Effect of the Implementation of Nursing Interventions Program on the Visual Activities among Geriatric Patients with Dry Eye Disease

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Abstract

Background: Dry eye disease (DED) is one of the most common ophthalmologic diseases affecting geriatric patients enforcing their visits to the ophthalmologist seeking eye examination and treatment. DED is a tear film condition caused by decreased tear production or increased tear evaporation, resulting in eye discomfort and weariness. Objective: Determine the effect of implementation of nursing interventions program on the visual activities among geriatric patients with DED. Settings: The study was carried out in the Ophthalmology Hospital (Farouk hospital) at Alexandria governorate, Egypt. Subjects: A convenient samples of 70 geriatric patients diagnosed with DED were included, who had intact or mild cognitive function impairment on the Saint Louis University Mental Status (SLUMS) Examination, Had no depression; score less than 3 on the Patient Health Questionnaire-2 (PHQ-2), Had no other eye problems than DED. The sample was divided into two equal groups (35 patients each). Tools: Five tools were used. Tool one: "Saint Louis University Mental Status (SLUMS) Examination". Tool two: "Patient Health Questionnaire- 2 (PHQ-2)". Tool three: "Older Adults Socio–Demographic and Clinical Data Structured Interview Schedule". Tool four: "Knowledge of Geriatric Patients with Dry Eye Disease Structured Interview Schedule". Tool five: "Visual Activities Questionnaire (VAQ). Results: The study showed that, the nursing interventions program had a large effect on the geriatric patients' study group's knowledge level (0.945) with a mean of 5.63±3.663, and 21.57±1.290 at the pre and post nursing interventions implementation; respectively. Additionally the intervention had a medium effect on their visual activities improvement (0.711) with a mean of 77.86±19.33, 49.74±3.43 pre and post the nursing interventions implementation; respectively. Conclusion: The geriatric patients who received the proposed nursing interventions program had achieved lower scores on the Visual activities scale (VAS) than those in the control group; with a statistically significant difference between the two groups.. Recommendations: Workshops about multicomponent exercise program are to be provided for the geriatric patients and their formal and informal care givers in the outpatient clinics to enhance their practice and to help the geriatric patients control DED symptoms.

Keywords: Nursing intervention, nursing program, visual activities, dry eye disease, geriatric patients.

Introduction

Dry eye disease (DED) is one of the most common ocular disorders in the geriatric patients. It is a major public health concern being one of the most prevalent causes of their primary eye care visits. DED is prevalent in 5% to 50% of the geriatric patients worldwide according to epidemiological research. (**Farrand et al., 2017**) It is defined as "a multifactorial disease of the tears and ocular surface that causes discomfort, visual disruption, which is accompanied by a rise in the osmolarity of the tear film in addition to ocular surface irritation and injury". (**Craig et al., 2017**)

Dry eye disease has a negative impact on all aspects of the patients' life. It can impair their capacity to see well, disrupting their activities of daily livings (ADLs) due to poor sleep quality. As well, it has a great effect on the older adults' physical functioning; as the patients with DED frequently report visual abnormalities in the form of blurred or foggy vision, fluctuating vision, and glare. (**Zou et al, 2018**)

Because DED is a chronic, incurable disease; its palliative and pharmaceutical treatment may be required for the rest of the patients' lives, greatly complicating the challenge of reconciling DED treatment regimens in daily activities. (**Noor, 2018; Ozudogru et al., 2019**) According to studies by **chan, 2021 and Morten et al, 2021**, patients with DED who have poor eyesight, and minimal disease related education is reflected on their adherence to DED treatment due to lack of knowledge about the importance of compliance with the artificial eye tears leading to increase the patients' susceptibility to the complications of DED.

There are multi ophthalmic exercises that should be practiced by the geriatric patients to assist them in maintaining a healthy ocular surface through helping the restoration of the optic nerve strength and increase the retina's focus, reducing the eye's fatigue through stimulation of the lacrimal gland (LG) secretion and improving tear's function. These ophthalmic exercises are taught by the gerontological nurses to help the preventing DED exacerbation in geriatric

patients. (**Kim et al., 2021; Labetoulle et al., 2022,**)

Thus, gerontological nurses should teach their patients about the multi ophthalmic exercises; of which the clock work, blinking, palming, near and far sight and up and down exercises (**Sun et al., 2022, Aragona et al., 2021, Rizanti, 2021**). Additionally, nursing interventions program should include teaching about tear duct occlusion technique, healthy nutrition for the eye, environmental modifications and smoking cessation to minimize DED manifestations severity. (**Tong & Yeo, 2018; Shekar et al., 2019**)

Significance of the study:

The current study will provide the geriatric patients with the required information regarding DED and its associated problems, as well as recommended exercises and activities needed to alleviate DED symptoms and assist them in becoming more adherent to treatment plans and self-reliant in their daily life activities.

Aim of the Study

This study aims to determine the effect of the implementation of nursing interventions program on the visual activities among geriatric patients with dry eye disease.

Research hypothesis

Geriatric patients with dry eye disease who receive the proposed nursing interventions program achieve lower score on the visual activities grading scale than those who do not receive it.

Materials and Method

Materials

<u>*Design:*</u> A quasi experimental research design was used to conduct this study.

<u>*Setting:*</u> the study was carried out in the Ophthalmology Hospital (Farouk hospital) at Alexandria governorate, Egypt.

<u>*Subjects:*</u> The study included a convenient sample of seventy (70) geriatric patients who are aged sixty years and above and fulfilling the following criteria:

1- Diagnosed with dry eye disease.

2- Have intact cognitive function or mild cognitive impairment on the Saint Louis University Mental Status (SLUMS) Examination, score 21 and more for high school education and score 20 and more for less than high school education.

3-Have no depression score less than 3 on the Patient Health Questionnaire- 2 (PHQ-2).

4-Have no other eye problems than dry eye disease.

The Epi info 7.0 program was used to estimate the number of the study subjects; the minimum estimated number was sixty nine (69) subjects; however, the researchers included 70 subjects. This number was divided randomly into two equal groups, 35 each in the study and control groups.

Tools: Five tools were used to collect necessary data from the study geriatric patients as follows:

Tool one: "Saint Louis University Mental Status (SLUMS) Examination"

The SLUMS is a 30-point, 11-item, clinician-administered scale, was developed by **Tariq et al (2006)**. This tool was used to assess the cognitive function of geriatric patients and identify those with cognitive impairment. The SLUMS was translated into Arabic language and approved to be valid and reliable by **Gamma et al, 2021** (reliability coefficient 0.723). This tool assesses eleven cognitive domains namely attention, visual spatial, numeric calculation, immediate and delayed recall, animal naming, digit span, clock drawing, figure recognition/size differentiation, and immediate recall of facts from a paragraph. Scoring of the items depends on the level of education of the respondents.

For respondents with High school education:

- "Normal response" took a score of 27 to 30.
- "Mild neurocognitive disorder "took a score of 21 to 26.
- "Dementia" took a score of 1 to 20.

For respondents with Less than high school education:

- "Normal response" took a score of 25 to 30.
- "Mild neurocognitive disorder" took a score of 20 to 24.
- "Dementia" took a score of 1 to 19.

For Illiterate respondents:

- "Normal response" took a score of "24 to 30".
- "Mild neurocognitive disorder" took a score of "19 to 23".
- "Dementia" took a score of "1 to 18".

Tool two: "Patient Health Questionnaire- 2 (PHQ-2)"

The PHQ-2 inquires was developed by **Chunyu et al., 2007** to assess the frequency of depressed mood and anhedonia over the past two weeks includes 2 questions using 4 point Likert scale from zero (0) Not at all to nearly every day (3). The purpose of the PHQ-2 is to screen for depression in a "first-step" approach, the PHQ-2 is a valid screening tool for depression in older people. The PHQ-2 was translated into Arabic language and approved to be valid and reliable by **Hafez et al, 2020** (reliability coefficient = 0.965). Its score ranged from 0-6. A score of 3 as the optimal cut point to screen for depression. If the score is 3 or greater, "major depressive disorder" is likely. If less than 3, "no depression" is likely.

Tool three: "Older Adults Socio–Demographic and Clinical Data Structured Interview Schedule"

This tool was developed by the researchers based on review of relevant literature, it consisted of two parts as follows:-
Part I: - Socio-demographic data of geriatric patients such as age, gender, marital status, level of education, occupation prior to retirement and monthly income.

Part II:- Clinical data of geriatric patients such as diagnosis, medical health history, signs and symptoms of the disease and used medications.

Tool four: "Knowledge of Geriatric Patients with Dry Eye Disease Structured Interview Schedule"

This tool was developed by the researchers based on review of relevant literature. It included questions related to causes of dry eye, risk factors, manifestations, environmental modifications, management and complications of dry eye disease. Responses were: Yes, No and I do not know. The scoring system is:

- "Yes" took a score of one (1)
- "No" and "I do not know" responses took a score of zero.

Items scores were summed providing a total tool's score which classified as:-

- "Poor" took a score from "0 to 12".
- "Fair" took a score from "13 to 19".
- "Good" took a score from "20 to 26".

Tool five:" Visual Activities Questionnaire (VAQ)"

The visual activities questionnaire was developed by **Kosnik et al., 1988** to assess problems in daily visual activities, and includes one hundred (100) items. A new version of the VAQ was developed by **Salone et al., 1992** (reliability=0.94); it included thirty three (33) questions and was adapted by the researchers through arranging it in "eight" domains namely: "Color discrimination" (three questions), "Glare disability" (three questions), "Light/ Dark adaptation" (four questions), "Visual acuity" (four questions), "Depth perception" (three questions), "Peripheral vision" (five questions), "Visual search" (five questions), and "Visual processing speed" (six questions). Responses are scored on a "Five" points Likert scale as follows;

- "Never" takes a score of "1".
- " Rarely" takes a score of "2".
- "Sometimes" takes a score of "3".
- "Often" takes a score of "4".
- "Always" takes a score of "5".

This tool included negative domains' statements indicating the higher the score, the higher the visual activities affection. Each domain scores were summed to provide a total score for the instrument. The scoring is as follows:-

- "Mildly affected visual activities" took a score of "28 to 83".
- "Moderately affected visual activities" took a score of "84 to 111".
- "Severely affected visual activities" took a score of "112 to 140".
- However, "Five" questions were "not applicable" for the study subjects; thus were removed as recommended by the instrument developer **Salone et al., 1992.**

Method

The study was carried out in three phases:

I. Preparation phase:

1. Permission was obtained from the Research Ethics Committee, Faculty of Nursing, Alexandria University.
2. Permission to carry out the study from the responsible authority at the Faculty of Nursing, Alexandria University was obtained.
3. Permission from the director of the study setting was obtained, who was informed about the purpose of the study, the date and time of data collection.
4. The Arabic versions of Tool I and II were used to select the study geriatric patients who were fulfilling the inclusion criteria.
5. Tool III was developed by the researchers based on a review of relevant literature.
6. Tool (V) was translated into the Arabic language by the researchers and tested for content validity by five experts in the related field.
7. Reliability of the translated Arabic version tools of IV and V were applied using Cranach's alpha test (r=0.934 and 0.928; respectively).

8. A pilot study was done on seven (7) selected geriatric patients with DED to assess the study tools for their applicability and clarity. Accordingly minimal modifications were done. Those geriatric patients were not included in the study subjects.

9. The researchers developed the nursing interventions program based on review of the relevant literature.

10. The researchers developed educational materials (booklet and brochure) containing illustrative pictures in order to clarify the nursing interventions for each geriatric patient in the study group.

11. The researchers designed timeline for the implementation of the study program.

II-Implementation phase:

1. The researchers used to go to the study setting every other day: Saturday, Monday, and Wednesday of every week from 8:30 am to 1:30 pm. On the other three days Sunday, Tuesday and Thursday the researchers used to contact each study group subjects to encourage, emphasize and ensure the importance of performing the ophthalmic exercises which have been taught to the subjects by the researchers. For those who were not able to attend any of the sessions for any reason, the researchers used to present it at another time that suits the patient.

2. When the researcher arrived to the outpatient clinic, she greets the health care professionals. Then join the study subjects in the outpatient department's waiting area. To maintain continuous contact with the study geriatric patients; the researchers obtained the phone number of each patient in order to ensure their sessions' attendance and exercises performance.

3. The researchers started data collection by introducing herself and explaining the aim of the study for the selected study patients who fulfilled the inclusion criteria.

4. Prior to implementing the nursing interventions program; the researchers used to attend to the study setting daily for two consecutive weeks; utilizing tool III to assess both study and control group patients' socio-demographic and clinical data, tool IV to assess DED related knowledge level, tool V to assess the impact of DED symptoms on patients' visual activities.

5. As there was no enough space to accommodate all the study group patients at the same time, thus the researchers divided them randomly into two sub- groups:
   a. Patients in group A used to attend to the outpatient waiting area on Saturday, Monday and Wednesday of every week at 8.30 am.
   b. Patients in group B used to attend to the outpatient waiting area on the same days at 11:30am to perform the ophthalmic exercises program. where, the researchers carried out six (6) sessions / day

6. The researchers further divided each sub-group to three (3) additional sub- groups; where each sub group included six (6) geriatric patients with DED, except the third sub group in a study group (B); which included five (5) geriatric patients only. The researchers carried out three (3) sessions for the three (3) additional sub-groups a day, six (6) sessions / week, eighteen (18) sessions/ week.

7. Each session consumed about 45-60 minutes, where the researchers used to give a rest period during the sessions.
   ▪ **The first session:** information about DED

In this session, the researchers discussed the importance of the proposed nursing interventions sessions and the planned goals to be achieved. Through providing simple information about DED as: - Definition, pathophysiology, risk factors in geriatric patients, signs and symptoms, diagnosis, follow up, complications and management.

- **The second session:** Healthy nutrition for the eye

In this session the researchers discussed and explained necessary information related to the importance of consumption of well-balanced diet and increasing specific food elements as vitamins namely: vitamin A, C, B12, omega 3, Zinc, in addition to drinking the recommended amount of fluids from 2.5 to 3 L/day unless contraindicated.

- **The third session:** Smoking cessation

Information regarding smoking was explained to the study group patients by the researchers including the types of smoking, its related eye problems, the importance of smoking cessation, and strategies for gradually quitting smoking.

- **The fourth session:** Environmental modifications

Environmental modifications were explained to the study group patients to prevent falls.

- **The fifth session:** Tear duct occlusion technique

Tear duct occlusion technique was taught to the study subjects by the researchers to help them to instill eye drops or ointments, and gave them the opportunity for re-demonstration.

- **The sixth session:** Clockwork exercises

In this session, the researchers carried out the clock work exercise, starting with explaining its importance, then performed the technique more than one time in front of the study group patients; giving them the chance for re- demonstration, instructing them to repeat the exercise every an hour daily for five consecutive weeks.

- **The seventh session:** Palming exercise

The technique of palming exercise was performed by the researchers for the study group patients tailoring its effect in reduction DED symptoms. They had the opportunity for re-demonstration, and were instructed to repeat them three times daily for five (5) weeks.

- **The eighth session:** Blinking exercise

The blinking exercise was demonstrated by the researchers and explained its importance for stimulating the LG to increase tears production for lessening DED symptoms. Furthermore, these patients were instructed to perform exercise five (5) times per day.

- **The ninth session:** Up and down viewing exercises

In this session the researchers performed the up and down exercise explaining its action in strengthening the optic nerve, that in turn improve visual acuity. In addition, the researchers instructed the patients to re-demonstrate and repeat the exercises ten (10) times per day.

- **The tenth session:** Near and distant view exercises

The near and far view exercise was done by the researchers clarifying its importance in improving the ciliary body function to increase secretions of aqueous humor to facilitate eye washing and nourishment. The study group patients were asked to re-demonstrate the exercises and repeat them ten to twelve (10-12) times per day.

- Along with all sessions, the researchers reviewed the action plan calendar to assess the geriatric patients' plan commitment.

- During each session, the researchers and the geriatric patients assessed the preset goals achievement. The researchers maintained geriatric patients' motivation and gave positive feedback and reinforcement.

- At the end of the sessions, the researchers distributed to the study geriatric patients brochures comprising environmental modifications, nutrition and ophthalmic exercises.

III. Evaluation phase:

1. Evaluation of the study group patients regarding DED related data, knowledge level and visual activities was done one time: immediately following the implementation of the nursing interventions program using tools III part II, IV, and V.
2. Evaluation of patients in the control group regarding DED related data, knowledge level and visual activities was done utilizing tools III part II, IV and V.
3. The researchers used to attend the study setting daily for two consecutive weeks until the evaluation phase was completed for the study and control groups.

- *Ethical considerations*

Written informed consent was obtained from geriatric patients after explaining the aim of the study, and had the right to refuse to participate in the study and/ or withdraw at any time. Patient's privacy was respected. Data confidentiality was ensured during implementation of the study.

- *Statistical Analysis*

The collected data were coded and entered in special format to be suitable for computer feeding. Following data entry, checking and verification process were carried out in order to avoid any errors. Furthermore, data were analyzed using different tests; where:
  - The descriptive statistical measures included: numbers, percentages, and averages (Arithmetic mean ($\overline{X}$), Standard deviation (SD), and effect size).
  - Moreover, Chi square test, Student T-test, Cohen's test, and ANOVA test were utilized.

- Data analysis and interpretation was statistically significant at P 0.05 or less.

Results

Table 1 illustrates the percent distribution of the studied geriatric patients according to socio-demographic characteristics. In relation to gender, this table shows that 77.1% and 80% of the study and control group; respectively are females. Regarding age, elders who are aged 60 to less than 65 years constituted 62.9% for the both groups with a mean age of 64.03 ± 4.162 and 63.91± 4.368 years for the study and control group; respectively. As regards marital status, 60%, 77.1% of the study and control group; respectively are married. In relation to the associated chronic diseases, 91.4%, 74.3% of the study and control group; respectively have chronic diseases.

Table 2 shows the percent distribution of the studied geriatric patients according to total levels of knowledge before and after the nursing interventions implementation. concerning the total knowledge level of the study group geriatric patients about DED, before the nursing interventions implementation, poor level of knowledge was reported by 97.1% and 91.4% of patients in the study and control group; respectively with a mean score of 5.63±3.663 and 6.97±5.153; respectively. After the nursing interventions implementation, good level of knowledge was reported by 94.3% of patients in the study group with a mean score of 21.57±1.290 and poor level of knowledge was reported 97.1% of patients in the control group with a mean score of 7.34±2.363 with a statistically significant difference (P=0.000).

Table 3 shows the percent distribution of the studied geriatric patients according to total levels of visual activities before and after the nursing interventions implementation. Concerning the total visual activities affection, this table shows that before the nursing interventions implementation, mild total visual activity level was reported by 60% and 65.7% of patients in the study and control groups; respectively with a mean score of 77.63±20.30

and 77.86±19.33; respectively. After the nursing interventions implementation, mild total visual activity level was reported by 100% of the study group with a mean score 49.74±3.433 and moderate total visual activity level was reported by 68.6% of patients in the control group with a mean score of 86.74±7.326 with a statistically significant difference between the two groups (P= 0.000).

Table 4 shows the distribution of the studied geriatric patients according to the effect size regarding knowledge about DED and visual activities levels. It is noticed that the nursing interventions program has a large effect on the knowledge level of the study group (0.945) with a mean of 5.63±3.663 before the implementation of nursing interventions program and 21.57±1.290 after the implementation of the nursing interventions program. In the contingency it has no observed effect on the knowledge levels of the control group (-0.045) with a mean score of 6.97±5.153 before the implementation of the nursing interventions program and 7.34±2.363 after the implantation of the nursing interventions program.

The nursing interventions program has a medium effect on the visual activities of the study group (0.711) with a mean of 77.86±19.33 before the implementation of nursing interventions program and 49.74±3.43 after the implementation of the nursing interventions program. It has no observed effect on the visual activities of the control group (-0.286) with a mean score of77.63±20.30 before the implementation of the nursing interventions and 86.74±7.326 after the implementation of the nursing interventions program.

Table 5 reveals the univariate logistic regression analysis of the study patients' levels of knowledge and socio- demographic data after the nursing interventions implementation. It is evident that age (P=0.016), level of education (P=0.017), regular follow up (P=0.004) were significantly associated with their total levels of knowledge. Additionally,

the R^2 value is 0.358 which means that 35.8% of the variability in the outcome is explained by the studied characteristics with overall significance of (P=0.000).

Table 6 reveals that age (P=0.000), level of education (P=0.000), living with (P=0.000), presence of chronic diseases (P=0.003), regular follow up (P=0.003) and duration of DED (P=0.015) were significantly associated with total levels of visual activities. The R^2 value was 0.424 which means that 42.4% of the variability in the outcome is explained by the studied characteristics with overall significance of (P=0.004).

Discussion

Dry eye disease (DED) is one of the most common ocular disorders in the geriatric patients; being a major public health concern being one of the most common predisposing causes of primary eye examinations. **(Craig et al., 2017; Jung et al., 2017; Plugfelder 2020)**

The findings of the present study showed that before the nursing interventions program implementation, the majority of the geriatric patients in both the study and control groups reported poor total level of knowledge regarding DED, this may be due to the fact that the majority of both groups' patients are illiterate, and lacking of health care providers' time for providing them with the needed knowledge. After the implementation of nursing interventions program, the majority of the study group patients reported good level of knowledge regarding DED compared to the majority of the patients in the control group who reported poor level with a statistically significant difference between the two groups (P= 0.000), this finding may be explained by the provision of information about DED related information The study group subjects expressed happiness to get answers for their questions by the researcher. This finding is in line with **Aragona et al., 2022** who reported that; lack of knowledge about the disease symptoms could be due to not receiving knowledge as the health team members have a busy care schedule which does not allow

enough time for health teaching that in turn had a negative impact on patient life.

With regard to the visual activities, the current study findings revealed that before the implementation of the nursing interventions program more than half of the geriatric patients in the study group compared to almost two thirds in the control group had mild visual activities affection. After the implementation of the nursing interventions program, all the geriatric patients in the study group reported mild visual activities affection compared to almost two thirds of control group who reported moderate visual activities affection with a statistically significant difference between the two groups (P= 0.000).This may be related to the fact that the geriatric patients in the control group were receiving the hospital routine care only, while providing the study group patients with the sufficient information about DED and also helping them to practice ophthalmic exercises which might sequentially relieved DED manifestations by stimulation the lacrimal gland secretions of the lacrimal fluid. This finding is in line with **Gupta 2019; Kim et al., 2021** who revealed that; blinking exercises, palming, up and down and near and far sight yoga ophthalmic exercises improved both DED symptoms and poor blinking habits, also protected against the impact of digital device use on tear film quality, DED onset and progression in turn relieving eye fatigue.

Concerning the effect of the implementation of the program; the nursing interventions program has a large effect on the knowledge level about DED which could be related to the utilization of different teaching materials during the program implementation as: distribution of a colored booklet and brochure that enhanced the delivery of DED related knowledge to the study group geriatric patients and helped them to modify their life styles as well as providing them with information about DED, strategies of smoking cessation, healthy nutrition for eye, environmental modification and tear duct occlusion technique which lead to subsiding manifestations of DED.

Furthermore, the nursing interventions program has a medium effect on the visual activities, which could be related to demonstrating multiple ophthalmic exercises as palming, blinking, clock work, up and down and near and far sight exercises resulting in improvement of lacrimal gland function that in turn enhanced their visual activities being a non-pharmacologic intervention for alleviating eye fatigue and related symptoms.

This finding is in accordance with **Kawashima et al, 2018** who revealed that ophthalmic exercises from four to six weeks cause a promising life style modification leading improvement the subjective DED symptoms with a significant decrease in DED. Another study by **Tong & Yeo, 2018** added that lifestyle changes as healthy eye nutrition consumption, practicing ophthalmic exercises, avoiding risky behaviors for DED, in addition to medical treatment had been effective for some DED patients. It might be beneficial to humidify the surrounding air, avoiding air draughts and changing the airflow characteristics. **Gupta 2019** also declared that ophthalmic or ocular exercises reduced the severity of eye fatigue symptoms by improving the efficiency of the extra ocular muscles and improving visual functioning.

Moreover, after the nursing interventions program implementation; it was declared that the more the study group patients' age, the less their level of knowledge; with a statistically significant difference between them (P=0.016). This can be explained; presence of age related changes especially in vision and hearing senses which affected the learning ability, knowledge and information acquirement. This finding is in agreement with **Correia et al., 2018** who added that; older people experiences cognitive changes in memory and intellectual skills that inhibit their abilities in acquiring new information or skills.

As well after the implementation of the program; it was observed that the more the study group patients' age, the more their level of visual activities affection; with significant difference between them (P=0.000). This may be due to the fact that the liability of age related changes in the ocular system increase in older adults as decreased the lacrimal fluid and the total body fluids that exacerbate DED

symptoms and visual activities affection. So, the researchers insisted on the importance of increasing fluid intake, unless contraindicated, and emphasized on using tear duct occlusion technique for eye lubrication. Furthermore, stressing on practicing eye exercises as far and near sight, blinking and palming exercises to enhance eye lubrication and relieve discomfort. Nevertheless, this goes in accordance with finding declaring that, with aging old people could undergo a number of significant visual changes as decreased visual acuity and binocular function. **(Erdinest et al., 2021)**

Thus in the present study geriatric patients with DED who received the proposed nursing interventions program achieved lower score on the visual activities scale than those in the control group who did not receive the nursing interventions; with a statistically significant difference between the two groups. Thereby the study hypothesis is supported by the study data.

Conclusion

Based on the findings of the present study, it can be concluded that: visual activities of the study geriatric patients who received the proposed nursing interventions program have achieved lower scores on the Visual activities scale (VAS) than those in the control group with a statistically significant difference between the two groups.

*Recommendations***:**
Based on the findings of the current study, the following recommendations are suggested:

1. Booklets and brochures containing DED-related information can be distributed to each older adult who attend the outpatient clinic to help control DED symptoms.

2. Posters demonstrating DED related information can be hung at the outpatient clinic to increase the older adults' awareness about DED and its management.

3. Workshops about the ophthalmic exercises program are to be provided

for the patients and their care givers in the outpatient clinics to enhance their practice and to help the patients control DED symptoms.

Nursing Interventions Program, Visual Activities, Geriatric Patients, Dry Eye Disease

Table (1): **Percent distribution of the studied geriatric patients according to socio- demographic characteristics and clinical data**

Socio-demographic characteristics	Studied groups				Test of Significance
	Study group (N=35)		Control group (N=35)		
	No.	%	No.	%	
Gender					
Female	27	77.1	28	80.0	X^2= 0.085
Male	8	22.9	7	20.0	P= 0.771
Age (years)					
60< 65	22	62.9	22	62.9	X^2= 1.377
65< 70	6	17.1	8	22.9	P= 0.711
70< 75	6	17.1	5	14.3	
≥75	1	2.9	0	0.0	
Mean ± SD	64.03±4.162		63.91±4.368		t= 0.025 P= 0.873
Marital status					
Married	21	60.0	27	77.1	X^2= 4.224
Widowed	11	31.4	8	22.9	P= 0.238
Divorced	2	5.7	0	0.0	
Single	1	2.9	0	0.0	
Associated chronic diseases					
Yes	32	91.4	26	74.3	X^2= 3.621 P= 0.057
No	3	8.6	9	25.7	
Chronic diseases #	N= 32		N= 26		
Cardiac diseases	18	56.3	4	15.4	X2= 1.000 P= 0.645
Musculoskeletal disease	15	46.9	4	15.4	X2= 0.565 P= 0.452
Diabetes mellitus	4	12.5	11	42.3	X2= 2.143 P= 0.143
Hypertension	3	9.4	18	69.2	X2= 0.057 P= 0.811
Immune-suppressive diseases	3	9.4	1	3.8	X2= 1.014 P= 0.314
Kidney diseases	1	3.1	3	11.5	X2= 1.938 P= 0.164
Endocrine diseases	1	3.1	1	3.8	X2= 1.014 P= 0.314
GIT diseases	1	3.1	0	0.0	X2= 1.014 P= 0.314
Respiratory diseases	0	0.0	1	3.8	X2= 1.000 P= 0.645

X^2= Chi Square test   t= student t test   NA= Not applicable   * Significant p at ≤0.05.

Table (2): Percent distribution of the studied geriatric patients according to total levels of knowledge before and after the nursing interventions implementation

Levels of knowledge about DED	Study group (N=35)				Control group (N=35)				Test of Significance
	Before the intervention		After the intervention		Before the intervention		After the intervention		
	No.	%	No.	%	No.	%	No.	%	
– Poor	34	97.1	0	0.0	32	91.4	34	97.1	X^{2a}= 2.061 P= 0.357
– Fair	1	2.9	2	5.7	1	2.9	1	2.9	X^{2b}= 67.33 P= 0.000*
– Good	0	0.0	33	94.3	2	5.7	0	0.0	X^{2c}= 2.061 P= 0.357
									X^{2d}= 67.33 P= 0.000*
Mean ±SD	5.63±3.663		21.57±1.290		6.97±5.153		7.34±2.363		

X^2= Chi square test X^{2a} Comparison between the study and control group before intervention

X^{2b} Comparison between the study and control group after intervention

X^{2c} Comparison in the control group before and after intervention

X^{2d} Comparison in the study group before and after intervention

Table (3): Percent distribution of the studied geriatric patients according to their total levels of visual activities before and after the nursing interventions implementation.

Levels of visual activities	Study group (N=35)				Control group (N=35)				Test of significance
	Before the intervention		After the intervention		Before the intervention		After the intervention		
	No.	%	No	%.	No	%	No	%	
-Mildly affected									X^{2a}= 0.468 P= 0.791
-Moderately affected	21	60.0	35	100.0	23	65.7	11	31.4	X^{2b}= 36.52 P= 0.000*
	12	34.3	0	0.0	11	31.4	24	68.6	X^{2c}= 10.06 P= 0.006*
-Severely affected	2	5.7	0	0.0	1	2.9	0	0.0	X^{2d}= 17.50 P= 0.000*
Mean ±SD	77.63±20.30		86.74±7.326		77.86±19.33		49.74±3.433		

X^2= Chi square test   * Significant at p ≤0.05

X^{2a} comparison between the study and control group before intervention

X^{2b} comparison between the study and control group after intervention

X^{2c} comparison in the control group before and after intervention

X^{2d} comparison in the study group before and after intervention

Table (4): Distribution of the studied geriatric patients according to the effect size regarding knowledge about dry eye disease and visual activities levels.

Group	Items	Stage		Mean Change	Effect size Cohen's D
		before the intervention	after the intervention		
		Mean ±SD	Mean ±SD		
Study	**Knowledge**	5.63±3.663	21.57±1.290	15.94	0.945
	Visual activity	77.86±19.33	49.74±3.433	-28.12	0.711
Control	**Knowledge**	6.97±5.153	7.34±2.363	0.37	-0.045
	Visual activity	77.63±20.30	86.74±7.326	9.11	-0.286

Effect size: 0.0-0.2, Small effect, 0.3 -0.7, Medium effect, 0.8-1.2 Large effect, ≥ 1.3 Very large effect

Table (5): Relation between the study patients' knowledge levels, socio- demographic data after the nursing interventions implementation.

Socio demographic , clinical data and dry eye disease related data	Unstandardized Coefficients		Standardized Coefficients	T	P
	B	Std. Error	Beta		
(Constant)	17.751	5.931		2.993	0.007
Age (< 70 years/ ≥70 years)	-0.163	0.068	-0.153	-2.413	0.016*
Sex (male/ female)	0.391	1.426	0.129	0.274	0.787
Marital status (married/ not married)	0.019	0.499	0.011	0.038	0.970
Place of residence (urban/rural)	-0.066	0.715	-0.024	-0.093	0.927
Level of education (educated/ not educated)	0.011	0.005	0.154	2.396	0.017*
Current work (yes/ no)	-0.002	0.893	-0.001	-0.002	0.998
Sufficiency of income (yes/ no)	1.233	0.850	0.309	1.451	0.162
Smoking status (yes/ no)	1.020	0.607	0.401	1.681	0.108
Living with (husband or wife/ others)	-0.038	0.220	-0.047	-0.175	0.863
Presence of chronic diseases (yes/ no)	-0.501	1.144	-0.110	-0.438	0.666
Duration of dry eye (< 5 years/ ≥ 5 years)	0.499	0.525	0.216	0.950	0.354
Regular follow up (yes/ no)	0.132	0.046	0.117	2.908	0.004*
Previous eye surgery (yes/ no)	-0.104	0.625	-0.036	-0.167	0.869
R^2 = 0.358	F= 22.332		P= 0.000*		

t= student t test   * Statistically significant at p ≤ 0.05   F= Anova test

Table (6): Relation between the study patients' levels of visual activities, socio-demographic data after the nursing interventions implementation

Socio demographic , clinical data and dry eye disease related data	Unstandardized Coefficients		Standardized Coefficients	T	P
	B	Std. Error	Beta		
(Constant)	58.849	14.950		3.936	0.001
Age (< 70 years/ ≥70 years)	0.204	0.040	0.217	5.047	0.000*
Sex (male/ female)	-1.256	3.595	-0.156	-0.350	0.730
Marital status (married/ not married)	1.964	1.258	0.425	1.562	0.134
Place of residence (urban/rural)	0.639	1.801	0.088	0.355	0.727
Level of education (educated/ not educated)	0.156	0.033	0.174	4.760	0.000*
Current work (yes/ no)	-2.143	2.251	-0.422	-0.952	0.352
Sufficiency of income (yes/ no)	-1.554	2.143	-0.146	-0.725	0.477
Smoking status (yes/ no)	-0.556	1.530	-0.082	-0.363	0.720
Living with (husband or wife/ others)	0.372	0.034	0.443	10.949	0.000*
Presence of chronic diseases (yes/ no)	0.190	0.064	0.193	2.954	0.003*
Duration of dry eye (< 5 years/ ≥ 5 years)	0.092	0.038	0.093	2.450	0.015*
Regular follow up (yes/ no)	0.083	0.028	0.122	2.961	0.003*
Previous eye surgery (yes/ no)	.755	1.576	0.098	0.479	0.637
$R^2 = 0.424$	F= 16.054		P= 0.004*		

t= student t test   ***** Statistically significant at $p \leq 0.05$ F= ANOVA test

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