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Assessment of knowledge and counselling on ophthalmic preparations among community pharmacists in Ibadan, Nigeria – an intervention study

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ABSTRACT

Background: The ratio of patients to ophthalmologists is rather high, affording inadequate time for patient interaction, especially on the use of ophthalmic preparations. An assessment of community pharmacists' knowledge and counselling on ophthalmic preparations is vital to maintaining quality of care received by patients.

Methods: A cross-sectional study was carried out among consented community pharmacists practicing in Ibadan metropolis in southwest Nigeria, who were randomized into control and intervention arms. Baseline assessment of their knowledge and counselling on ophthalmic preparations was done. An educational intervention was then carried out among the intervention pharmacists. Postintervention assessment was carried out to evaluate the effect of the intervention. Data was summarized with descriptive and inferential statistics.

Results: A total of 115 (control arm-62; intervention arm-53) community pharmacists participated in the study. Percentage of community pharmacists who understood punctal occlusion (control vs intervention) increased from 21.0% vs 22.6% at baseline to 45.4% vs 83.0% postintervention. Preintervention (control vs intervention), 83.9% vs 81.1% knew that eye drop bottle tip should not touch the eyes during application. This improved postintervention to 82.3% vs 100%. A significant difference in participants' knowledge and counselling on ophthalmic preparations was observed postintervention. Participants' knowledge comparison (control vs intervention) was 7.79 ± 1.79 vs 7.60 ± 1.65 ($p = 0.565$) and 8.89 ± 1.73 vs 10.83 ± 1.63 ($p < 0.001$) at baseline and postintervention, respectively. The counselling comparison (control vs intervention) was 2.82 ± 1.93 vs 2.57 ± 1.91 ($p = 0.476$) at baseline, and 2.97 ± 2.48 vs 5.98 ± 1.69 ($p < 0.001$) postintervention.

Conclusion: The educational intervention, which addressed the knowledge and counselling gaps discovered at baseline, improved the community pharmacists' knowledge and counselling on ophthalmic preparations.

1.0 Introduction

Successful eyes drop administration by patients require adherence to the administration technique. Any mistake in the administration steps could lead to treatment failure.[1-2] Patient education is important to prevent eyes drop administration errors by patients.[3-4] However, patient education on appropriate administration technique for ophthalmic preparations is a health need that is yet to be adequately met.[5]

The high patient-to-ophthalmologist ratio would suggest that ophthalmologists spend insufficient time with patients, and this may lead to inadequate patient counselling on appropriate administration technique for ophthalmic preparations.[6] Many patients refill their eyes drop prescriptions in community pharmacies. Community pharmacists must therefore have adequate knowledge about ophthalmic preparations to optimize therapeutic outcomes.[7]

Inappropriate administration technique is a major cause of therapeutic failure in patients on long-term use of ophthalmic preparations.[8] Lampert and colleagues (2019)

stressed the importance of reiterating the administration technique during refills to reinforce patient adherence.[9] However, Nigerian-trained pharmacists have insufficient experiential clinical rotation in ophthalmic dispensing, and this may pose a challenge to the quality of care received by patients.[6] There is paucity of literature on the assessment of community pharmacists' knowledge and counselling on ophthalmic preparations in Nigeria. The aim of this study was to carry out an intervention study on community pharmacists' knowledge and counselling on ophthalmic preparations.

2.0 Methods

2.1 Study design, setting and participants

A cross-sectional study involving pre-postintervention evaluation of participants' knowledge and counselling on ophthalmic preparations was carried out among community pharmacists in Ibadan, Nigeria. Ibadan (7.3775° N, 3.9470° E) is the largest city in Nigeria where the University of Ibadan, which is the premier university, and the University College Hospital are situated. Using Raosoft online sample size determination with a margin of error of 5% and a confidence level of 95%, with an estimated population size of 200 community pharmacist in Ibadan metropolis. An extra 10% of the calculated sample size was added to make allowances for attrition, making a total 145 participants. Pharmacists working at the community pharmacists who gave their informed consent were recruited for the study. Students on experiential training rotations were excluded from the study.

2.2 Educational Intervention

An online educational intervention was carried out for the community pharmacists in the intervention arm after the baseline data collection. The online interaction included basic knowledge and counseling points on ophthalmic preparations. Postintervention assessment was carried out one month later. The study period was between June and November 2021.

2.3 Data collection tools and administration

The instrument for data collection was a validated questionnaire developed for a previous study.[10] There were three sections in the questionnaire. Section A addressed socio-demographic characteristics of participants while Sections B and C addressed participants' knowledge and counselling on ophthalmic preparations, respectively.

Consecutive sampling was done for every consented community pharmacist in Ibadan. The community pharmacists were randomized into control and intervention arms. The questionnaire was administered in their respective pharmacies and collected immediately because of the nature of the assessment.

2.4 Data analysis

The data was analysed using SPSS Version 20.0 for Windows (SPSS Inc. Chicago, IL). Descriptive statistics was summarised using frequency, percentage, mean, standard deviation. Independent-samples t-test and one-way analysis of variance were carried out to compare the knowledge and patient counseling scores of the community pharmacists in the control and intervention arms, and years of work experience. Level of significance was set at $p < .05$.

The community pharmacists' responses to questions on ophthalmic preparations were assigned a score of "1" and "0" for each correct and incorrect response, respectively. The maximum obtainable score was 13 points for the knowledge and 10 points for the counseling. Each participant's assessment score was converted to percentage by dividing it with the maximum obtainable score and multiplying by 100. The percentage scores were categorized as poor (0 – 49.9%), fair (50 – 69.9%), good (70 – 89.9%), and excellent (90 – 100%).

2.5 Ethical Approval

Approval for this study was obtained from the Oyo State Ministry of Health ethical approval Committee with the reference number AD 13/479/4204B

3.0 Results

A total of 115 (control arm-62; intervention arm-53) community pharmacists completed the study. There were 29 (46.8%) and 20 (37.7%) females in the control and intervention arms, respectively. Table I shows further details on socio-demographic characteristics of the study participants.

The percentage of community pharmacists who understood punctal occlusion (control vs intervention) increased from 21.0% vs 22.6% at baseline to 45.4% vs 83.0% postintervention. Also, at baseline, only 51.6% in the control arm and 41.5% in the intervention arm knew how long eye drops can be safe for use after first use; this increased to 83.0% among participants in the intervention arm. The percentage of participants that knew the tip of the eye drop bottle should not touch the eye increased from 81.1% at baseline to 100% postintervention in the

intervention arm. Majority of the community pharmacists, (62.9%) in the control arm and 62.3% in the intervention arm had "fair knowledge" of ophthalmic preparations preintervention. Postintervention, majority of the pharmacist in the control arm 46.8% still had fair knowledge category while 49.1% and 34.0% of pharmacists in the intervention arm had "good knowledge" and excellent knowledge, respectively. Details on the knowledge assessment of the community pharmacists on ophthalmic preparation is presented in Table 2.

An improvement was observed in ophthalmic preparation administration step counselling among community pharmacists in the intervention arm as shown in Fig I. Comparison of participants' knowledge and counseling scores between the study arms showed significant difference postintervention, unlike at preintervention Table 3.

Table 3.1: Socio-Demographic Characteristics of Study Participants

Variables	Frequency (%)	
	Control	**Intervention**
Gender		
Female	29 (46.8)	20 (37.7)
Male	33 (53.2)	33 (63.3)
Educational qualification		
Bachelor of Pharmacy only	54 (87.1)	49 (92.5)
Additional qualification	8 (12.9)	4 (7.6)
Years of community pharmacy work experience		
1 – 5	46 (74.2)	36 (67.9)
6 – 10	7 (11.3)	10 (18.9)
>10	9 (14.5)	7 (13.2)

Table 3.2: Knowledge Assessment of Pharmacists on Ophthalmic Preparations

Questions	Frequency (%) of correct responses			
	Pre-intervention		Post-intervention	
	Control	Intervention	Control	Intervention
Do ophthalmic preparations have systemic side effects?	44 (71.0)	34 (64.2)	44 (71.0)	38 (71.7)
The ocular contact time of eye drops and eye ointments are the same	51 (82.3)	45 (84.9)	55 (88.7)	46 (86.8)
Can eye drops be applied on a soft contact lens?	45 (72.6)	46 (86.8)	43 (69.4)	46 (86.8)
Is it compulsory for patients to always wash their hands before and after applying eye drops?	55 (88.7)	43 (81.1)	55 (88.7)	48 (90.6)
Is it important to shake some eye drop bottles before use?	41 (66.1)	32 (60.4)	43 (69.3)	49 (92.5)
Eye drops should be applied in the pocket created in the lower eye lid	49 (79.0)	42 (79.2)	54 (87.1)	50 (94.4)
The tip of the eye drop bottle should touch the eyes gently for accurate drop application	52 (83.9)	43 (81.1)	51 (82.3)	53 (100)
Eye drop bottles should be kept on a table in the bedroom to remind for prompt application	22 (35.5)	20 (37.7)	32 (51.6)	37 (69.8)
How long should a patient wait if he must apply more than one drop of the same eye drop?	5 (8.1)	2 (3.8)	18 (29)	29 (54.7)
How long should a patient wait if he must apply one drop each from two separate eye drops?	17 (27.4)	16 (30.2)	34 (54.8)	35 (66.0)
Briefly explain the punctal occlusion method	13 (21.0)	12 (22.6)	27 (43.5)	44 (83.0)
How long can an eye drop be safe for use after opening it for use?	32 (51.6)	22 (41.5)	36 (58.1)	44 (83.0)
How will you counsel a patient using contact lens to apply eye drops in relation to the contact lens?	34 (54.8)	36 (67.9)	32 (51.0)	47 (88.7)
Knowledge score categories				
Poor knowledge (0 - 49.9%)	13 (21.0)	13 (24.5)	6 (9.7)	1 (1.9)
Fair knowledge (50.0 - 69.9%)	39 (62.9)	33 (62.3)	29 (46.8)	8 (15.1)
Good knowledge (70.0 - 89.9%)	9 (14.5)	6 (11.3)	23 (37.1)	26 (49.1)
Excellent knowledge (90.0 - 100.0%)	1 (1.6)	1 (1.9)	2 (3.2)	18 (34.0)

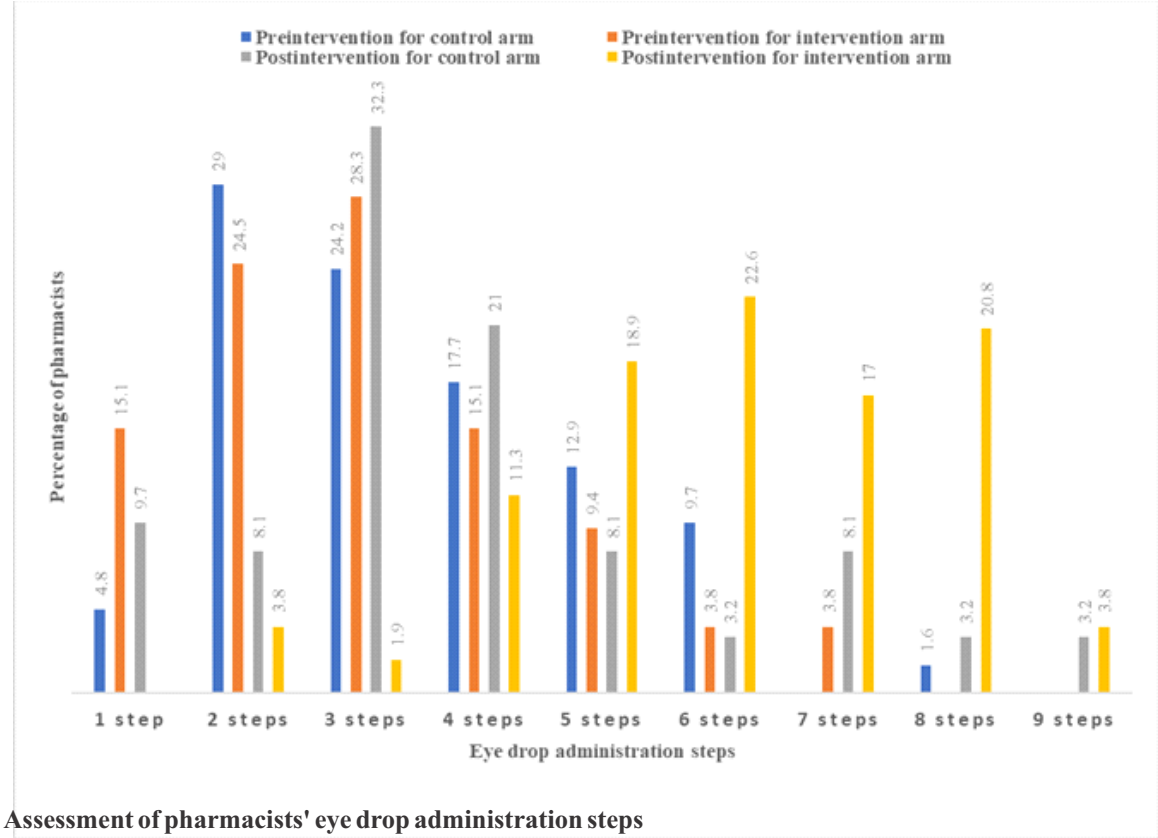

Fig 1: Assessment of pharmacists' eye drop administration steps

Table 3.3: Comparison of Study Participants' Knowledge and Counseling Pre- and Postintervention

Variables	Preintervention			Postintervention		
	Mean ± SD			Mean ± SD		
	Control	Intervention		Control	Intervention	
Knowledge	7.79 ± 1.79	7.60 ± 1.65	0.565	8.89 ± 1.73	10.83 ± 1.63	<0.001*
Counselling	2.82 ± 1.93	2.57 ± 1.91	0.476	2.97 ± 2.48	5.98 ± 1.69	<0.001*

* = Statistically significant

4. Discussion

Ophthalmic preparations are sterile preparations that are applied to the ocular cavity and require proper administration for effectiveness. A major barrier to this is inadequate administration technique by patients. A previous study stated that wrong administration accounted for about one-fifth of medication treatment errors.[6] Community pharmacists are well positioned to educate patients and counsel them on appropriate administration technique for ophthalmic preparations for better therapeutic outcomes.

This study showed a fair knowledge and poor counseling on ophthalmic preparation among community pharmacist in Ibadan metropolis. The knowledge and counseling gaps discovered at baseline were addressed by an educational intervention which led to significant improvements in both

knowledge and counseling on ophthalmic preparations by the community pharmacists. A similar result was obtained among hospital pharmacists in Ibadan metropolis, in an earlier study.[10] It is important to regularly update community pharmacists on specific day-to-day pharmaceutical care activities such as counseling on ophthalmic preparations.

About one–third of the pharmacists in the study site did not know that ophthalmic preparations have systemic effect and about two-third did not know what punctal occlusion meant. Another study reported that majority of pharmacists are unaware of the benefit of punctal occlusion.[6] Punctal occlusion is an important procedure that could easily be demonstrated to patients to prevent unwanted systemic side effects from eyes drop.

The percentage of intervention pharmacists who did not consider hand washing to be important before eyes drop application reduced from about 20% to less than 10% postintervention. Hand washing is one of the good eyes drop application practices that should be regularly explained to patients when they refill their ophthalmic preparations at community pharmacies.[1]

Less than one-tenth of study participants knew the waiting time of five minutes when administering two different eye drops. Oyebode and Aje (2022) reported that about a quarter of hospital pharmacists knew the waiting time.[10] A study carried out among patients in 136 community pharmacies in Belgium showed that about one-quarter of patients do not wait for five minutes before instilling two drops.[11] Uneven eyes drop distribution and wastage could result from not observing waiting time between eyes drop administration and may eventually lead to therapeutic failure.

In the intervention arm, the percentage of pharmacists who did not know that the tip of the eyes drop bottle should not touch the eyes dropped from 18.9% to zero percent. Several studies have shown that patients allowed the tip of eyes drop bottle to touch their eyes reduced sequel to adequate counselling.[1-2,8,12] Good and appropriate counseling is important for effective administration of ophthalmic preparations by patients.

Unlike before educational intervention when scores obtained by both study arms were comparable, a significant difference was observed when comparing knowledge and counselling on ophthalmic preparations, postintervention. This showed a great improvement in knowledge and counselling of the community pharmacist in the intervention arm because of the educational intervention. However, the slight increase in the assessment scores for those in the control arm could have resulted from self-study after completing the questionnaire.

There are some limitations to this study. Hawthorne effect cannot be ruled out because of repeated administration of the research tool. Questionnaire-based studies pose a limitation of response bias. The result of the study cannot be generalized for all community pharmacists in Nigeria since it was carried out in Ibadan metropolis.

5.0 Conclusions

The educational intervention, which addressed the knowledge and counselling gaps discovered at baseline, improved the community pharmacists' knowledge and counselling on ophthalmic preparations. This was evidenced by the significant difference in the postintervention assessment. Regular update for community pharmacists is vital to improve the quality of their pharmaceutical care activities to achieve better patient outcomes.

Conflicts of Interest: None declared by the authors.

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