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EFFECT OF PROPOSED NURSING CARE PROTOCOL ON SELECTED OUTCOMES AMONG PATIENTS WITH GLAUCOMA

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Abstract

Background: Glaucoma is a common condition which affects people worldwide. It is a group of eye diseases characterized by elevated intraocular pressure (IOP) that causes damage to the optic nerve, which can lead to progressive loss of vision. Awareness and knowledge related to the nature of glaucoma and treatment regimen is the first step in planning for disease management. **Aim:** The aim was to evaluate the effect of proposed nursing care protocol on selected outcomes among patients with glaucoma. **Design:** Quasi-experimental pre-posttests nonequivalent control group design was used in the study. **Setting:** The study was conducted in the Glaucoma Outpatient Clinic, in one of university hospital in Cairo, Egypt. **Sample:** A purposive sample of 62 adult male and female patients confirmed diagnosis with primary open angle glaucoma in both eyes over period of six weeks. **Tools:** five tools were utilized to collect data; Personal and Background Information Form; Pre-Post Patients' Knowledge Assessment Test; Glaucoma Manifestations Assessment Tool; Glaucoma Activity Limitation-9 Questionnaire and Patients' Practices Checklist Regarding Eye Care. **Results:** The mean age of patients under the study was 55.4±5.1 and 52.8±4.6 in the study and control group respectively. A highly significant differences were found between study and control group ($p<0.05$) in relation to outcome variables (glaucoma knowledge, activity limitation, and practices of eye care). **Conclusion:** the scores of glaucoma knowledge, activity limitation, and practices of eye care were higher after implementation of nursing care protocol than the scores of the control group who received routine hospital care. **Recommendations:** Application of nursing protocol of care in glaucoma outpatient clinic and guide the nurses to motivate the patients with glaucoma to follow the guided information.

Keywords: Nursing Care Protocol, Glaucoma Knowledge, Eye Care Practices, Activity Limitation.

1. INTRODUCTION

Glaucoma is a common condition which affects people worldwide. It is a group of eye diseases characterized by elevated intraocular pressure (IOP) that causes damage to the optic nerve, which can lead to progressive loss of vision. It is called the silent thief of sight because there are usually no early symptoms until visual disability or visual loss occurs (Stein, Khawaja, & Weizer, 2021). Globally, glaucoma stands out as the main cause of blindness and irreversible visual disability (World Health Organization,

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2019). In Egypt, glaucoma is the main cause of blindness; representing 55.7%among other causes of visual impairment (AlTarawneh, 2021).

There are two main types of glaucoma, open-angle glaucoma (OAG) and angle closure glaucoma (ACG). Primary open angle glaucoma is the most common type, accounting for approximately 90% of all glaucoma cases. This type of glaucoma develops slowly, no symptoms in early stage and by the time it may lead to irreversible vision loss if not found and treated on time (Gao, 2020). Individuals with a family history of glaucoma, diabetes, and hypertension are at highest risk for open-angle glaucoma. Age is also strongly associated with the disease and beginning at age 40 years. In early stages of glaucoma, Patients usually do not have any visual complaints. Symptoms vary with type of glaucoma, but the defining characteristic is optic nerve damage as evidenced by certain types of visual deficits. The patient may experience blurred vision or halos around lights, difficulty focusing, difficulty adjusting eyes in low lighting, loss of peripheral vision (Hilton, 2022).

Because the disease can progress or change without warning, the treatment is essential for prevention of complication and decrease risk of blindness. The treatment of glaucoma aims to slow the rate of visual field loss by reducing IOP. Often, the first treatment used to achieve this aim is a regular using of prescribed eye drops. Some cases may require systemic medications, laser treatment, or other surgery. However, there is no complete cure for glaucoma. Patient awareness of glaucoma, early diagnosis, continuing treatment, regular follow up and eye examination can preserve eyesight (Al- Shakarchi, 2011; Schuster, Erb, Hoffmann, Dietleinb & Pfeiffer, 2020).

Awareness and knowledge related to the nature of glaucoma, risk factors, consequences and treatment regimen, as well as the natural approaches to glaucoma care is the first step in planning for disease management. Consequently, this could have a positive impact on patients' health seeking behavior and enhances compliance to treatment (Mansour, Abd-Elaziz, Mekkawy, & Ahmed, 2016). Previous studies reported that the knowledge of patients with glaucoma is unsatisfactory and they had little understanding of their disease and its treatment (Peralta, Muir, & Rosdahl, 2018).

Significance of the Study

Glaucoma is a common condition of visual disability. It is the second leading cause of blindness globally and this blindness is usually irreversible. In 2010, 2.1 million persons around the world went blind because of glaucoma (Bourne et al., 2016). It was estimated that in 2020, 76 million people worldwide were affected by glaucoma. The number of cases is expected to continue rising past 2020, climbing to more than 111.8 million in 2040. The predicted increase in glaucoma cases in the coming years is considering the impact it would have on quality of life for people across the globe and the economic burdens it would create for governments (Allison, Patel & Alabi, 2020).

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In Egypt, studies revealed that the incidence of glaucoma has been increasing. In accordance to what uses reported by personal communication with nursing staff and physicians (Dec, 2020), at outpatients' clinic, in in one of Cairo university affiliated hospital, the flow rate of patients with primary open angle glaucoma is about 200 patients per year. It represents a higher flow of thetotal number of patients admitted to Ophthalmology Clinics with other eye problems. In surveys from different districts in Egypt, the prevalence of blindness from glaucoma was 12.1% at Mansoura, 19.7% at Alexandria, and 9.2% in Shibin El-Kom (El Gilany, El Fedawy, & Tharwat, 2002; Mansour et al., 2016).

Based on the researcher' observation and reports gained through contacts with the attending physicians in the study setting. The flow rate of patients with glaucoma is very high as compared to other medical conditions. Through contact with many of concerned patient, it was revealed that they have lack of knowledge of their disease, its treatment, and difficulty instilling eye drops. Moreover, many of patients with glaucoma experience vision defect resulting in difficulty in performing tasks involving reading, mobility outside the home, difficulty in walking, and stair-climbing.

Currently, there are few studies done in Egypt in the field of nursing care of patients with glaucoma. Most of these studies focused mainly on assessing knowledge and awareness of glaucoma. In practice, this study intends to provide new evidence-based on clinical findings to support and add data for practice guidelines that might enhance nursing care outcomes of patients with glaucoma. In addition, the investigator aspires that the findings of current study help to build up a body of the knowledge of nursing and provide knowledge for the benefit of all concerned parties of patients' care including practicing nurses and nursing students as well. The findings the study will generate alteration and motivation for further researches in this topic.

The aim of the study

The aim of the study was to evaluate the effect of a proposed nursing care protocol on selected outcomes related to (glaucoma knowledge, glaucoma manifestation, glaucoma activity limitation, patients' practice regarding eye care) among patients with glaucoma.

Research Hypotheses

To fulfill the aim of this study the following research hypotheses were formulated:

H1: The total mean scores of knowledge assessment of patients with glaucoma who will receive the proposed nursing care protocol will be different than the total mean scores of knowledge assessment of patients who receive a routine hospital care.

H2: The total mean scores of intraocular pressure of patients with glaucoma who will receive the proposed nursing care protocol will be different than the total mean scores of intraocular pressure of patients who receive a routine hospital care.

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H3: The total mean scores of visual acuity of patients with glaucoma who will receive the proposed nursing care protocol will be different than the total mean score of visual acuity of patients who receive a routine hospital care.

H4: The total mean scores of activity limitation of patients with glaucoma who will receive the proposed nursing care protocol will be different than the total mean scores of activity limitation of patients who receive a routine hospital care.

H5: The total mean scores of eye care practice of patients with glaucoma who will receive the proposed nursing care protocol will be different than the total mean scores of eye care practice of patients who receive a routine hospital care.

2. MATERIALS AND METHODS

Research Design

Quasi-experimental pre-posttests nonequivalent control group design was used to demonstrate causality between an intervention (proposed nursing care protocol) and outcomes (glaucoma knowledge, glaucoma manifestation, glaucoma activity limitation, patients' practice regarding eye care). In this design, the researcher had two groups, one experimental and one control. This design lacks element of random assignment and the researcher was to exercise certain control and uses criteria other than random assignment (e.g. an eligibility cut off mark) to enhance the study internal validity and strengthen the quality of evidence (Rogers & Reves, 2020).

Setting

The current study was conducted in the Glaucoma Outpatient Clinic, in one of university hospital in Cairo, Egypt. The outpatient clinic is located in the third floor and is divided into three rooms, including firstly an examination and treatment room for patients with glaucoma, examination and treatment room for patients with corneal diseases; and thirdly eye rehabilitation room. The clinic work schedule is from Saturday to Thursday, eight hours per day. Three nurses are working in the clinic. The glaucoma out patients' clinic serves patients with different diagnosis of glaucoma and corneal diseases. Different diagnostic procedures are done in the clinic such as assessment of intraocular pressure and visual acuity.

2.1 Sample

A Purposive sample of 62 adult male and female patients having a confirmed diagnosis of primary with open angle glaucoma in both eyes over period of six weeks. Patients were chosen and randomly divided into two equal groups (31/each), study group (I) those who received nursing care protocol and the control group (II) those who received the routine hospital care. In addition, the following criteria were established to ensure the homogeneity of the sample: including (a) Patients who had no history of intraocular surgery, or other eye diseases, (b) Patients with no communication problems.

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2.2 Data Collection Tools

Tool I: Personal and Medical Background Information Form (PMBIF): This questionnaire was developed by the researcher and included two parts as follows: Part one (personal data), which was collected from each patient of the study and control group as well. Data included age, gender, level of education, occupation and place of residence. Part two (medical data) included patient's medical diagnosis, duration of illness, manifestation of illness, family history and history of chronic diseases.

Tool II: Pre-post Glaucoma knowledge Assessment Test (GNAT)*:* This tool was constructed and formulated by the researchers after review of literature and adapted from (Alqahtani et al., 2021; Kim, Tong, Lee, Borodge & Kooner, 2021), then modified to assess the patients knowledge in relation to the causes of glaucoma, risk factors, complications, treatment, and life style factors that affect IOP including (Rubbing the eye, sleeping position, heavy lifting, down bending of head, frequent coughing and sneezing, constipation, smoking, exposure to sun light, follow up, and regular physical exercises).

Tool III: Glaucoma Manifestations Assessment Tool (GMAT):-Which consist of two main parts:

Part I: Visual acuity. It included assessing the visual acuity of both eyes by using **landolt C chart**. The results of visual acuity are classically reported using 20/20 (6/6 when using meters) for standard vision (Daiber & Gnugnoli, 2020).

Part II: Intraocular pressure (IOP) assessment. This test uses an instrument to measure the pressure inside the eyes by the physician using Haag-*Streit* diagnostic Tonometry. It is fast and widly used to measure the internal eye pressure. Normal intraocular pressures ranges from 10 to 20 mm Hg, while in patient with glaucoma, it can measure ≥ 21 mm Hg (Wang et al., 2020).

Tool IV: Glaucoma Activity Limitation-Questionnaire (GALQ). This tool was adapted from (Khadka et al., 2011), and modified by the researcher to assess difficulty of daily activates in patients with glaucoma. It included five items: walking after dark, walking on uneven ground, seeing objects coming from the side, judging distance of foot to step/curb, and finding dropped objects. The scale is scored through three points, likert scale; (1 = “no difficulty”, 2= “some difficulty”, and 3= “severe difficulty”). Reliability for this tool was established using cronbach's alpha and indicated (α = 0.8).

Tool V: Patients’ Practices Checklist Regarding Eye Care (PPCEC). The checklist included: eye hygiene, eye drop instillation and palming eye exercise. These checklist was adapted from four studies (Sheta & Abo El-Fadl, 2021; Gwenhure, & Shepherd, 2019; Davis et al., 2018, and Mohamed et al., 2011), and they were modified by the researcher to assess patients' practice regarding eye care. The response to each item in the eye care procedures was categorized into correctly and incorrectly; one score was given for each correctly step and zero for each incorrect step. Total scores for every checklist was (0-17) and converted into percentile, then categorized as follow: ≥ 70% indicating an adequate practice while <70% indicating an inadequate practices.

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Its reliability was 0.80 by (Sheta & M Abo El-Fadl, 2021). The reliability was established using cronbach's alpha and indicated (α = 0.9).

Procedure

Following obtaining the official permission to proceed with the proposed study, the study was conducted through three phases:

(a) Preparatory phase: It was concerned with the preparation of the different data collection tools after reviewing the related literature and instructional booklet was designed and written in a simple Arabic language to meet patient's needs and their different levels of understanding. Then, patients diagnosed with glaucoma and fulfilled the criteria for possible inclusion were interviewed individually. Those patients who accepted to participate in the study were asked to sign a consent form**.** At that time, the nature and the purpose of the current study as well as all other ethical consideration was explained to all patientss in both groups.

(b) Implementation Phase: In this phase, Patients who accepted to participate in the study were interviewed by the researcher to obtain data related to Personal and Medical Background Information, Knowledge Assessment Test, Glaucoma Manifestation Assessment, Glaucoma Activity Limitation as well as Patients' Practices Checklist Regarding Eye Care using the designated study tools.

The recruited participants basically were randomly allocated to study and control group. The study group received the proposed protocol in two sessions; one instructional session and one practical session. The instructional session covered the information about disease including definition; risk factors; signs and symptoms; signs of complications, management and life style factors, while the practical session was focused on eye care procedures including the eye hygiene, eye drop instillation and eye exercise training. All sessions were conducted individually by the researcher. The lengths of instructional and practical sessions were lasted between 30 to 45 minutes with intervals of rest period. The participants in the study group were asked to redemonstrate eye care procedures to ensure the applicability of the practical part. The control received a routine hospital care; including eye drops medication such as cosopt and travatan, regular assessment of intraocular pressure and visual acuity and regular follow up.

During each session, the researcher gave break time according to patients' needs, and used teaching media such as flyers and audio-visual materials to facilitate understanding of the information given for the patients. Furthermore, each patient in the study group was handed a copy of the protocol of care in the form of booklet containing pictures representing clarifications of the instructions in order to assist patients in revising and more conceptualization of the learned material. Then, the researcher followed up the study participants weekly by telephone based on an arranged appointment to make sure they were able to master the skill of eye drop instillation, and performs eye exercises efficiently and independently. The researcher provided the patients with the opportunity

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to inquire about any aspect of the learned material related to glaucoma information and any instruction. Discussion and further explanation was provided as needed.

(d) Evaluation Phase: It was performed for the patients in both groups two times post intervention: the first one was at the end of the third week, while the second one was at the end of the sixth week (Lai et al., 2020) using the study tools 2, 3, 4, 5 at the glaucoma outpatient clinic. The collected assessment scores were analyzed and compared statistically with the control group to evaluate the effect of proposed nursing care protocol on the selected outcomes among patients with glaucoma.

Ethical Consideration

A written initial approval was obtained from the Ethics and Research Committee of the Faculty of Nursing - Cairo University. Also an official permission was obtained from hospital/units administrator to conduct the study. Each participant was informed about the purpose of the study and its significance. The subjects were also informed that the participation in the study is entirely voluntary and anonymity and confidentiality will guaranteed through coding the data. The patients were informed that they have the right to withdraw from the study at any time without any penalty. Moreover, subjects were informed that data will not be reused in another research without their permission. Patients who agreed to participate in this study were asked to sign a consent form.

3. DATA ANALYSIS

Collected data was tabulated, computed, and analyzed by personal computer using Statistical Package for the Social Sciences (SPSS), version 23 (IBM Corporation, 2015). Descriptive statistics including frequency, percentage distribution, means and standard deviation as well as t-tests were used to compare the means of the two groups.. In addition to Chi square ($\chi 2$ test) statistic was also used to investigate whether distributions of categorical variables differ from one another. A probability level of ≤ 0.05 was adopted as the level of significance for testing all hypotheses.

4. RESULTS

To fulfill the aim of the current study, the data were collected, then tabulated, analyzed and represented into three main sections entitled as Section one: Descriptive the statistical finding of study subjects in relation to personal and medical related data (Tables 1- 2 and figures 1,2). Section two: Covered the statistical findings pertinent to the study outcome variables including glaucoma manifestation assessment of the studied patients (tables from 3-4). While, Section three: the total mean scores of the study hypotheses (table 5).

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Section I: Statistical Description of Personal and Medical Related Data between Study and Control Group (Tables 1- 2 and Figures 1, 2)

Table 1: Frequency and Percentage Distribution of Personal Data among Study and Control Group (N=62)

Variable	study group (n= 31) No	%	Control group (n= 31) No	%	Test
Age					
40-50	7	22.6%	11	35.5%	T=1.11
> 50	24	77.4%	20	64.5%	P 0.27
Range	40-62		44 -63		
Mean± SD	55.4±5.1		52.8±4.6		
Median	56		54		
Gender					
Male	19	61.3%	21	67.7%	X^2 =0.28
Female	12	38.7%	10	32.3%	P 0.59
Level of education					
Don't read and write	18	58.1%	15	48.4%	X^2= 3.4
Read and write	9	29.0 %	8	25.8%	P 0.32
Primary education	4	12.9%	5	16.1%	
Secondary education	0	0.0%	3	9.7%	
Occupation					
Employee	0	0.0%	1	3.2%	X^2=1.65
Housewife	4	12.9%	6	19.4%	P 0.64
Manual work	10	32.3%	8	25.8%	
Un employed	17	54.8%	16	51.6%	

** Significant at p≤ 0.05* *** Highly Significant at p≤0.01*

Table (1) shows that the mean age of the study group is 55.4±5.1 years of age ranging from 40.0-62.0 years, while the mean age of the control group is 52.8±4.6 years of age ranging from 44 -63 years. The majority of the study and control group are males (61.3% and 67.7 %) respectively. Furthermore, regarding the level of education, is 58.1% of the study group and 48.4% of the control group don't read and write and in both groups around half (54.8% and 51.6%) respectively were unemployed. There were no statistically significant differences among the two groups regarding all demographic characteristics (p>0.05).

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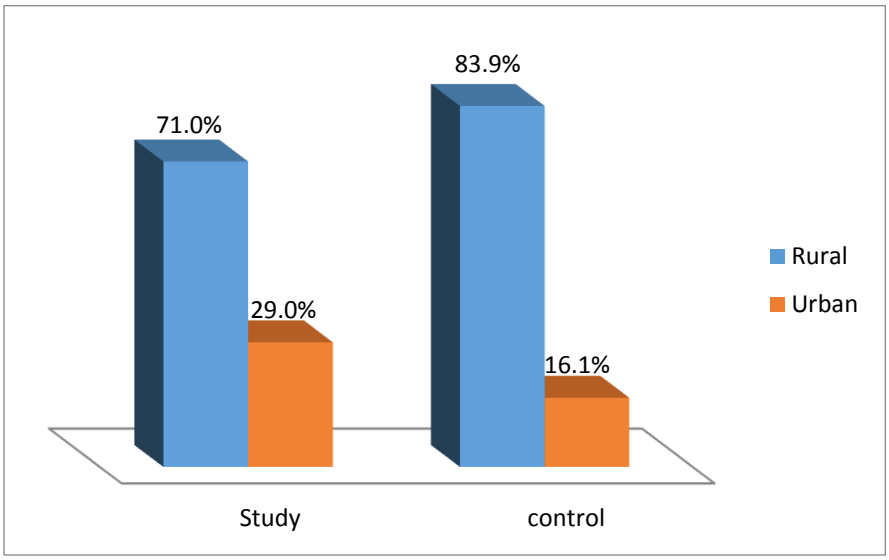

Figure 1: Percentage distribution of place of residence between study and control group (N = 62)

Figure (1) showed that the majority of patients in both groups are residing in rural area (71.0%, 83.9%) respectively of the control group respectively lived in rural areas. In addition, there was no statistically significant differences between both groups ($X^2 = 1.47$; P = 0.22) was revealed.

Table 2: Frequency and Percentage Distribution of Medical background Data among Study and control Group (N=62)

Variable	study group (n= 31) No %		Control group (n= 31) No %		X^2	P-value
Onset of symptoms						
Two- three months	2	6.5%	0	0.0%	2.0	0.15
>three months	29	93.5%	31	100.0%		
Timely seeking medical treatment						
Yes	12	38.7%	10	32.3%	0.28	0.59
No	19	61.3%	21	67.7%		
If no; the cause						
Lack of knowledge	15	78.9%	19	90.5%	1.0	0.30
Long distance	4	21.1%	2	9.5%		
Family history of glaucoma						
Yes	14	45.2%	11	35.5%	0.60	0.43
NO	17	54.8%	20	64.5%		
Associated chronic disease						
Yes	15	48.4%	13	41.9%	0.26	0.61
No	16	51.6%	18	58.1%		

** Significant at p≤ 0.05* *** Highly Significant at p≤ 0.01*

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Table (2) clarifies that, 93.5% of study group and all of control group experienced visual changes for more than three months; as well 61.3 % of study group and 67.7% of control group delayed seeking medical treatment once experiencing visual changes for more than three months; with 78.9% of study group and 90.5% of control group because of the lack of knowledge about glaucoma. There was no statistically significant difference between both groups (P>0.05) as regard medical background data.

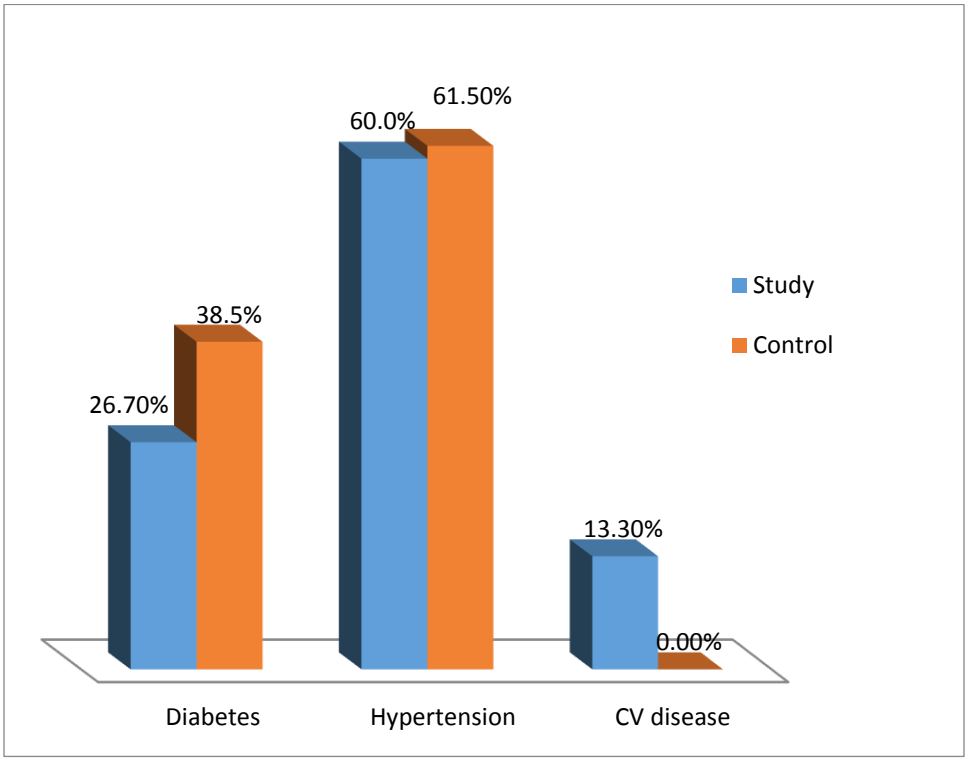

Figure 2: Percentage distribution type of associated chronic diseases in study and control groups (N = 62)

Figure (2) clarifies that hypertension is the most providing associated illness in both groups followed by diabetes and the CV disease. These data shows no statistically significant difference between both groups ($X^2 = 2.037$, P = 0.361).

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Table 3: Changes in visual acuity (VA) among patients in the study and control group throughout study phases (N=62)

Variable	1st assessment				X^2 (p-value)	2nd assessment				X^2 (p-value)	3rd assessment				X^2 (p- value)
	Study (n= 31)		Control (n= 31)			Study (n= 31)		Control (n= 31)			Study (n= 31)		Control (n= 31)		
Visual acuity of right eye	**NO.**	**%**	**NO.**	**%**		**NO**	**%**	**NO**	**%**		**NO**	**%**	**NO**	**%**	
6/9-6/18	17	54.8%	20	64.5%	0.2(0.6)	18	58.1%	20	64.5%	0.11(0.75)	18	58.1%	21	67.7%	0.23(0.63)
6/24-6/36	13	41.9%	11	35.5%		12	38.7%	11	35.5%		12	38.7%	10	32.3%	
6/60 and worse	1	3.2%	0	0.0%		1	3.2%	0	0.0%		1	3.2%	0	0.0%	
Visual acuity of Left eye															
6/9-6/18	22	71.0%	24	77.4%	0.09(0.77)	22	71.0%	22	71.0%	0.0(0.99)	22	71.0%	23	74.2%	0.02(0.88)
6/24-6/36	9	29.0%	7	22.6%		9	9.0%	9	29.0%		9	29.0%	8	25.8%	
6/60 and worse	0	0.0%	0	0.0%		0	0.0%	0	0.0%		0	0.0%	0	0.0%	

** Significant at p≤ 0.05* *** Highly Significant at p≤ 0.0*

Table (5) highlights that there were no statistically significant differences in visual acuity value of both eyes between the study and the control group in 1st 2nd and 3rd assessment (X^2= 0. 2, P = 0.6) (X^2 = 0.09, P=0.77), (X^2= 0.11, P = 0.75) (X^2 = 0.0, P=0.99), (X^2= 0. 23, P = 0.63) (X^2 = 0.02, P=0.88) respectively.

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Table 4: Changes in intraocular pressure (IOP) among patients in the study and control group throughout study phases (N=62)

Variable	1st assessment				X^2 (p-value)	2nd assessment				X^2 (p-value)	3rd assessment				X2 (p-value)
	Study (n= 31) NO.	%	Control (n= 31) NO.	%		Study (n= 31) NO	%	Control (n= 31) No	%		Study (n= 31) NO	%	Control (n= 31) NO	%	
IOP of right eye															
≤20mmHg	0	0.0%	0	0.0%	1.6(0.2)	23	74.2%	24	77.4%	0.02 (0.88)	28	90.3%	19	61.3%	5.4(0.02*)
21-30mmHg	20	64.5%	29	93.5%		8	25.8%	5	16.1%		3	9.7%	12	38.7%	
>30 mmHg	11	35.5%	2	6.5%		0	0.0%	2	6.5%		0	0.0%	0	0.0%	
IOP of left eye															
≤20mmHg.	0	0.0%	0	0.0%	0.28(0.6)	26	83.9%	19	61.3%		30	96.8%	16	51.6%	
21-30mmHg.	31	100.0	27	87.1%		5	16.1%	11	35.5%	2.2(0.13)	1	3.2%	14	45.2%	
>30 mmHg.	0	%	4	12.9%		0	0.0%	1	3.2%		0	0.0%	1	3.2%	4.2(0.04*)
		0.0%													

** Significant at p≤ 0.05* *** Highly Significant at p≤ 0.0*

Table (4) presents that, there were no statistically significant differences in IOP value of both eyes between the study and the control group in the first assessment (X^2= 1.6, P = 0.2) (X^2= 0.28, P = 0.6) respectively. While statistically significant differences were found in IOP of both eyes between the study and the control group in the third assessment (X2= 5.4, P=0.02*) (X2= 4.2, P=0.04*) respectively.

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Section (III): Total Mean Scores Findings:

Table 5: ***Comparison between the study and control group regarding the total Mean Scores of glaucoma knowledge, activity limitation, and practices of eye care throughout study phases (N=62)***

	1st assessment		t-test (p-value)	2nd assessment		t-test (p-value)	3rd assessment		t-test (p-value)
	Study (n= 31) Mean ± SD	control (n=31) Mean ± SD		Study (n=31) Mean ± SD	Control (n=31) Mean ± SD		study (n=31) Mean ± SD	Control (n=31) Mean ± SD	
Glaucoma knowledge	0.22± 0.04	0.21 ± 0.03	1.095 (0.278)	0.67 ± 0.04	0.22 ± 0.04	43.571 (0.0001**)	0.87 ± 0.03	0.25 ± 0.04	67.981 (0.0001**)
Activity limitation	1.99±0.42	2.16 ± 0.51	1.409 (0.164)	1.66 ± 0.57	2.11 ± 0.48	3.308 (0.002*)	1.54 ± 0.51	2.14 ± 0.46	4.785 (0.0001**)
Practices of eye Care	0.16±0.04	0.16±0.03	0.000 (1.000)	0.87±0.03	0.19±0.04	74.490 (0.0001**)	0.96±0.1	0.19±0.03	40.396 (0.0001**)

** Significant at p≤ 0.05* *** Highly Significant at p≤ 0.01*

The above table indicated highly significant differences were found between both groups in 2nd and 3rd assessment (p<0.01) in relation to outcome variables (glaucoma knowledge, activity limitation, and practices of eye care).

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5. DISCUSSION

Primary open angle glaucoma (POAG) is often asymptomatic until the optic nerve damage is severe. Once primary open angle glaucoma or other types of this disease is diagnosed, it becomes possible to control or prevent further complications. Awareness and knowledge related to the nature of glaucoma, risk factors, consequences and treatment regimen is the first step in planning for disease management. Adherence to topical eye drop therapy also remains one of the challenges in the management of glaucoma. So, this study is conducted to evaluate the effect of proposed nursing care protocol on selected outcomes.

Section (I): Personal and medical background information (PMBI):

Regarding the studied patients' demographic data, the results of the current study revealed no statistically significant differences between the study and control group in socio-demographic characteristics. More than two thirds of the patients in study and control groups their age more than 50 years old. As documented by various scientific references that the optic nerve and the outflow-pathway of the eye likely begins to weaken over time. As result, weakens, the eye pressure gradually begins to increase. The current study findings in the same line of a study of Kreft, Doblhammer, Guthoff & Frech, (2019) who conducted study to assess Prevalence, incidence, and risk factors of primary open-angle glaucoma, reported that the percentage of patients with open angle glaucoma increases dramatically with age.

Likewise, a study of Lee & Mackey, (2022) about Glaucoma–risk factors and current challenges in the diagnosis of a leading cause of visual impairment, found that the prevalence of glaucoma increases with age. Adults aged above 40 years are having an increased susceptibility to POAG. This further affirms that with the aging process the drainage system of the eye gradually loses elasticity and gets weak. As a result, the proper drain of aqueous fluid is disturbed. Without any symptoms or pain pressure builds up in the eye, resulting in to initiation of loss of peripheral vision.

In relation to gender, the present study illustrated that more than half of the study and control group patients were males. This might suggest that gender difference is potential risk of primary open angle glaucoma. In congruence with this study finding Khachatryan, et al., (2019) in a genetics study investigating gender and risk of primary open angle glaucoma, who reported that male gender was significantly associated with primary open angle glaucoma among African Amrican, The researchers noted that estrogen hormone protects women from developing primary open angle glaucoma, possibly due to the vasodilator effect of estrogen, which results in enhanced ocular blood flow and decreased IOP. Additionally, estrogen could influence aqueous humor secretion and drainage. Moreover, a study of Zhang, Wang, Li & Jiang, (2021) in a meta-analysis and systematic review study about prevalence of primary open angle glaucoma in the last 20 years,

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concluded that the prevalence of primary open angle glaucoma is increased among males.

Concerning patients' education, the study showed that the majority of patients in the study and control groups couldn't read and write. This result might lead to lower patient awareness and understanding of their disease which cause less engagement in managing it and increase IOP. This study result was supported by the study of Sesar, et al., (2020) about Health-related quality of life in primary open-angle glaucoma patients. The results of this study showed that among glaucoma patients factors such as lower educational level and older age may be significantly contribute to poorer patient compliance with physicians' advice, and therefore negatively influence quality of life.

The study findings revealed that the majority of the study and control group were unemployed, and more than one fourth are employed among which the majority of them have manual work. From the researcher might interpret this finding as this could be due to the fact that most of the studied patients were at old aged, and those who were working, the current condition of glaucoma forced them to quit their work because glaucoma causes low vision that impair their performance of some tasks as tailor and drivers because of loss of peripheral vision and have difficulty to see at night or in low lighting areas. This study findings is consistent with Hardianti, et al., (2020) who conducted a study that aimed to determine the relationship between the characteristics of respondents (age, gender, and occupational status) and the quality of life of glaucoma patients and they reported that most participants were not working.

The current study found that more than two third of the studied patients were living in rural area. It may be argued that the university hospital where the study take place has lower costs of examination and has multiple specialists that serve people in Cairo and nearby rural areas. This also might be due to the high costs of eye drops and need to obtain these medications from health insurance. This finding in consistent with Birhanu & Tegegne, (2022) study of Predictors for elevation of Intraocular Pressure (IOP) on glaucoma patients and that stating that near half of the studied patients were coming from rural residents, this study demonstrated that low awareness of a disease and medication non adherent might be related to an increased IOP among rural residents.

Concerning medical data, the study findings found no statistically significant difference between patients in the study and control group in all medical data that the majority of them and control group had glaucoma for more than three months and more than half of them didn't seek medical help after the onset of symptoms. This may be associated with asymptomatic nature of POAG. Some patients ignore symptoms due to lack of awareness and the patients lack awareness regarding the right way for seeking medical advice. According to a study of Stein, Khawaja, & Weizer. (2021), who studied Glaucoma in adults—Screening, diagnosis, and management, they explained that many patients with glaucoma are asymptomatic early in the disease course.

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The findings of the present study also revealed that more than one thirds of study and control group had a positive family history of glaucoma. This might document that, heredity as one of the risk factors for developing glaucoma. This finding is in agreement with Mabuchi, Mabuchi, et al., (2020) about Genetic variants associated with the onset and progression of primary open-angle glaucoma, they highlighted that around half of the patient with primary open angle glaucoma have a positive family history.

Additionally, more than one third of the studied patients had chronic disease, and most of them had hypertension and diabetes**.** This could emphasize that chronic systemic conditions such as hypertension and diabetes may be associated with elevated intraocular pressure and lead to incidence of primary open angle glaucoma. The findings are confirmed with Kuang, Xirasagar, Kao, Shia, & Lin, (2020) study who conducted study aimed to assess the association of systemic hypertension with primary open-angle glaucoma. The researchers found that POAG was significantly associated with prior HTN. Moreover, a study of Grzybowski, Och, Kanclerz, Leffler & De Moraes, (2020) about primary open angle glaucoma and vascular risk factors, as the authors reported that chronic systemic conditions such as hypertension and diabetes have been postulated to be correlated with POAG. Also added that elevated blood pressure was associated with higher IOP as main risk factor for POAG.

Section II: Glaucoma manifestation among the studied patients.

Regarding glaucoma manifestation, the results of the present study revealed that pre intervention nearly two third of study and control group had elevation of IOP (> 21-30 mm Hg), while post intervention, IOP was controlled among the study group. From researcher's opinion, AS IOP is a modifiable factor in patients with glaucoma; accessible records of the out–patient clinic denoted such findings, at the subsequent patient visits. On subsequent patient visits at outpatient clinic. This could be due to majority of the studied patients follow prescribed instructions of physicians and researcher during defined period of the study. While in control group, IOP fluctuated. This could be due to the persistence with glaucoma medications has been found to be low due to missing of taking eye drops at times.

Therefore the study hypothesis (II) was supported as intraocular pressure value among the study group was different than intraocular pressure value among the control group. According to a study done by Jayaram, (2020) about Intraocular pressure reduction in glaucoma, the researcher reported that the topical treatment reduced the IOP by 25%, a reduction maintained throughout study patient group follow-up. Glaucoma progression was less with proper management. Moreover the study of Birhanu & Tegegne, (2022) about Predictors for elevation of Intraocular Pressure (IOP) on glaucoma patients, highlighted that the effectiveness of glaucoma treatment and management is significantly measured by how well IOP is controlled. The reduction of intraocular pressure is one of the indicators that, the therapy given to glaucoma patients under treatment is aeffective.

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The present study indicated no statistical significant difference among both groups group regarding visual acuity at baseline and post intervention. Moreover, visual acuity of more than half of studied patients was 6/9-6/18. The researcher's might justify the majority of studied patients had low visual acuity of eye at pressures under or equal 30 mmHg, and did not improve on subsequent visits. This means that low visual acuity but not a complete loss of vision, because there is still some sight and it can be corrected in some patients at outpatient clinic with the use of visual aids such as glasses or lenses. Using glasses may provide a larger field of view and a more comfortable in some patients. Therefore, the study hypothesis (III) the total mean score of visual acuity of patients with glaucoma who will receive the proposed nursing care protocol are different than the total mean score of visual acuity of patients who receive a routine hospital care was rejected.

The previous findings was consistent with a study of Dhawan, Hans, Sandhu & Midha, (2019) about evaluation of vision-related quality of life in patients with glaucoma: the researchers noted that most of the patients, were diagnosed as having mild and moderate glaucoma, patients with mild glaucoma had visual acuity equivalent to controls, more than 6/18, whereas, visual acuity in moderate glaucoma cases ranged from 6/18 to 6/60. In accordance to a study of Ouchi, et al., (2019) about Color visual acuity in preperimetric glaucoma and open-angle glaucoma, the authors reported that early stage of glaucoma is associated with low visual acuity. Vision loss due to glaucoma has traditionally been described as loss of peripheral vision. The study demonstrates that decreased vision with associated central field loss can be a relatively on early finding in glaucoma.

Section III: Total Mean Score of Study Variables:

The study revealed that; there was no significant difference among both groups in scores of knowledge regarding glaucoma causes, risk factors, complications, and treatment and lifestyle factors at baseline pre-intervention. This might be due to lack of health care members, understaffing of health care members leaving less time for patient education, and a high flow of patients every day at out- patient clinic. This also could be due to lack of educational materials about glaucoma as a written labels or brochures that clarify glaucoma causes and risk factors.

While post intervention, there was a significant improvement of knowledge among the study group. Therefore, the study hypothesis (I) the level of knowledge scores of patients with primary open angle glaucoma of the study group will be different than the knowledge scores of the control group was accepted. In accordance to a study done by Bizuneh, Tsega, Addis & Admassu, (2020), about awareness of glaucoma and associated factors among adults, the researchers found that most of the studied patients had a pre-intervention low knowledge score, showing improvement in knowledge. Moreover, a study done by Kio, Bankole & Ayodele, (2020) on 97 glaucoma patients, reported that pre intervention knowledge mean score level of participants on glaucoma self-management intervention over six weeks increased from 9.28±3.76 to post intervention mean score of 18.12±1.09.

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Concerning activity limitation, the present study also revealed that, at base line pre intervention there was no significant difference among studied patients in performing some tasks as walking after dark, walking on uneven ground. This is probably more closely related to age causing decline of vision and loss of peripheral vision of the eye among the studied and control group. Moreover, patients in early stage glaucoma were in need for more lighting and experience poor of vision at dark. While in the studied patients, despite decline of vision can't be reversed, but after application of protocol, some of the studied patients reported less difficulties in activities of walking after dark, walking on uneven ground, because the patients become aware of various methods for safe movement after dark or on uneven ground while minimizing fear of falls. Therefore the hypothesis IV the score of activity imitation of the study group will be different than the scores of activity imitation of the control group was accepted.

It was observed from the study findings that also showed that no statistically significant difference in patient's practices regarding eye care between control and study group before intervention. However after three weeks and six weeks (post intervention), the study group showed improvement in the eye care practices. This may be due to watching videos which clarify eye drop technique, eye cleansing and eye exercise to maximize the perception and benefit of instruction. This could elaborate the effect of nursing care protocol on improvement of patients' practices regarding eye care. Therefore, hypothesis (V) The total mean scores of eye care practice of patients with glaucoma who will receive the proposed nursing care protocol will be different than the total mean scores of eye care practice of patients who receive a routine hospital care was accepted.

The findings of the present study revealed that there were highly significant improvement of total mean scores of glaucoma knowledge, activity limitations and patient practices regarding eye care post intervention. This could be explained as implementing a proposed study protocol have a positive effect on outcomes of patients' with primary open angle glaucoma. This findings is consistent with a study of Seewoodhary & Watkinson, (2011) who studied Public health knowledge of glaucoma that emphasized the important role of the ophthalmic nurse in educating patients and their family members as soon as the diagnosis is confirmed. It is very important in managing this silent disease that robs people off their valuable sight.

6. CONCLUSION

The results of the present study suggest that improving patients' outcomes can be achieved through proper planning for education systematically and periodically. Hence, nurses should prepare nursing programs for the care for patients taking into account the prescribed treatment plan of physicians and incorporating knowledge related to the patient's special needs. The role of nurses in the care of glaucoma patients is much wider; they contribute to success of patients coping as regards of their new condition. moreover, an educational programme focusing on information about glaucoma, correcting patients' misconception and expectations, and provide training patients on self-management of

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eye care may be helpful to avoid serious damage to a person's vision. Improving patients' awareness about their illness and hence compliance with therapy, as well as encouraging healthy life style activities is an integral aspect of glaucoma care.

7. RECOMMENDATIONS

Based on the study findings, the researcher recommends the following:

Replication of the study on a larger probability sample from different geographical areas in Egypt is recommended. Nurses should be encouraged to collaborate with other health team members to provide comprehensive care for patients with glaucoma. Establishing standardized instructions in order to increase knowledge among patients with glaucoma. Application of nursing protocol of care in glaucoma ophthalmic care settings is critical and important to motivate patients with glaucoma to follow the guided information.

Conflict of Interest

All authors declare that they have no conflicts of interest.

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