Implementation And Appropriateness of a Self-Instructional Material on Glaucoma Secondary Prevention Among Patients Attending Eye Clinic at Federal Medical Center Abeokuta, Ogun State, Nigeria

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Abstract

Damaging and insidious nature of glaucoma makes it easily complicated without being noticed. Current patient education methods used in most hospitals rely heavily on direct interaction with healthcare providers, which may not be sustainable due to high patient loads and limited healthcare personnel. Therefore, there was an urgent need for self-instructional materials tailored to the specific educational needs of glaucoma patients to enhance their self-management capabilities. This study assessed the appropriateness and implemented the use of self-instructional materials (cue cards) on secondary prevention of glaucoma among patients attending eye clinic at Federal Medical Center (FMC), Abeokuta, Ogun State, Nigeria. This study adopted quasi-experimental research design. Leslie Kish formula was used in calculating 40 patients who participated in the study. The participants were assigned equally into Experimental (EG) and Control Group (CG). Data collected were analysed using descriptive and inferential statistics at 0.05 level of significance. Results revealed no significant difference between the experimental and control groups' pre-intervention knowledge mean scores of glaucoma ($t_{(38)} = 1.19$; $p > 0.05$), pre-intervention self-management knowledge mean scores of secondary prevention of glaucoma ($t_{(38)} = 0.89$; $p > 0.05$), and, pre-intervention attitudinal dispositions mean scores ($t_{(38)} = 1.13$; $p > 0.05$). However, there were significant difference between the experimental and control groups' post-intervention knowledge mean scores of glaucoma ($t_{(34)} = 13.66$; $p < 0.05$),

secondary prevention of glaucoma ($t_{(34)}$ = 7.88; $p < 0.05$), and attitudinal dispositions of secondary prevention of glaucoma ($t_{(34)}$= 8.891; $p < 0.05$). In conclusion, the use of self-instructional materials (cue cards) on secondary prevention of glaucoma among patients attending eye clinic at Federal Medical Center Abeokuta, Ogun State was found effective. It is recommended that health professionals should be trained on how to use the recently designed cue cards to increase patients' knowledge of risks, causes and secondary prevention of glaucoma.

Keywords: Cue cards, Glaucoma, Glaucoma secondary prevention, Self-instructional material

Introduction

In Nigeria, visual disability ranks among the top five disabilities, while visually impaired people are at higher risk than the healthy population for accidents, social withdrawal, and depression.[1] With population aging, the number of people with visual impairment and blindness is rapidly growing, as many eye diseases are more prevalent among the people. Given the high prevalence of glaucoma and the limited healthcare resources in Nigeria, innovative approaches such as self-instructional materials can provide patients with continuous access to essential information. This initiative aims to bridge the educational gap and empower patients to take an active role in managing their condition, ultimately reducing the burden on healthcare providers and improving patient outcomes. Additionally, this research aligns with global public health goals of reducing blindness caused by glaucoma through effective secondary prevention strategies.

Approximately, 15% of global blindness is due to glaucoma and around 600,000 people go blind annually.[2] In 2010, 60.5 million people were victims of glaucoma globally.[3] This is expected to rise to 76 million in 2020 and 111 million in 2040.[4] It was also reported that 57.5 million people were affected in 2015 by POAG alone[5]. Blindness due to glaucoma is highest in Africa[2] accounting for 15%[6] of the global blindness (4.20%).[7]

The situation is worse in Sub Saharan Africa,[6] where poor awareness and knowledge further compounded the condition. Glaucoma blindness imposes significant economic burden not only for individuals affected,[8] but also it increases healthcare cost,[9] increases rehabilitation cost for the blind which all affects the economic growth of a nation.[10]

Patients with glaucoma require a better understanding of their eye health as their treatment depends on their ability to practice self-care. According to

Benjamin et al.[11] non-adherence to glaucoma medication is known to reach as high as 80% in low-income countries where educational attainment is deemed to be low. Enlightening glaucoma patients about their condition may help them feel better. Research indicates that patients' comprehension of the disease and attention to important health information tends to improve when they receive structured written information, chats, and flips. Accordingly, patients' understanding, adherence to treatment, patient satisfaction, and self-care are all improved by access to health education materials.[11]

The use of health talk has been a major method used by nurses and other health workers for transmission of information to promote behavior change.[12] However, the success of such health talk is linked with participants of high level of education and high economic status. Intervention with the less educated, illiterate, and impoverished must go beyond simple health education and instead involve empowering families via knowledge, social skills, and personal abilities through the use of appropriate health education materials to ensure knowledge retention, behavioral change, and its maintenance.[13] Till date in Nigeria, glaucoma constitutes a medical, public health and socioeconomic problem. This is because Nigeria is found to be one of the most endemic countries in the world, accounting for a sizeable proportion of the global cases.[14]

Despite the availability of medical treatments, many patients attending the Federal Medical Centre, Abeokuta, Ogun State, struggle with the secondary prevention of glaucoma. This situation is exacerbated by a lack of comprehensive educational resources that empower patients to manage their condition effectively. About two-third of the patients diagnosed with glaucoma at the FMC eye clinic since the beginning of 2015 suffered from advanced glaucoma. The long-term consequence is that many of these patients will go blind unless effective preventive measures are taken.

Current patient education methods rely heavily on direct interaction with healthcare providers, which may not be sustainable due to high patient loads and limited healthcare personnel. Therefore, there is an urgent need for self-instructional materials tailored to the specific educational needs of glaucoma patients to enhance their self-management capabilities. Furthermore, some of the current studies[15],[16] are on prevalence some using descriptive design, however, no research has been conducted in Ogun State, and specifically at the Federal Medical Center Abeokuta, that has produced any validated self-instructional materials for the prevention of secondary glaucoma. Therefore, the damaging and insidious nature of glaucoma make it spread gradually without being noticed but causes serious harm. Given the high prevalence of

glaucoma and the limited healthcare resources in Nigeria, innovative approaches such as self-instructional materials (cue cards) can provide patients with continuous access to essential information. This initiative aims to bridge the educational gap and empower patients to take an active role in managing their condition, ultimately reducing the burden on healthcare providers and improving patient outcomes. Additionally, this research aligns with global public health goals of reducing blindness caused by glaucoma through effective secondary prevention strategies.

This study tends to fill such gap by validating the effectiveness of a self-instructional materials (cue cards) materials on secondary prevention of glaucoma among patients attending eye clinic at Federal Medical Center Abeokuta, Ogun State, Nigeria.

Research Questions

1. What is the level of appropriateness of the newly developed self-instructional material among glaucoma patients on glaucoma prevention?
2. What is the efficacy of developed cue cards in the secondary prevention of glaucoma among glaucoma patients?

Hypotheses

1. There is no significant difference between pre and post knowledge mean scores of glaucoma among patients attending eye clinic at Federal Medical Center Abeokuta, Ogun State, Nigeria
2. There is no significant difference between the pre and post self-management knowledge mean scores of secondary prevention of glaucoma among patients attending eye clinic at Federal Medical Center Abeokuta, Ogun State, Nigeria
3. There is no significant difference in the pre and post-intervention mean score of participants' attitudinal dispositions on secondary prevention of glaucoma

Materials and Methods

Research Design: This study adopted a two group pretest-posttest quasi-experimental design.

Research setting: This study will be conducted in the Federal Medical Centre Abeokuta, Ogun State. The hospital is a 250-bedded regional specialist hospital. The department of ophthalmology was created in 1999 and provided eye care services to over 100 clients on each clinic day and perform an average

of 7 surgeries per theatre sessions. The clinic runs four times in a week with surgery day slated for Wednesday of every week.

Population: The target population for this study were 7411 patients that have commenced diagnosis and treatment at the eye clinic of the Federal Medical Centre Abeokuta, Ogun State.

Sample and Sampling Technique

The sample size of 40 patients was reached using the Leslie Kish formula. Kish's effective sample size gives the approximate size of an equal probability sample which would be equivalent in precision to the unequal probability sample used.

Instrumentation: Data was collected using a self-developed questionnaire tailored alongside the self-instructional material on glaucoma secondary prevention. The instrument is divided into four parts/phases:

Section A: assessed the socio-demographic information pertaining to the respondents' age, gender, level of education, employment, marital status, religion, ethnic group, and monthly income.

Section B: Knowledge About Glaucoma Questionnaire: This section of the questionnaire was adopted from the studies of Obasuyi et al.,[17] Fasoranti et al.[18],and Bankole et al.[10] It is a twenty (20) item general knowledge questions about the concept of glaucoma, the causes, signs and symptoms, the effect of glaucoma on one's health, and the prevention of glaucoma will be utilized. Each correct response received one point, while an incorrect response received zero point. The total score for all twenty (20) knowledge questions ranged from 0 to 20 points. Participants' overall knowledge will be categorized using modified Bloom's cut-off point and will be categorized as adequate when their score is between 80% and 100% (16-20 points), moderate when their score was between 50% and 79% (10-15 points), and inadequate when their score was less than 50% (<10 points).[19]

Section C: Self-Care Management Knowledge: It is a ten-item self-developed questionnaire that assessed respondents' knowledge of self-care management of glaucoma. The first eight items were measured on a 4 likert scale ranging from A= Always (4); O = Often (3); R =Rarely (2) and N = Never (1); while the last two items were assessed on "Yes" or "No" response. This scale has a total score of 36. The higher the score, the better the knowledge of self-care management of glaucoma.

Section D: Attitude towards glaucoma management: This section of the questionnaire assessed the respondents attitudinal disposition towards glaucoma management. It is a 5-item questionnaire, where 1 is "not confident at all" and 5 is "very confident". The total score for this scale is 25. The higher

the score, the better the attitude of the respondents towards the management of glaucoma.

Pre and Post intervention: The researcher made an arrangement with the Medical Director about the period for data collection, which were every Tuesday and Thursdays which are the statutory clinic days for patients with glaucoma and severe eye cases. The training as well as the collection of the data was done on these days for 4 weeks. The consent of the participants were obtained and the structured test paper was used to collect data in person from the participants after 4 weeks of training. The intervention lasted for 50 minutes each day. The data was collected in three phases namely:

Phase One (Pre intervention): The researcher requested the consent of the participants, explained the purpose and benefits of the study and also solicited for the cooperation of the participants throughout the study. The researcher got herself familiarized and acquainted with the participants and a cordial relationship was established. The objectives of the training were explained to them. The researcher explained the topic to be discussed during the training within four weeks and agreed with the participant that each session will last for fifty minutes. The pretest took place using structured test paper after the orientation. This was done to assess the general knowledge level of the patients on the knowledge and prevention of glaucoma among the patients.

Phase Two (Intervention sessions): The objective of this session was to expose the participants to the training package on the prevention of glaucoma. This section was divided into four sessions along with activities to be done in each section, which lasted for forty minutes. The intervention took four weeks, divided into four sections as listed below:

1st week: The researcher met the participants' as scheduled. The researcher introduced herself to the participants once again. Issues like: What is glaucoma (including eye pressure; Difficulties of giving a diagnosis; Different types of diagnosis; How might glaucoma effect my eye sight? What to expect at an eye clinic appointment? The method of teaching includes lecture, demonstration and use of visual aids. They were encouraged to ask questions to clear their doubts.

2nd week: Participants were exposed to contents of module two which consists of the importance of eye drops tablets, the side effects of eye drops and tablets, feeling confident to instill eye drops,. The session lasted for 60 minutes.

3rd week: Participants were exposed to the contents of module three which consists of: Practical on instilling eye drops and drop aids, how eye drops work to control glaucoma; side effects of drops; how to store eye drops; and also

discourse on behaviour of using drops/beliefs about drops/medicines in general. This was done alongside the use of cue cards. The session will last for 60 minutes.

4th week: Participants were exposed to the contents of module four which consists of prevention regarding adherence to eye drops alongside the use of the cue card. Revisions of modules one to three were done. The session lasted for 60 minutes. They were told to come back after two weeks for posttest which was the same as pretest

Phase Three (Evaluation of intervention session): this session was done after two weeks of intervention session to determine their knowledge towards prevention of glaucoma, as well as practice of effective eye drop instillation**.** All the participants were given the posttest questionnaire to complete and they were collected immediately. The researchers appreciated and wish the participants well in their life endeavour.

Method of Data Analysis: The completed questionnaire was collected, coded and analysed. The statistical Package for Social Science (SPSS) version 27 was used for the analysis. Descriptive and inferential statistics of frequency counts, McNemar and t-test were used to analyze the hypotheses at 0.05 significant level.

Ethical Consideration: Ethical approval for this study was obtained from Babcock University Health Research Ethics Committee (BUHREC) with a reference number NHREC/24/01/2020/BUHREC/803/24.

Results

Table 1: Descriptive report of the level of appropriateness of the newly developed health education material

		SA	A	D	SD
1	The self-teaching material was easy to understand	15 (88.2)	2 (11.8)	-	-
2	The visuals in the cue card helped me understand glaucoma better.	17 (100.0)	-	-	-
3	The information provided was relevant to my situation.	17 (100.0)	-	-	-
4	I feel more confident in managing my glaucoma after using the cue card.	14 (82.4)	3 (17.6)	-	-
5	Overall, I am satisfied with the self-teaching material.	17 (100.0)	-	-	-

Table 1 shows the level of appropriateness of the newly developed health education material among glaucoma patients on glaucoma prevention. It was revealed that all the participants in the experimental group agreed that the self-teaching material was easy to understand, helped them understand glaucoma better, provided them with relevant information to their situations, felt more confident in managing glaucoma after using the cue card, and were satisfied with the self-teaching material. Therefore, it could be said that the level of appropriateness of the newly developed cue cards for secondary prevention of glaucoma is very good.

Table 2: A 2 x 2 Classification Table for McNemar Analysis for the effect of cue cards on secondary prevention of glaucoma

Intervention * Control Cross tabulation						Risk Estimate		
		Without cue cards		Total	McNemar Test value	Odds Ratio for post-test	The odds Ratio for the Pretest	Decision
		Correct response	Incorrect response					
With Cue cards	Correct response	994	468	1462				
	Incorrect response	654	980	1634	.000**	9.321	1.888	Significant
Total		1648	1448	3096				

The result presented in Table 2 revealed a significant difference in the efficacy of two educational methods (with and without cue cards) among glaucoma patients. It was found that there was a difference in the level of knowledge retention on the secondary prevention of glaucoma between the group educated with cue cards and those without cue cards at Federal Medical Center Abeokuta, Ogun State, Nigeria. The McNemar p-value of 0.000 is significant at less than 0.05 significant level.

Table 3: T-test showing the knowledge mean score of participants on glaucoma in the intervention and control group

		N	Mean	Std. Dev.	Std. Error Mean	Df	T	Mean diff	Sig
Pre-test	Intervention	20	41.956	3.650	1.799	38	1.188	1.052	.438
	Control	20	43.008	3.019	1.876				
Post-test	Intervention	17	81.789	1.781	1.095	34	13.656	38.266	.000
	Control	19	43.523	3.032	1.808				

The result presented in Table 3 revealed that at pre-intervention stage, no statistical significant difference was found in the participants' knowledge mean scores of glaucoma between the intervention group [group treated with the cue cards] (N = 20, Mean = 41.956, Std. dev. = 3.650) and the control group [group treated without the cue cards] (N = 20, Mean = 43.008, Std. dev. = 3.019). This led to the retention of the initial hypothesis of no significant difference between the experimental and control groups' pre-intervention knowledge mean scores of glaucoma among patients attending eye clinic at Federal Medical Center Abeokuta, Ogun State, Nigeria (t = 1.188; mean diff. = 1.052; p = .438 >.05). From the post-intervention knowledge mean scores, it can be concluded that the experimental group (N = 17, Mean = 81.789, Std. dev. = 1.781) and the control group (N = 19, Mean = 43.523, Std. dev. = 3.032) differed significantly. This makes the previously established hypothesis of no significant difference between the experimental and control groups' post-intervention knowledge mean scores of glaucoma unsustainable (t = 13.656; mean diff. = 38.266; p = .000 <.05).

Table 4: T-test showing the self-management knowledge mean score of participants on secondary prevention of glaucoma in the intervention and control group

		N	Mean	Std. Dev.	Std. Error Mean	Df	T	Mean diff	Sig

Pre-test	Intervention	20	17.100	1.557	.362	38	0.890	0.329	.842
	Control	20	17.429	1.380	.114				
Post-test	Intervention	17	32.287	1.688	.384	34	7.876	14.910	.000
	Control	19	17.377	1.801	.150				

The result presented in Table 4 revealed that at pre-intervention stage, no statistical significant difference was found in the participants' self-management knowledge mean scores of secondary prevention of glaucoma between the intervention group (N = 20, Mean = 17.100, Std. dev. = 1.557) and the control group (N = 20, Mean = 17.429, Std. dev. = 1.380). This led to the retention of the initial hypothesis of no significant difference between the experimental and control groups' pre-intervention self-management knowledge mean scores of secondary prevention of glaucoma among patients attending eye clinic at Federal Medical Center Abeokuta, Ogun State, Nigeria (t = 0.890; mean diff. = 0.329; p = .842 >.05).

From the post-intervention self-management knowledge mean scores, it can be concluded that the experimental group (N = 17, Mean = 32.287, Std. dev. = 1.688) and the control group (N = 19, Mean = 17.377, Std. dev. = 1.377) differed significantly. This makes the previously established hypothesis of no significant difference between the experimental and control groups' post-intervention knowledge mean scores of secondary prevention of glaucoma unsustainable (t = 7.876; mean diff. = 14.910; p = .000 <.05).

Table 5: T-test showing attitudinal dispositions mean score of participants on secondary prevention of glaucoma in the intervention and control group

		N	Mean	Std. Dev.	Std. Error Mean	Df	T	Mean diff	Sig
Pre-test	Intervention	20	10.337	3.472	.501	38	1.129	0.557	.289
	Control	20	9.780	8.123	.675				
Post-test	Intervention	17	23.501	3.441	.487	34	8.891	13.445	.003
	Control	19	10.056	7.883	.643				

The result presented in Table 5 revealed that at pre-intervention stage, no statistical significant difference was found in the participants' attitudinal dispositions mean scores of secondary prevention of glaucoma between the intervention group (N = 20, Mean = 10.337, Std. dev. = 3.472) and the control group (N = 20, Mean = 9.780, Std. dev. = 8.123). This led to the retention of the initial hypothesis of no significant difference between the experimental and control groups' pre-intervention attitudinal dispositions mean scores of secondary prevention of glaucoma among patients attending eye clinic at Federal Medical Center Abeokuta, Ogun State, Nigeria (t = 1.129; mean diff. = 0.557; p = .289 >.05).

From the post-intervention attitudinal dispositions mean scores, it can be concluded that the experimental group (N = 17, Mean = 23.501, Std. dev. = 3.441) and the control group (N = 19, Mean = 10.056, Std. dev. = 7.883) differed significantly. This makes the previously established hypothesis of no significant difference between the experimental and control groups' post-intervention attitudinal dispositions mean scores of secondary prevention of glaucoma unsustainable (t = 8.891; mean diff. = 13.445; p = .003 <.05).

Discussion

The outcome of this study on the general knowledge of participants in the treatment groups (control and experimental) reveal poor knowledge. The poor knowledge of glaucoma observed among the participants of this study is in line with the previous study of Bankole et al who stated that a barrier to self-management was the difficulty with the proper administration of drops by patients due to lack of requisite knowledge about the diseases.[10] Also, Aina et al who examined knowledge of glaucoma management among glaucoma patients on medical therapy in a tertiary hospital found out that only 18(10%) of the patients had a good knowledge of the purpose of glaucoma treatment, and less than half (48.3%) of the participants could recall the names of their anti-glaucoma medications.[20]

Comparatively, this study is in line with the report of Bankole et al[10] and Sotirios et al[21] in glaucoma patients in Greece on medication adherence and effective eye drop instillation, the results showed that individuals with lower levels of knowledge were less likely to adhere to medication instructions and skilful on eye drop instillation compared to those that were highly informed and trained by medical practitioners themselves.

The outcome of this study showed that the participants' pre intervention knowledge weighted percentage score level was low, which means they did not have adequate knowledge on what glaucoma is all about (history, signs and symptoms) but after, the experimental group was exposed to the use of self-

instruction materials and there was an improvement in their mean score. This implies that the self-instruction material has been able to enhance their knowledge about glaucoma and self-management which will enhance treatment seeking behaviour. The outcome of the poor knowledge of glaucoma at pre intervention among the participants of this study is in line with the previous study of Olawoye et al who reported that 56 (46.7%) of the glaucoma patients in their study were aware of glaucoma, but only 39 (32.5%) patients could answer at least one knowledge question correctly.[16]

In a related study by Ashaye et al, they reported that knowledge of all the eye diseases assessed was poor.[22] The outcome of the post intervention revealed the participants' knowledge of glaucoma self-management to be good. This indicates the effectiveness of the nurse-led training on glaucoma self-management. This is consistent with the previous study conducted that improving education has been seen as a key aspect in changing adherence and self-management behavior.[23],[24] Also, Zhou et al an overall improvement in self-management with better knowledge of glaucoma and fulfilled information needs.[25]

The outcome of the study equally revealed a significant difference between the pre and post self-management knowledge mean scores of secondary prevention of glaucoma. Therefore, the difference observed in the post intervention mean score on knowledge of self-management knowledge mean scores of secondary prevention of glaucoma in the control and experimental groups could not have happened by chance but due to the educational intervention the participants in experimental group were exposed to. This result is consistent with the findings of Chong et al in their study on the evaluation of educational intervention on knowledge and awareness regarding glaucoma among working adults in northeast of Malaysia identified a significant improvement in medication adherence among glaucoma patients, with reductions in the frequency of forgetting to administer eye drops from daily forgetfulness to specific situations like travel.[23]

Wahyuni, Wibowo and Setiadi who evaluated educational interventions to improve patient knowledge, and adherence to glaucoma treatment that results in a reduction in intraocular pressure based on current clinical evidence.[26] The educational intervention was successful in increasing adherence to treatment. Additionally, Taushanova et al evaluated the impact of educational interventions on medication adherence among glaucoma patients in Kazakhstan reported that a significant increase in the proportion of good glaucoma knowledge in the intervention group one month after the educational intervention and the effect persisted after three months.[27]

On the hypothesis that stated no significant difference in the pre and post-intervention mean score of participants' attitudinal dispositions on secondary prevention of glaucoma, a significant positive attitudinal disposition was reported at post-intervention for the participants in the treatment group. This study lend credence to the findings of Ashwini et al who find a positive attitude towards usage of eye drops.[28]

Conclusion and Recommendations

In conclusion, the present study showed that the self-instructional material on glaucoma secondary prevention was effective in improving knowledge, attitude, and self-management of glaucoma among the participants in the intervention group. The results of the program revealed that the posttest and follow-up scores of the experimental group differed from the control group in the desired direction. It is clear that the intervention program has a lasting impact because the condition was comparable in the follow-up measurements conducted two months after the program ended.

It is recommended that health professionals should be trained on how to use flipcharts to increase patients' knowledge of risks, causes and secondary prevention of glaucoma. They should also be encouraged to use their counselling skills when interacting with patients.

Ethics approval: Babcock University Health Research Ethics Committee (BUHREC) with a reference number NHREC/24/01/2020/BUHREC/803/24.

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