32.878
<i>P</i>		<0.01	<0.01	<0.01	<0.01

### 3.4 Comparison of self-efficacy score

The analysis of variance of repeated measurement showed that there exhibited noticeable difference in self-efficacy ( $P < 0.05$ ). There exhibited noticeable difference among different time points ( $P < 0.05$ ). There exhibited noticeable difference in  $\times$  time interaction ( $P < 0.05$ ). After intervention, the scores of self-efficacies augmented. Compared between groups, the scores of self-efficacies in the study group were higher than those in the control group at 1 month, 2 months and 3 months after intervention ( $P < 0.05$ ). All the data results are indicated in Table 2.

**Table 2** WOMAC scores between the two groups [ $\bar{x} \pm s$ , points]

Group	N	Before intervention	One	month	2 months	3 months
			after intervention	after intervention	after intervention	after intervention
<b>C Group</b>	<b>150</b>	15.95 $\pm$ 3.94	20.96 $\pm$ 3.91	25.76 $\pm$ 3.42	30.71 $\pm$ 3.91	
<b>R Group</b>	<b>150</b>	15.81 $\pm$ 3.91	25.85 $\pm$ 2.82*	30.91 $\pm$ 2.65*	36.76 $\pm$ 1.58*	
<b>Intergroup (F/P)</b>		12.423/ $<0.01$				
<b>time (F/P)</b>		14.578/ $<0.01$				
<b>Intergroup <math>\times</math> time (F/P)</b>		17.570/ $<0.01$				

*Note: compared with the control group at the same time, \*  $P < 0.05$*

### 3.5 Comparison of quality-of-life scores

After intervention, the scores of distant visions, adjustment ability, reading and fine movements and activities of daily living in the study group were remarkably higher ( $P < 0.05$ ). All the data results are indicated in Table 3.

**Table 3** The quality-of-life scores between the two groups [ $\bar{x} \pm s$ , points]

Group	N	Distant vision		Regulating ability		Reading and fine movements		Ability of daily living	
		Before intervention	After intervention	Before intervention	After intervention	Before intervention	After intervention	Before intervention	After intervention
		<b>C Group</b>	50	35.57 $\pm$ 4	39.19 $\pm$ 5	8.27 $\pm$ 2	13.19 $\pm$ 2	8.10 $\pm$ 2	13.95 $\pm$ 3
<b>R Group</b>	50	35.62 $\pm$ 4	45.96 $\pm$ 4	8.30 $\pm$ 2	16.92 $\pm$ 3	8.15 $\pm$ 2	16.49 $\pm$ 4	9.72 $\pm$ 3	17.45 $\pm$ 4
<b>t</b>		0.104	11.193	0.125	10.297	0.212	5.808	0.067	5.306
<b>P</b>		$>0.05$	$<0.01$	$>0.05$	$<0.01$	$>0.05$	$<0.01$	$>0.05$	$<0.01$

## 4. DISCUSSION

Cataract refers to the pathological changes of lens transparency and color that lead to the decline of visual quality. According to the etiology, cataract



can be roughly divided into age-related, traumatic, congenital, secondary and drug-induced cataract, among which age-related cataract is the main subtype (Nair, Tagare, Venkatesh, & Odayappan, 2022; Samanta, Jayaraj, Sood, & Agrawal, 2022). Cataract is the leading cause of blindness in China and the world (Cheng et al., 2022). According to the data released by the global disease burden, there were still 8.537 million cataract retired athletic patients in China in 2015 (Ortiz-Peregrina et al., 2022). With the aging of the population, the incidence and number of cataracts are still increasing. Surgery is the only effective treatment for cataract at present (Schroeder et al., 2022). An eye disease epidemiological survey in 9 provinces of China in 2014 showed that the surgical coverage rate of retired athletic patients with cataract-related severe visual impairment or blindness was 62.7% (Tan et al., 2022). The cataract surgery rate (CSR) also augmented from 318 in 1999 to more than 3000 in 2019 (Wang et al., 2020). However, there is still a big gap with developed countries (Minnaert et al., 2022). Improving the rate of cataract surgery is still the focus to prevent and treat of blindness in our country. Previous studies have indicated that economic difficulties are an important reason for retired athletic patients to choose cataract surgery (Dubuc, Li, & Tourjman, 2022; Wirbelauer & Geerling, 2022).

Compared with the general population, retired athletic patients are more likely to remarkably reduce the quality of life related to vision. A systematic review of the prevalence of cataract in China from 2000 to 2010 shows that in 2010, the prevalence rate of cataract in the 45-89 age group was 21.96% (Chin & Khan, 2022). In my country's 2006 national survey of nine provinces (Sun, Li, Yu, & Zheng, 2022), the prevalence of cataracts in Beijing was 15.57% in the central and eastern regions, 23.11% in Ji'an, Jiangxi in the central region, and 22.4% in Luxi, Yunnan, in the western region. The research of Chinese scholars pointed out that the prevalence rate was 14.12% among 4539 subjects aged 50 and above in Foshan (Xia, 2022). It was found that the prevalence rate of cataract augmented with age and there was a noticeable difference between urban and rural areas. A survey in Yimeng Mountain area of Shandong Province found that the prevalence rate of cataract was 68.97%. There was no noticeable difference between female prevalence rate (68.11%) and male prevalence rate (70.88%) (Rajabto, Purba, & Chandika, 2022). The prevalence rate of people aged 70 and above (90.33%) was remarkably higher than that of people under 70 years old (57.25%). The results of a study by some scholars showed that the prevalence of cataract in Europe, the United States and Australia ranged from 5% to 30% (Rajendrababu, Puthuran, Alia, Uduman, & Wijesinghe, 2022). In other Asian countries such as Singapore, a population-based cross-sectional study of Asian adult Asians (Chinese, Malays and Indians) residing in Singapore found that the prevalence of cataract in Singaporeans was 6.54%. Iran, an Asian country, also conducted a meta-analysis of the incidence of clinical cataracts in Iran from 1990 to 2017 (Yela, Faber, Dantas, Benetti-pinto, & Jales, 2022). The study included 59,668 people in 12 Iranian provinces and

the overall incidence of cataracts was 9.27%. 2015-2016 Australian National Eye Health Survey showed that the prevalence of cataracts was 4.3%. A Polish study showed that the prevalence of cataracts was 12.1%. With the aging of the population, the prevalence rate of cataract is increasing, so it is necessary to strengthen community intervention for retired athletic patients with cataract.

Community health service is a relatively successful basic health care system implemented by economically developed countries for many years. According to relevant statistics, South Korea has completed the first 10-year plan of health information system (1991-2000) and the second phase (2001-2010) is being implemented. Under the strong promotion of the South Korean government, almost 90% of the 244 community health information systems across the country have been computerized and 95% of hospitals and clinics have settled accounts through Internet links to the national health insurance department. The Community Health Information System was developed by the Center for Health Policy Research at the University of Texas School of Public Health to assess the health status of parish communities in 57 Texas counties and to conduct action planning and outcome monitoring. At present, the types of information include: community Resource Catalog (CRD), population data, birth data, mortality data, etc. In 1996, more than 90% of general practitioners in the Netherlands and the UK used information systems in their work and services. In order to provide guidance for system developers, the Dutch General Practitioners Association has established a systematic reference model and test procedures. Public opinions on deepening the reform of the medical and health system were made public by the CPC Central Committee and the State Council on April 6, 2009. The "opinions" is put forward the short-term goal of "effectively reducing the burden of medical expenses on residents, successfully alleviating expensive to see a doctor" and "building up and promoting a basic medical and health system covering urban and rural residents." Our long-term mission is to provide the masses with health and medical care that is safe, effective, convenient, and affordable. The development of community health service is an important measure taken by the CPC Central Committee and the State Council to implement the people-oriented scientific concept of development, build a harmonious society and alleviate the "difficulty and high cost of seeing a doctor". Under the guidance of the goal of "patient-centered", outpatient service is the top priority in seeking medical treatment, which has been studied and discussed by many domestic scholars and experts. Based on the screening management under the community health care system, the advanced information technology standard process is adopted to manage the retired athletic patients, simplify the organization, and manage scientifically to achieve a better "patient-centered". To achieve the central goal of community health service institutions, the level of community health services will be improved to constantly meet the basic medical and health service needs of the people.

Combined with the results of this study, the analysis showed that the screening management based on the community health care system was beneficial to prevent and reduce the complications after cataract surgery. Good health education and obeying the doctor's advice are beneficial to enhance the self-care ability of the elderly and chance of vision recovery. Compared with routine intervention, the screening management based on the community health care system can effectively promote the retired athletic patient's compliance with doctor's orders and the retired athletic patient's emotional state. This may be similar to the screening management based on the community health care system. There is effective health education for retired athletic patients, timely identification of complications and related treatment in general hospitals. This innovative management model is similar to the referral system of community hospitals and general hospitals. It is beneficial to the two medical resources to learn from each other's strengths and weaknesses. However, the screening management based on the community health-care system is more convenient and more simple compared with the referral system. It is based on the complementarity of two health resources, emphasizing community services, retired athletic patients, focusing on health education, improving retired athletic patient compliance and co-management of diseases, which greatly reduces medical costs and enables retired athletic patients to enjoy better medical services. Through comprehensive prevention and treatment, senile cataract patients can have a healthy living environment, good healthy behaviors and lifestyles, thereby to achieve the purpose of improving prognosis.

To sum up, cataract screening management in the elderly based on the community health care system can effectively improve the condition, enhance medical compliance behavior and self-efficacy, alleviate negative emotions and improve the quality of life.

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