HUE UNIVERSITY

UNIVERSITY OF MEDICINE AND PHARMACY

TRAN NGUYEN TRA MY

THE UTILIZATION OF GLAUCOMA EYE CARE SERVICES AND INTERVENTION MODEL AMONG PEOPLE AGED OVER 40 YEARS IN HUE CITY

SUMMARY OF DOCTORAL THESIS

HUE – 2022

Research was performed at

UNIVERSITY OF MEDICINE AND PHARMACY,

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Speciality of Public Health

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INTRODUCTION

Glaucoma is is a disease of the optic nerve with the progressive damage of retinal ganglion cells, characterized by damage to the visual field and optic nerve, and often associated with high intraocular pressure. Blindness caused by glaucoma is incurable because the functional damage and physical damage caused by glaucoma is irreversible. In the world, the prevalence of glaucoma is 76 million people in 2020 and it will increase to 111.8 million people in 2040. Asia remains the continent that has the largest number of glaucoma patients. In Vietnam, the rate of binocular blindness due to glaucoma is about 6,4%, accounting for the third leading cause of blindness. Vietnam currently has about 329,300 people blind due to glaucoma.

Glaucoma is a disease that currently has no definitive treatment. Early detection and good management are the only ways to help glaucoma patients avoid blindness. However, most the glaucoma cases go undiagnosed. In developing countries, 90% of patients do not know that they have glaucoma. A study in Da Nang, Vietnam showed that: the rate of glaucoma in people aged over 40 years old was 4,86%, of which 66,9% of glaucoma patients in the community did not know they had glaucoma and had not been treated.

Limited utilization of glaucoma eye care services is common in Vietnam and in over the world. Concerning the people, lack of knowledge about glaucoma, lack of correct attitude about the danger of the disease and lack of awareness of early screening leads to limited utilization of glaucoma eye care services. According to a study in Nam Dinh by Dao Thi Lam Huong: 96,1% of people did not have good knowledge; and the people having bad attitudes accounted for 61,2%, which led to the rate of good practice not exceeding 10%. Regarding the health service delivery system, in Vietnam, equipment was poor and the ability to provide services was still inadequate, especially at the commune level. The grassroots-level health units were assigned the responsibility of primary medical examination and treatment, health communication as well as emergency treatment of diseases including eye disease. However, the ability to provide services is limited. Eye care services for glaucoma at the grassroots-level health units are both simple and limited.

Glaucoma causes irreversible visual damage, but people have limited utilization of eye care services. Therefore, there is a need for an intervention model that takes advantage of grassroots-level health

units in education communication, which can improve knowledge, attitude and practice about glaucoma for people. Besides, they can detect early, transfer patients to the hospital and manage glaucoma. That can help patients preserve their vision and improve their quality of life.

Therefore, we proceed with the topic: " **The utilization of glaucoma eye care services and intervention model among people aged over 40 years in Hue city**" with two objectives:

1. To describe the prevalence of glaucoma and the utilization of glaucoma eye care services among people aged over 40 years old in Hue city in 2017.

2. To develop and evaluate the results of the model intervention to increase the utilization of glaucoma eye care services among people aged over 40 years old in Hue city.

The scientific contribution of the study:

The thesis has applied a scientific method to describe the prevalence of glaucoma in people aged over 40 years old and The utilization of glaucoma eye care services on both sides: service users and service providers. Exploring the related factors to create an appropriate intervention model to help people increase the utilization of glaucoma eye care services in the community with the participation of grassroots health workers.

The practical contribution of the study:

To describe the prevalence of glaucoma in people aged over 40 years old in Hue city.

To describe the prevalence of glaucoma, the utilization of eye care services and related factors.

An intervention model has been made with three groups of solutions, including the mobilization of the grassroots health level based on regulations on functions, tasks and available equipment of grassroots-level health units. That helps people increase the utilization of glaucoma eye care services, early detection, timely treatment, and vision preservation for patients.

DISSERTATION PROPOSAL STRUCTURE

The thesis has 141 pages with 4 chapters, 55 tables, 5 pictures, 6 diagrams, 4 charts, 121 references (Vietnamese: 45, English: 76). Introduction: 3 pages. Literature review: 37 pages. Research subjects and methods: 26 pages. Results: 36 pages. Discussion: 36 pages. Conclusion: 2 pages. Recommendations: 1 page.

Chapter 1
LITERATURE REVIEW

1.1. GLAUCOMA OVERVIEW AND GLAUCOMA EYE CARE SERVICES

1.1.1. Definition

Glaucoma is a disease of the optic nerve that begins with damage to the retinal ganglion cells and the nerve fiber layer. It is characterized by elevated intraocular pressure (IOP), cupping and atrophy of the optic nerve head, and typical visual field defects. Risk factors for glaucoma include: gender, age, refractive error, diabetes, hypertension, history of trauma, surgery, family history of glaucoma, use of corticoid.

1.1.2. Prevalence of glaucoma

In the world

America: prevalence of glaucoma in Americans over 40 years old: 2,1%, Glaucoma patients: 76 million people (2020) which will increase to 111.8 million (2040). Africa: prevalence of glaucoma of urban population: 6,8%; 14,4% of them have visual impairment due to glaucoma. The prevalence of glaucoma in urban areas is 58% higher than in rural areas. Europe: in Denmark, up to 3,76% of people aged over 50 years old have glaucoma and up to 10% of people aged over 80 years old require glaucoma treatment. Asia: India: prevalence of glaucoma in urban: 3,23% and Asia is considered the continent with the highest prevalence of glaucoma in the world.

In Viet Nam

In the North: the prevalence of glaucoma patients accounts for 2,3%. The prevalence of glaucoma suspect was 4,3%. Central region: in Da Nang, the prevalence of glaucoma: 4,86%. The South: The rate of high IOP in people aged over 40 years old was statistically significant, the rate of narrow anterior chamber angle in people aged over 40 years old: 33%.

1.1.3. Glaucoma eye care services

As recommended by the Vietnam Ophthalmology Association, glaucoma eye care services include the following objects:

1. Health education and communication: conducted in the community through various forms of communication. 2. Early detection examination: for people aged over 40 years old, especially those with risk factors. 3. Monitoring and treatment: by appropriate methods, and ensuring adherence to the treatment. 4. Management: in localities, it is necessary to establish a network of glaucoma management.

1.1.4. The utilization of glaucoma eye care services of people

In the world

India: only 2,3% of people knew about glaucoma. China: 77,78% of people had not been previously diagnosed and they had not had an eye exam within the previous 5 years. Africa: 50% of patients were blind in one eye. 90% did not know they had glaucoma until it was first discovered. Diagnosed rate of open-angle glaucoma: 8% in developing countries compared with developed countries: 34%.

In Viet Nam

Thai Binh: most patients went to the hospital and got treatment at the late stage when their visual function had been severely damaged and can not be recovered. Da Nang: 66,9% of glaucoma patients in the community did not know they had glaucoma and they had not been examined and treated. Nam Dinh: the rate of patients diagnosed with glaucoma was 89,4%. This rate in Hue is more than 60% and the rate of people who had never had an eye exam accounted for 41,7%.

1.2. INTERVENTION MODELS TO INCREASE THE UTILIZATION OF GLAUCOMA EYE CARE SERVICES IN THE WORLD AND VIETNAM

1.2.1. Models in the world

- *Dixpanxe of Soviet Union:* organized in 3 lines: Line 1: Eye clinic of the regional polyclinic. Line 2: Glaucoma clinic of cities, regional hospitals. Line 3: Glaucoma department of the Institute of Eye Diseases.

- *The glaucoma management model in India*: The service delivery model is divided into levels: Level 1 care focuses on early detection and hospital transfer. Level 2 care: medical treatment. Level 3 care is medical treatment and surgical treatment.

- *Nepal's glaucoma management screening model*: Including activities: raising awareness about the disease and community eye screening activities. All people $\geq$ 50 years old would be screened for glaucoma risk assessment, if they had glaucoma, they would be treated for free.

- *Glaucoma screening model in the United State*: Glaucoma screening program on African-Americans aged 50-59 years used visual field testing, people who detected with a threshold of visual impairment at risk of glaucoma would be followed and treated.

- *Wheel and spokes model*: National and international glaucoma centers corresponded to wheel centers, and local medical facilities and

hospitals corresponded to spokes. The networks work in coordination with many other health sectors.

- *Eye care pyramid model in India*: The model was designed to cover all levels of care from basic to advanced with linked services, starting from the integration of primary health care to health care system reform.

1.2.2. Models in Viet Nam

- Glaucoma management model of the National Eye Hospital: A model for monitoring and managing glaucoma patients and people had risk factors for glaucoma. Participating personnel are ophthalmologists of Eye care facilities at the district/provincial level who were trained in methods of monitoring and managing glaucoma patients. There was close coordination between eye care staff at all levels. The grassroots-level health units were equipped with instruments to measure IOP, and managed glaucoma patients under the direction guige of district health centers and higher specialized medical levels.

- Glaucoma management model of Da Nang Eye Hospital: setting up an outpatient software system for glaucoma patients. Information integrated in the ID card the results of the visual field test, and OCT scans at the Functional Exploration Department. Directly connected to the glaucoma computer system so that the glaucoma doctor could access the results directly on the computer system, keep the results for the patients, and easily compare the results between visits to help monitor and evaluate disease progression.

1.2.3. The situation of glaucoma care service delivery

Functions and duties of grassroots-level health units

According to the regulations of the Ministry of Health, the grassroots-level health units have the function of providing and performing primary health care services for people in the area. In the contents of primary health care, the functions of health education, treatment - prevention and health management are considered important tasks performed regularly and continuously by grassroots-level health units in order to protect people's health.

The situation of providing glaucoma examination and treatment services according to medical regulations

The grassroots-level health units rarely provide glaucoma eye care services. According to Regulations: grassroots-level health units can only measure VA, performing simple medical procedures. In the whole country, the infrastructure was still inadequate, unable to keep

up with the demand for eye examination and treatment, which was increasing in the community.

The situation of health education and communication about glaucoma

People tended to only go to an eye clinic when they had eye pain symptom (40,9%). According to research by Luu Thi Thanh Tam: the level of knowledge about glaucoma in the community was very low: 91,3% did not know anything about glaucoma. Research by Ha Trung Kien: most patients did not know anything about their disease (92%).

1.3. OVERVIEW OF RESEARCH LOCATION

Eye care services were provided mainly at levels 1,2,3. The grassroots-level health units rarely examined and treated eye diseases. Prevalence of glaucoma in people > 40 years old: 5,4% (first diagnosed glaucoma: 61,5%). However, at present, in Hue, there is still no feasible solution to enhance the screening for glaucoma and good management. Therefore, we would like to develop a model to enhance glaucoma eye care services for people aged over 40 years old, the ultimate aim is to detect the disease early and provide timely treatment to help patients preserve vision.

Chapter 2
SUBJECTS AND METHODS

2.1. STUDY SUBJECTS

Study subjects

- People aged over 40 years old in Hue city
- Grassroots-level health units and grassroots health workers in Hue city.

*** For the people**

- Selection criteria: People aged over 40 years old with permanent residence in Hue city at the time of the study and agreed to participate in the study.
- Exclusion criteria: Subjects were not healthy enough for screening, functional exploration and follow-up. Or the subjects had the neuropsychiatric disease, loss of behavioral control, and did not cooperate to detect disease or did not agree to participate in the study.

*** For grassroots-level health units and health workers:**

- Inclusion criteria: Grassroots-level health units in Hue city, health workers who were working at the time of the study.
- Exclusion criteria: they did not agree to participate in the study.

Research location: The study was conducted in Hue city.
Research period: descriptive cross-sectional method: from 1/2017 to 7/2017. Developing solutions, intervention models, implementing models, evaluating intervention effectiveness: 8/2017 to 12/2019.

2.2. RESEARCH METHODS

The study used two research methods

- Phase 1: We performed the Descriptive Cross-Sectional method to describe the prevalence and the utilization of glaucoma eye care services in subjects over 40 years old and the prevalence of glaucoma.
- Phase 2: We performed a study design for community intervention compared with the control group to evaluate intervention results of the utilization of glaucoma eye care services.

2.2.2. Sample sizes and sampling techniques

2.2.2.1. Sample sizes

- State 1

+ Sample size of the prevalence of glaucoma in people aged over 40 years old: Sample size: use the formula

$$n = z^2_{(1-\alpha/2)} \frac{p(1-p)}{d^2}$$

$Z_{1-\alpha/2}$ = 1,96 (expected confidence level of 95%) p : prevalence of glaucoma in people aged over 40 years old: 4,86 % (p = 0,0486); d = 1%. The minimum number of survey samples is 1776 people.

+*Sample size to estimate the utilization rate of glaucoma eye care services:* Since there are no studies on the utilization rate of glaucoma eye care services among people > 40 years old in Vietnam, therefore, we based on the rate of glaucoma patients using the screening service to estimate the number of patients participating in in the study. This result helped to calculate the population >40 years old through the prevalence of 4,86%

$$n = z^2_{(1-\alpha/2)} \frac{p(1-p)}{d^2}$$

p: rate of glaucoma patients who used glaucoma screening services, p = 0,33; d = 10%. Calculated result: n = 85. Prevalence of glaucom in people aged over 40 years old: 0,048, we had calculated the result:

$$n = \frac{85 \times 100}{0{,}0486} = 1770$$

Therefore, the general sample size for 2 purposes is at least 1776 people. To prevent sample loss, we actually surveyed 2025 people.

+ *Sample size to survey health workers*: we selected the entire sample: total: 27 grassroots-level health units x 5 health workers = 135 health workers.

- State 1

+ *Sample size to estimate the utilization rate of glaucoma eye care services:*

$$n = 2\left(\frac{Z_{1-\frac{\alpha}{2}} + Z_{1-\beta}}{ES}\right)^2$$

$$ES = \frac{p_1 - p_2}{\sqrt{p(1-p)}}$$

$$p = \frac{p_1 + p_2}{2}$$

$Z_{1-\alpha/2}$ = 1,96; $Z_{1-\beta}$ =1,282. p1, p2: the rate of people using the glaucoma screening service in the intervention group and the control group at the end of the intervention. The study expected the difference before and after the intervention was 10% and the difference between the intervention group and the control group was also 10%, , p_1: 34,0%; p_2: 24,0%. Result: n1 = n2 = 434. To avoid insufficient data collection, in fact, the sample size was 525 people/group.

+ *Sample size to survey health workers*: we selected the entire sample like state 1: 14 wards in the control group and the intervention group: 14 x 5 health workers = 70 health workers.

+ *Sample size for assessing clinical characteristics of glaucoma patients, suspected glaucoma and people had risk factors of glaucoma*: Select all subjects in the cross-sectional study equally divided into 2 groups with similar demographic characteristics. Quantity: 212 people per group. Corresponding to the number of eyes assessed were 421 eyes in the control group and 423 eyes in the intervention group.

2.2.2.2. Sampling technique

- Stage 1: Sampling technique for cross-sectional descriptive research: Using systematic random sampling method. The required number of samples in each ward was distributed according to the rate of the population over 40 years old in that ward to the total population over 40 years old in the city.

- Stage 2: Sampling technique to evaluate intervention research results: Randomly select 7 wards into the intervention group, then select 7 wards into the control group. Intervention group: An Cuu, Truong An, Thuy Bieu, An Dong, Huong So, Tay Loc, Phu Thuan. Control group: An Tay, An Hoa, Thuan Thanh, Vinh Ninh, Thuan Loc, Phu Cat, Phu Hiep, using systematic a random sampling method.

2.2.3. Research index and variables

Study of glaucoma prevalence and the utilization of glaucoma eye care services

- Research variables on common characteristics.
- Research variables on characteristics of glaucoma.
- Research variables on knowledge, attitude and practice of people about glaucoma.
- Research variables on the utilization of glaucoma eye care services: communication services, glaucoma screening and treatment services.
- Research variables on the utilization of eye care services at grassroots-level health units.

Interventional Research

- Research variables on characteristics of health workers.
- Research variables on the characteristics of eye care service delivery in glaucoma at grassroots-level health units.
- Research variables on knowledge, attitude, practice of health workers.
- Research variables on the eye of glaucoma patients, those had risk factors for glaucoma and glaucoma suspect.

2.2.4. Variable evaluation

Characteristics of glaucoma

- *Diagnosis of glaucoma:* 2/3 criteria are present: glaucomatous optic disc defect, visual field defect, IOP>21 mmHg.
- *Glaucoma suspect:* At least one of the following criteria is present: Glaucomatous optic disc defect, suspected visual field defect but not associated with optic disc defect at grade 1, optic disc margin hemorrhage, high IOP (>21 mmHg), wide optic disc, obstructed anterior chamber angle but optic disc, visual field and IOP are normal.
- *Risk of glaucoma:* having one of the following conditions: refactive error, hypertension, diabetes, cardiovascular disease, family history of glaucoma, history of using corticosteroid drugs, history of eye trauma, eye surgery.
- *Knowledge, attitude and practice about glaucoma of people:* Knowledge: 09 questions, maximum score is 23, ≥18 points (75%): good knowledge. Attitude: 09 statements scored on the Likert scale, ≥34 points (75%): good attitude. Practice: 08 questions, the maximum score is 09 points, ≥07 points (75%): good practice in glaucoma.

The utilization of glaucoma eye care services:

- *Glaucoma screening service*: people have had an eye exam, measured IOP, checked optic nerver.

- *Treatment services for glaucoma patients*: Patients have been diagnosed with glaucoma with follow-up and treatment.

- *Knowledge, attitude and practice of health workers about glaucoma:* Knowledge*:* 10 questions, the maximum total score is 26, ≥ 20 points (75%): good knowledge. Attitude: 08 statements give points according to the Likert scale, ≥ 30 points (75%): good attitude. Practice on glaucoma detection: 08 questions, the maximum score is 11, ≥08 points (75%): good practice on glaucoma detection.

- *Disease severity of glaucoma patients, glaucoma suspect and those had glaucoma risk factors:* stable disease: there are no progressive symptoms of IOP, optic disc and visual field. The disease is unstable if one of the progressive symptoms of IOP, optic disc and visual field was present.

2.2.5. Steps to conduct research

Step 1: Describe the prevalence of glaucoma and the utilization of glaucoma eye care services

Step 2: Develop an intervention model.

The scientific basis of the intervention model according to the Precede-Proceed model through the following 3 groups of factors:

The predisposing factors includes: knowledge, attitude and practice of people aged over 40 years old: the percentage of people with good knowledge, attitude and practice about glaucoma is very low. The rate of people who had been screened for glaucoma was only 24,0%. The percentage of people who did not use the screening service relates to those who did not have good knowledge, good attitudes or good practices.

The enabling factors includes: service availability: grassroots-level health units had primary health care mission including primary care and health education communication. Besides, they could conduct "clinical eye examination" technique according to segmentation. However, most grassroots-level health units were not able to provide glaucoma eye care services.

The reinforcing factors were based on the role of health workers at grassroots-level health units, health collaborators, the coordination of local women's associations and elderly people's associations.

Model: "Increasing the utilization of glaucoma eye care services"

Step 3: Deploy the intervention model. Contents of intervention activities:

- *Workshop organization:* Workshop to report the results of the actual situation investigation and intervention planning.

- *The first solution*: we had improved the capacity of communication skills, knowledge, attitude and practice for health workers at grassroots-level health units.

+ Conveying knowledge for health workers to improve knowledge and attitudes about glaucoma. Training on how to detect glaucoma by using vision chart and flashlight.

+ Training in communication skills: for health workers at grassroots-level health units, health collaborators, women's unions, elderly people's associations, ward radio staffs.

- *The second solution:* active communication intervention to change behavior.

+ Direct communication: Awareness education for people, communication for glaucoma patients, glaucoma suspect and those had glaucoma risk factors.

+ Indirect communication: Hanging large-sized media panels, posters, leaflets, loudspeakers, sending messages directly to mobile subscribers.

- *The third solution:* treating and managing glaucoma patients, glaucoma suspect and and those had glaucoma risk factors, provided glaucoma screening services for people.

+ Medical intervention solutions: Glaucoma patients, glaucoma suspect and those had risk factors for glaucoma were monitored, scheduled for follow-up treatment.

+ Activities to provide glaucoma screening services at grassroots-level health units: Health workers who are doctors used vision chart, flashlights to screen and detect glaucoma patients, transferring patients, managed stable glaucoma patients.

+ Coordinating with ophthalmology at Family Doctor's Clinic and Hue University of Medicine and Pharmacy Hospital.

Step 4: Evaluating intervention results

- *Intermediate index*: comparing the rate of change before and after the intervention, between the control group and the intervention group: knowledge, attitude and practice of the people – health workers; rate of

eye examination within one year, rate of eye examination with the reason of periodic examination, rate of eye examination at grassroots-level health units, disease severity of glaucoma patients, suspect glaucoma and those had glaucoma risk factors.

- *Main result index*: comparing the rate of change before and after the intervention, between the control group and the intervention group:

+ Percentage of people using glaucoma screening services.

+ Percentage of glaucoma patients using glaucoma treatment services.

2.2.6. Methods of data processing

- Collected data is encrypted, entered and managed by Epidata 3.1 software. Descriptive statistics: frequency and percentage, mean and standard deviation.

- Using inferential statistics to find out related factors and risk factors with Chi-square tests and risk factors assessment (odds ratio OR), 95% confidence interval.

- Using a multivariable logistic regression model to analyze the relationship between dependent variables including knowledge, attitude, practice and utilization of medical services for glaucoma screening with independent variables: gender, age, education level, occupation, health insurance, glaucoma, family history of glaucoma. Data were analyzed using SPSS 20.0 and Stata 16.0.

The effectiveness index: $EI = \frac{P1 - P2}{P1}$

P1: pre-intervention index, P2: post-intervention index

The effectiveness of intervention= $EI_{INT} - EI_{CON}$

2.2.7. Research Ethics

- The study was approved by the Ethics Committee in Biomedical Research of the University of Medicine and Pharmacy, Hue University.

- The study provided the necessary information about the research investigation to the research subjects, with the consent of the research subjects.

- Although intervention activities were only conducted in the intervention group. However, at the cross-sectional phase of the study, all control subjects who were glaucoma patients, having risk factors of glaucoma, or glaucoma suspect were given health advice, initial management, further counseling, continued monitoring and treatment at specialized levels.

Chapter 3
RESULTS

3.1. PREVALENCE OF GLAUCOMA AND THE UTILIZATION OF GLAUCOMA EYE CARE SERVICES AMONG PEOPLE AGED OVER 40 YEARS IN HUE CITY

3.1.1. Prevalence of glaucoma

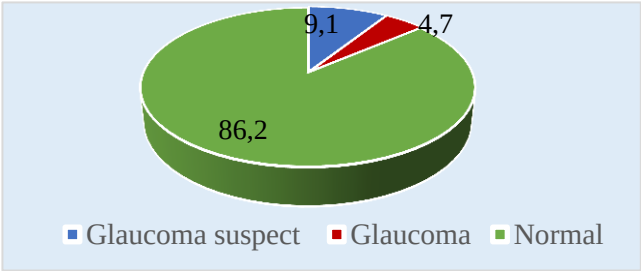

Figure 3.1. Prevalence of glaucoma (n = 2025)

Table 3.1. Prevalence of people had risk factors for glaucoma (n=2025)

Risk factors for glaucoma	n	%
Yes	772	39,1
No	1253	61,9
Total	**2025**	**100,0**

Table 3.2. Prevalence of newly diagnosed glaucoma patients (n=96)

Glaucoma	n	%
Newly diagnosed glaucoma	56	58,3
Previously diagnosed glaucoma	40	41,7
Total	**96**	**100,0**

Table 3.3. Knowledge, attitude, practice about glaucoma (n=2025)

Evaluation		n	%
Knowledge	Good	50	2,5
	Not good	1975	97,5
Attitude	Good	74	3,7
	Not good	1951	96,3
Practice	Good	50	2,5
	Not good	1975	97,5
Total		**2025**	**100,0**

3.1.2. Utilization of glaucoma eye care services among people aged over 40 years old in Hue city

Table 3.4. Percentage of people who were informed about glaucoma (n = 2025)

People who were informed about glaucoma	n	%
Yes	448	22,1
No	1577	77,9
Total	**2025**	**100,0**

Table 3.5. People's eye exam history (n = 2025)

History of the eye exam	n	%
Once a year	617	30,5
Once in 1-2 years	265	13,1
Once in 2 - 5 years	150	7,4
Once in >5 years	141	7,0
Never had an eye exam	852	42,1
Total	**2025**	**100,0**

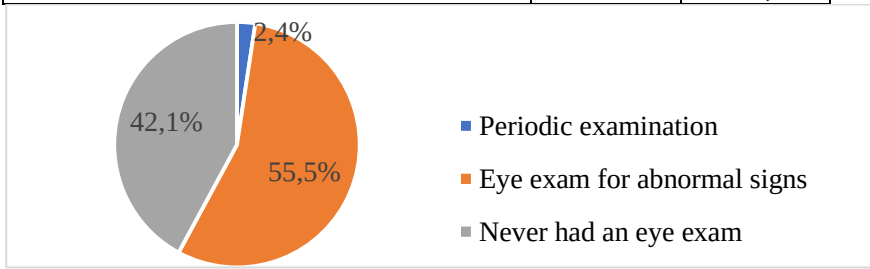

Figure 3.2. Reasons for people's eye exams (n = 2025)

Table 3.6. Prevalence of people screened for glaucoma (n = 2025)

Glaucoma screening		n	% General	%/people had eye exam	
				n	%
People had eye exam	Have been screened	485	24,0	485	41,3
	Have never been screened	688	34,1	688	58,7
Never had an eye exam		852	42,1		
Total		**2025**	**100**	**1173**	**100**

Table 3.7. Prevalence of glaucoma patients who used treatment services (n=96)

Glaucoma treatment	n	%
Yes	39	40,6
No	57	59,4
Total	**96**	**100,0**

Table 3.8. The multivariable logistic regression model identifies factors related to the utilization of glaucoma screening services

Factors \ Screening		Have been screened		
		OR	95% KTC	p
Age	41 – 50	1		
	51 - 60	1,66	1,07-2,59	**<0,05**
	61 - 70	2,56	1,67-3,93	**<0,05**
	> 70	3,22	2,06-5,02	**<0,05**
Education level	Illiteracy	1		
	Primary school	1,13	0,70-1,83	0,607
	Junior high school	1,43	0,88-2,33	0,154
	High school	1,80	1,10-2,94	0,018
	University/Postgraduate	2,44	1,38-4,33	**<0,05**
Occupation	Officials, pensioners	1		
	Workers/Seller	0,71	0,48-1,04	0,080
	Housewife	1,00	0,69-1,47	0,985
	Other jobs	1,01	0,75-1,37	0,948
Health Insurance	No	1		
	Yes	**2,75**	1,41-5,35	**<0,05**
Knowledge	Good	1		
	Not good	3,91	2,09-7,32	**<0,05**
Attitude	Good	1		
	Not good	2,91	1,76-4,83	**<0,05**
Practice	Good	1		
	Not good	4,26	2,29-7,92	**<0,05**
Family history of glaucoma	No	1		
	Yes	2,48	1,26-4,88	**<0,05**

3.1.3. Knowledge, attitude and practice about glaucoma of health workers

Table 3.9. Knowledge, attitude and practice of health workers (n=135)

Evaluation		n	%
Knowledge	Good	10	7,4
	Not good	125	92,6
Attitude	Good	15	11,1
	Not good	120	88,9
Practice	Good	2	5,9
	Not good	32	94,1
Total		**135**	**100,0**

Table 3.10. Characteristics of the utilization of eye care services of people at grassroots-level health units (n = 2025)

Eye examination at grassroots-level health units	n	%
Yes	35	1,7
No	1990	98,3
Total	**2025**	**100,0**

3.2. DEVELOPING THE INTERVENTION MODEL

The intervention model focuses on three groups of intervention solutions:

1. Solutions to improve capacity in communication skills, knowledge, attitudes, and practice in early detection of glaucoma for health workers. 2. Positive communication solutions for behavior change intervention. 3. Medical intervention solutions.

Results of solutions: Organized 41 seminars, training sessions, health education communication for 2956 participants. The total number of indirect media provided was 4068. The total number of examinations, consultations and treatment for the subjects carried out by health workers at grassroots-level health units was 2,516 times.

3.3. EFFECTIVE INTERVENTION OF THE MODEL OF INCREASING GLAUCOMA EYE CARE SERVICES

3.3.1. Changing knowledge, attitude and practice about glaucoma among health workers

Table 3.11. Changing knowledge about glaucoma among health workers in the intervention group compared with the control group

Group/Time \ Knowledge		Not good		Good		Total	p
		n	%	n	%		
Intervention	Before	33	94,3	2	5,7	**35**	**< 0,05**
	After	2	5,7	33	94,3	**35**	
	Total	**35**	**50,0**	**35**	**50,0**	**70**	
Control	Before	32	91,4	3	8,6	**35**	1,000
	After	31	88,6	4	11,4	**35**	
	Total	**63**	**90,0**	**7**	**10,0**	**70**	

Table 3.12. Changing attitude about glaucoma among health workers in the intervention group compared with the control group

Group/Time \ Attitude		Not good		Good		Total	p
		n	%	n	%		
Intervention	Before	31	88,6	4	11,4	**35**	**< 0,05**
	After	2	5,7	33	94,3	**35**	
	Total	**33**	**47,1**	**37**	**52,9**	**70**	
Control	Before	31	88,6	4	11,4	**35**	**< 0,05**
	After	21	60,0	14	40,0	**35**	
	Total	**52**	**74,3**	**18**	**25,7**	**70**	

Table 3.13. Changing practice about glaucoma among health workers in the intervention group compared with the control group

Group/Time \ Practice		Not good		Good		Total	p
		n	%	n	%		
Intervention	Before	8	88,9	1	11,1	**9**	**<0,05**
	After	1	11,1	8	88,9	**9**	
	Total	**9**	**50,0**	**9**	**50,0**	**18**	
Control	Before	9	90,0	1	10,0	**10**	1,00
	After	8	80,0	2	20,0	**10**	
	Total	**17**	**85,0**	**3**	**15,0**	**20**	

3.3.2. Changing knowledge, attitude and practice about glaucoma of people

Table 3.14. Changing knowledge about glaucoma among people in the intervention group compared with the control group

Group/Time \ Knowledge		Not good		Good		Total	p
		n	%	n	%		
Intervention	Before	512	97,5	13	2,5	**525**	**<0,05**
	After	267	50,9	258	49,1	**525**	
	Total	**779**	**74,2**	**271**	**25,8**	**1050**	
Control	Before	511	97,3	14	2,7	**525**	1,00
	After	510	97,1	15	2,9	**525**	
	Total	**1021**	**97,2**	**29**	**2,8**	**1050**	

EI_{INT} = 47,8%; EI_{CON} = 0,2%; The effectiveness of intervention = 47,6%

Table 3.15. Changing attitude about glaucoma among people in the intervention group compared with the control group

Group/Time \ Attitude		Not good		Good		Total	p
		n	%	n	%		
Intervention	Before	507	96,6	18	3,4	**525**	**<0,05**
	After	254	48,4	271	51,6	**525**	
	Total	**761**	**72,5**	**289**	**27,5**	**1050**	
Control	Before	504	96,0	21	4,0	**525**	**<0,05**
	After	454	86,5	71	13,5	**525**	
	Total	**958**	**91,2**	**92**	**8,8**	**1050**	

EI_{INT} = 49,9%; EI_{CON} = 9,9%; The effectiveness of intervention = 40,0%

Table 3.16. Changing practice about glaucoma among people in the intervention group compared with the control group

Group/Time \ Practice		Not good		Good		Total	p
		n	%	n	%		
Intervention	Before	513	97,7	12	2,3	**525**	**<0,05**
	After	282	53,7	243	46,3	**525**	
	Total	**795**	**75,7**	**255**	**24,3**	**1050**	
Control	Before	506	96,4	19	3,6	**525**	0,233
	After	497	94,7	28	5,3	**525**	
	Total	**1003**	**95,5**	**47**	**4,5**	**1050**	

EI_{INT} = 45,0%; EI_{CON} = 1,8%; The effectiveness of intervention = 43,2%

3.3.3. Intervention result of the utilization of glaucoma eye care services of people

Table 3.17. Changing the utilization of glaucoma screening services of people in the intervention group compared with the control group

Group/Time \ Screening		No		Yes		Total	p
		n	%	n	%		
Intervention	Before	384	73,1	141	26,9	**525**	**<0,05**
	After	215	41,0	310	59,0	**525**	
	Total	**599**	**57,1**	**451**	**42,9**	**1050**	
Control	Before	385	73,3	140	26,7	**525**	**<0,05**
	After	438	83,4	87	16,6	**525**	
	Total	**823**	**78,4**	**227**	**21,6**	**1050**	

EI_{INT} = 43,9%; EI_{CON} = -13,8%; The effectiveness of intervention = 57,7%

Table 3.18. Changing the utilization of glaucoma treatment services of glaucoma patients in the groups before and after

Group/Time \ Treatment		No		Yes		Total	p
		n	%	n	%		
Intervention	Before	17	56,7	13	33,3	**30**	**< 0,05**
	After	9	39,1	14	60,9	**23**	
	Total	**26**	**49,1**	**27**	**50,9**	**53**	
Control	Before	12	57,1	9	42,9	**21**	0,935
	After	14	58,3	10	41,7	**24**	
	Total	**26**	**57,8**	**19**	**42,2**	**45**	

EI_{INT} =31,0%; EI_{CON} = -2,1%; The effectiveness of intervention = 33,1%

Chapter 4
DISCUSSION

4.1. PREVALENCE OF GLAUCOMA AND THE UTILIZATION OF GLAUCOMA EYE CARE SERVICES AMONG PEOPLE AGED OVER 40 YEARS OLD IN HUE CITY

4.1.1. Prevalence of glaucoma

Figure 3.1 showed that the prevalence of glaucoma among people aged over 40 years old in Hue city was 4,7%, 9,1%: glaucoma suspect. This result was similar to some studies in Vietnam such as Dinh Thi Thu Trang: 5,4%. Luu Thi Thanh Tam: 4,86% Dao Thi Lam Huong: Nam Dinh: 2,2%. We found that 58,3% of glaucoma patients did not know

that they had glaucoma, similar to the studies: by Coleman and Myron Yanoff: 50% of glaucoma patients did not know that they had glaucoma. In Vietnam, Luu Thi Thanh Tam: 66,9% of glaucoma patients in the community did not know they had glaucoma and they have not been treated.

Knowledge, attitude and practice of people about glaucoma

97,5% of people did not have good knowledge. Similar to the studies of Sathyamangalam: only 0,5% of patients had a good understanding; Ha Trung Kien: 92% of patients knew nothing or were very vague about glaucoma.

The percentage of people with a good attitude about glaucoma in our study was lower than some abroad studies such as the Ogbonnaya study: 61,2%, and similar to Dao Thi Lam Huong: people's attitude was less interested in treatment: 61,2% in Nam Dinh, 75,0% in Thai Binh.

There are 97,5% of people did not have good practice about glaucoma. Some other studies: Sood: the rate of non-adherence to treatment was 59,5%; Paudel: 53,5% of people never had an eye exam.

4.1.2. Situation of glaucoma eye care services

Characteristics of the utilization of general eye examination

Only 30,4% of people had annual eye exams; 42,1% never had an eye exam, which was too little because the average age of this study was over 60, and annual eye exams are recommended.

Glaucoma communication service

The percentage of people who were informed about glaucoma was only 22,1%, similar to the study of Dinh Thi Thu Trang: more than 80% of subjects had never heard of glaucoma.

The utilization of glaucoma screening and treatment service

Table 3.6 showed that the percentage of people who had been screened is only 24,0%. Similar to some studies: in Ghana: 28,6%; higher than Rewri's study: 3%.

Regarding the utilization of treatment services, Table 3.7 showed that: patients used treatment services corresponding to the rate of 40,6%. The percentage of patients who did not use treatment services was mainly due to the reason that they did not access screening services to diagnose glaucoma.

4.1.3. The relationship between the utilization of glaucoma screening services and other factors

Through the analysis of Table 3.8, we found that people who had good knowledge, attitudes and practices were 3,91, 2,91 and 4,26 times more likely to use the service, than those had bad knowledge, bad

attitude and bad practice. Thus, there were three main factors related to the utilization of glaucoma eye care services: knowledge, attitude and practice about the disease. This was the basis for us to build a behavioral change communication intervention model for research subjects.

4.2. DEVELOPING THE INTERVENTION MODEL

4.2.1. Current situation of eye care in the locality

4.2.1.1. Characteristics of health workers, equipment and practice of glaucoma examination and the ability to examine and treat glaucoma at grassroots-level health units

The provision of medical services for glaucoma examination and treatment at grassroots-level health units was both limited in terms of facilities (there was only vision chart and flashlight), the rate of bad bad knowledge about glaucoma: 92,6%, good attitude was only accounted for 11,1%. Only 5,9% of health workers were assessed as good practice. Similar to the study of Dao Thi Lam Huong: good knowledge: 3,3%; lower than M. K. Amedome: 51,5% and Osaguona: 31%.

4.2.1.2. Characteristics of the utilization of eye care services at grassroots-level health units

In this study, only 1,7% of people had ever gone to grassroots-level health units for eye examination, 90,8% of people assessed that the capacity of health workers was not enough for eye examination. This was also a fairly common occurrence. According to The health sector report, although the public health network was widespread, its operational efficiency was not high, and the quality of medical care had not met the increasing and diverse needs of the people.

4.2.2. Developing the intervention model

Through the results of research on the current situation and analysis of some factors related to the utilization of glaucoma eye care services, we developed intervention solutions including:

- Solutions to improve the capacity of grassroots health workers in communication skills, counseling, and skills for examining and detecting glaucoma in the community based on existing equipment of grassroots-level health units.

- Glaucoma communication solution for people aged over 40 years old to improve knowledge, attitude and good practice about glaucoma in 07 intervention wards.

- Solutions for medical intervention, examination, treatment, monitoring and management of glaucoma patients, people had glaucoma risk factors and suspect glaucoma, providing screening services for people.

4.3. EVALUATING THE EFFECTIVENESS OF INTERVENTION

4.3.1. Changing knowledge, attitude and practice of glaucoma among health workers after the intervention program

After two years of intervention, health workers in the intervention group significantly improved their knowledge, attitude and practice about glaucoma: before the intervention, 94,3% of health workers had poor knowledge about glaucoma, after the intervention, this rate was 11,4%. Similar to the study Dao Thi Lam Huong: After the intervention, there was a change in good knowledge between the two groups: 3,3%, compared to 86,7%.

Regarding attitude, after two years of intervention, the rate of good attitude had a statistically significant difference: in the intervention group, good attitude was 94,3% compared to 40% in the control group.

Regarding practice: as the result in Table 3.13: Before the intervention, both groups had the rate of bad practice at 97,1%; After the intervention, in the intervention group: the rate of good practice increased to 77,1%. In the control group, the rate of change was not significant.

4.3.2. Changing knowledge, attitudes and practices about glaucoma of people after the intervention program

The results showed that after implementing solutions for communication and health education, people's knowledge had a positive change: Table 3.14: rate of bad knowledge is 97,5 %, after the intervention, this rate reduced to 50,9%. The difference between before and after was statistically significant with $p < 0,05$. EI_{INT}=47,8%. The effectiveness of intervention: 47,6%.

In terms of attitudes, we noted a positive change in people's attitudes about glaucoma. After the intervention, there was a statistically significant difference between the rate of bad attitude in the intervention group which was 48,4% compared with 86,5% in the control group; EI_{INT}=49,9%; The effectiveness of intervention: 40,0%.

Concerning the practice, in the intervention group, good practice increased from 2,3% to 46,3%, the difference was statistically significant ($p<0,05$). In the control group, this change rate was not statistically significant ($p<0,05$); The effectiveness of intervention: 43,2%.

The results were similar to the study of Nguyen Van Trong: After the intervention, the good practice rate increased from 37,2% to 50,6%, the effective intervention reached 32,8%.

4.3.3. Intervention results in the utilization of glaucoma screening and treatment services

With the population of the intervention, our ultimate goal was to increase the proportion of people who were screened for glaucoma. Through the two years of intervention, the subjects were more interested in the problem of being screened for glaucoma during eye exams. According to Table 3.17, in the intervention group, the rate of glaucoma screening increased from 26,9% to 59,0%, ($p<0,05$). In the control group, the rate of glaucoma screening did not improve. EI_{INT} =43,9%, EI_{CON} = -13,8%. The effectiveness of the intervention: 57,7%.

With the improvement of knowledge, attitude and practice about glaucoma, the number of people undergoing screening has increased, contributing to the improvement of the rate of using treatment services of glaucoma patients in the community. Results Table 3.18: in the intervention group, the percentage of untreated glaucoma patients decreased from 57,7% to 39,1% ($p<0,05$). In the control group: the difference before and after was not statistically significant ($p > 0,05$); The effectiveness of the intervention reached 33,1%. A similar study by Hark: after the intervention program, the percentage of people attending glaucoma screening was 70%.

4.3.4. Results of the severity of glaucoma patients, glaucoma suspect and those had glaucoma risk factors

In the intervention group, the rate of stability was quite high at 98,8%. Compared with the control group, it was 92,6%; Similar to the study of Dao Thi Lam Huong: The intervention province of Nam Dinh had 88,3% of eyes with stable progress while in Thai Binh only 71,8% of eyes with stable disease.

4.4. NEW POINTS OF RESEARCH

This study used the Precede - Proceed model in the intervention to change the behavior of people and health workers. The purpose was increasing the rate of utilization of glaucoma eye care services for the community. Applying the Precede - Proceed model in the intervention, the model had an impact on 03 groups of behavioral causal factors. Identifying the important role of primary health care in the health care system, the model has placed grassroots-level health units in an important position in providing communication and screening services with the flexible use of the equipment that was available at grassroots-level health units. By enhancing the ability to provide glaucoma medical services at grassroots-level health units based on the existing facilities of the grassroots-level health units, the model has brought about sustainability.

CONCLUSION

Through the research results on the utilization of glaucoma eye care services among people aged over 40 years old, analyzing related factors, over the time of implementing intervention solutions, we had conclusions as follows:

1. Glaucoma prevalence and utilization of eye care services among people aged over 40 years old

- Prevalence of glaucoma among people aged over 40 years old in Hue city is 4,7%, 9,1% of people were glaucoma suspect. 39,1% of people had risk factors for glaucoma.
- 58,3% of glaucoma patients did not know that they had glaucoma.
- There were 97,5% of people did not have good knowledge, 96,4% of people had bad attitudes, 97,5% of people had bad practices.
- Only 22,1% of people have ever been informed about glaucoma.
- 42,1% of people never had an eye exam.
- The percentage of people who have been screened for glaucoma accounted for 24,0%. The percentage of glaucoma patients using treatment services only accounted for 40,6%.
- Only 3,0% of people came to the grassroots-level health units for eye examination, 90,8% of the people thought that the capacity of health workers at the grassroots-level health units was not enough to provide eye examination and treatment.
- The percentage of health workers had poor knowledge about glaucoma accounted for 92,6%, those had bad attitudes accounted for 88,9%. 94,1% of doctors did not have good practice in glaucoma screening and detection.
- There was a statistically significant relationship between people's utilization of glaucoma screening services and the following factors: knowledge, attitude, and practice about glaucoma. In which: people with good knowledge, good attitude and good practice were 3,91, 2,91, and 4,26 times to use the service than the group with bad knowledge, bad attitude and bad practice.

2. Effectiveness of some intervention solutions

2.1. Solution

The intervention model was based on community participation, focusing on three groups of evidence-based interventions:

- Solutions to improve communication skills, knowledge and practice of early glaucoma detection for health workers.
- Active communication solutions to change people's behavior.

- Medical intervention solutions for glaucoma patients, glaucoma suspect, people had risk factors for glaucoma, providing screening services.

Results of solutions:

- Organized 41 seminars, training sessions, health education communication for 2956 participants.

- The total number of indirect media provided was 4068.

- The total number of examinations, consultations and treatment for the subjects carried out by health workers at grassroots-level health units was 2516 times.

2.2. Interventional effectiveness of the model to increase the utilization of glaucoma eye care services

- Knowledge, attitude and practice of health workers:

+ In the intervention group: the percentage of health workers had good knowledge increased from 5,7% to 94,3%, good attitude increased from 11,4% to 94,3%, good practice increased from 2,9% to 77,1%.

+ In the control group: the percentage of health workers had good knowledge increased from 6,8% to 11,4%, good attitude increased from 11,4% to 40,0%, good practice increased from 2,9% to 5,7%.

- Knowledge, attitude and practice of people:

+ In the intervention group: the percentage of people had good knowledge increased from 2,5% to 49,1%; good attitude increased from 3,4% to 51,6%, good practice increased from 2,3% to 46,3%. The effective intervention of changing knowledge, attitude, and practice was respectively 47,6%, 40,0% and 43,2%

+ In the control group: the percentage of people had good knowledge increased from 2,7% to 2,9%, good attitude increased from 4,0% to 13,5%; good practice increased from 3,6% to 5,3%.

- The utilization of glaucoma screening service:

+ In the intervention group: the percentage of people who have been screened for glaucoma increased from 26,9% to 59,0%; The effective intervention of changing the utilization of screening services was 57,7%.

+ In the control group: the percentage of people who have been screened for glaucoma decreased from 26,7% to 16,6%.

- The utilization of glaucoma treatment services:

+ In the intervention group: the percentage of glaucoma patients who have been treated increased from 33,3% to 60,9%; The effective intervention of changing the utilization of treatment services was 33,1%.

+ In the control group: the percentage of patients who have been treated decreased from 42,9% to 41,7%.

- Disease severity of glaucoma patients, glaucoma suspect and people had risk factors for glaucoma.

+ In the intervention group: the percentage of eyes with stable disease status: 98,8%.

+ In the control group: the percentage of eyes with stable disease status: 92,6%.

RECOMMENDATION

Through the results of the study on the utilization of glaucoma eye care services, analyzing factor systems and implementation of a number of intervention solutions, we would like to have some recommendations as follows:

1. Glaucoma is a dangerous eye disease that must be followed up for life. Therefore, improving knowledge, attitude and practice in utilization of glaucoma eye care services should be a top priority. This needs to be coordinated with the sense of responsibility of the health sector.

2. Primary health care has strengths in health education communication and primary medical examination and treatment. Therefore, it is necessary to actively communicate to improve the knowledge as well as the ability to detect glaucoma of grassroots health workers. From there, health workers can raise public awareness about glaucoma as well as promptly detect many glaucoma cases in the community.

3. Based on the results from the research model, we propose to apply the model widely to the entire Thua Thien Hue province in particular and other provinces in general. Promoting the role of grassroots health units in the glaucoma management model in the community. Towards reducing the burden of disease caused by glaucoma for patients and the whole society.

4. Simple procedures to detect and diagnose glaucoma today are still mainly based on intraocular pressure measurement, so the Health sector needs to adjust regulations so that this procedure can be carried out at the grassroots level of health care, helping people have more opportunities to use eye care services in the easiest and most convenient way.

5. In the next time, we will continue to do more research on the risk factors of glaucoma. With the aim of developing an intervention model that affects risk factors to reduce the percentage of people who have glaucoma in the community, in order to reduce the burden of disease not only for patients but also for society as a whole.

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