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Research Article

Effectiveness of an Information, Education, and Communication Package on Compliance to Glaucoma Medication among Caregivers of Childhood Glaucoma

T. Thuileiphy[1], Cecilia Mary Susaimuthu[1], Dewang Angmo[2], Ramanjit Sihota[2]

[1]Department of Nursing Education, College of Nursing, All India Institute of Medical Sciences, New Delhi, India, [2]Department of Ophthalmology, Glaucoma Research Facility and Clinical Services, All India Institute of Medical Sciences, New Delhi, India

ABSTRACT

Aim: Patient education is important for building patients' knowledge, practice, and self-management. The purpose of this study is to assess the effectiveness of information, education, and communication (IEC) package in educating caregivers of pediatric glaucoma. **Methodology:** In this prospective interventional study done at the ophthalmology department of a tertiary care hospital, a validated IEC package was administered to 60 caregivers of children attending a glaucoma clinic through interactive teaching sessions, demonstration, and return demonstration. Knowledge and practice questionnaires, observational checklist, and medication log sheets were used during the pre-test and one month after administration of IEC package (post-test). **Results:** The majority of the caregivers were female; the mean post-test knowledge score increased significantly, $P = 0.0001$. There was a significant increase in the post-test practice score, $P = 0.0001$. The pre-test and the post-test knowledge scores had a significant association with educational status, $P = 0.001$, family monthly income, $P = 0.001$. The pre-test and the post-test practice scores had a significant association with gender, $P = 0.004$ and relationship to child, $P = 0.003$. **Conclusion:** This study revealed that an IEC package and short teaching session significantly increased the knowledge and practice of caregivers.

Keywords: Caregivers, Compliance, Information, education and communication package, Knowledge, Practice

Address for Correspondence: Ms. Cecilia Mary Susaimuthu, Department of Nursing Education, College of Nursing, All India Institute of Medical Sciences, New Delhi, India. E-mail: cecilia.aiims@gmail.com

Introduction

Childhood glaucoma is an unusual eye disease and a significant cause of childhood blindness caused by an abnormally raised intraocular pressure (IOP). The primary goal in the treatment of glaucoma is lowering IOP to prevent further progression of the disease. For topical medications, non-compliance can be in the form of failure to use eye drops, improper timing, taking the wrong medication, taking excessive medication, in addition to improper techniques of administration.[1] Compliance to the medication regime is essential for treating most chronic diseases like glaucoma. Poor adherence to medication regime accounts for a substantial worsening of the disease and increased health-care costs.[2] The incidence of childhood glaucoma is 1 in 10,000–68,000 live births worldwide.[3] Studies have shown that nine out of ten glaucoma patients were unable to instill eye drops correctly.[4]

A review of the literature shows that health-care providers play a key role in assessing patient's health challenges. Time-

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dependent glaucoma medication adherence was better when parents were responsible for eye drop instillation. Overall, decreased adherence was associated with decreased parental health literacy. Children of parents with poor health literacy are more vulnerable to poor medication adherence, which needs a lot of commitment and knowledge to monitor their child's condition.[5] Investigators have identified multiple factors related to poor adherence, including more frequent and complex dosing, situational factors such as competing activities, forgetfulness, and patient-centered factor such as poor disease knowledge.[6] This study evaluates the effect of Information, Education, and Communication (IEC) intervention in the knowledge and practice of caregivers of childhood glaucoma.

Statement of problem

A study to assess the effectiveness of an Information, Education and Communication (IEC) package on compliance to Glaucoma medication among the caregivers of children attending glaucoma clinic at AIIMS, New Delhi.

Objectives

The objectives of the study were as follows:

- To assess the knowledge and practice regarding glaucoma medication among the caregivers of children with glaucoma
- To develop IEC package on "compliance to glaucoma medication" for caregivers of children with glaucoma
- To associate the knowledge and practice of caregivers with selected demographic variables.

Hypothesis

- H_1: There will be an increase in the level of knowledge and practice among caregivers after administering IEC package regarding glaucoma medication as assessed by structured knowledge questionnaire at $P < 0.05$
- H_2: There will be a significant association between the knowledge and practice of caregivers with selected demographic variables at $P < 0.05$.

Methodology

A prospective interventional study was conducted at the congenital glaucoma clinic in the ophthalmology department of a tertiary care hospital from July to December 2017. The study participants (60) were caregivers of children with childhood glaucoma and their enrollment was done through convenience sampling technique. Informed consent was obtained from all the caregivers. Inclusion criteria were those caregivers who were actively involved in the care of the child, those willing to participate in the study and come for follow-up, and those who were able to read/write Hindi or English language. Self-developed (validated) tools were used.

The sample size was calculated based on a pilot study of 10 caregivers, considering pre-test practice average score 4.9 ± 4.3 and post-test score 7.8 ± 7.2 in the pilot study. With a power of study – 90, lost to follow-up of 10% and Type 1 error of 5%, the sample size was calculated as 60. Seventy caregivers were enrolled in the study, of which ten caregivers were lost to follow-up.

In this study, one group pretest-posttest research design was used where only the experimental group was selected as the study subject. A pre-test observation of the dependent variable was made before implementation of an intervention to the selected group, then intervention was administered, and finally a post-test observation of the dependent variable was carried out after 1 month to assess the effect of the intervention on the group.

The intervention was carried out by one to one teaching with discussion and clarification of queries using information pamphlet, demonstration of the correct techniques of eye drop administration, and a return demo was taken from participants thereafter. The duration for the intervention was approximately 15 min. A medication log sheet was distributed to caregivers after proper instruction and telephonic communication were done to ensure medication compliance. After 1 month of IEC package administration, the effectiveness of the intervention was reassessed by administering knowledge and practice questionnaires and an observational checklist.

Statistical analysis

The scores and coding were allocated for each item and were entered in an excel spreadsheet 2016 16.0.6741.2048. SPSS version 16.0 was used for statistical analysis. Data of 60 caregivers were analyzed. Descriptive statistics such as frequencies, percentage, and measure of central tendencies were used. Inferential statistics such as paired *t*-test, independent *t*-test, one-way ANOVA, and Bonferroni test were also used. A $P < 0.05$ was considered statistically significant.

Results

The total number of caregivers who completed all reviews was 60. Most of the caregivers, 71.7% were in the age group of 18–30 years and 58.3% were females. About 93.3% of the caregivers were married. The child's mother was a caregiver in 63.3% cases. About 86.7% of the caregivers were having one child affected with childhood glaucoma and 43.3% of affected children were found to be the first child in the family. About 40% of caregivers were educated up to secondary level, 38.3% studied up to primary level, and 21.7% were graduates and above, 65% of caregivers were unemployed. About 41.7% caregivers were having a family monthly income of 5001–10,000. About 60% were

from a joint family and only 23% had previous information on the medication log sheet [Table 1].

The pre-test (7.3 ± 2.1) to the post-test knowledge score (12.2 ± 1.3) significantly increased, $P = 0.0001$ [Table 2]. The post-test practice score (18.0 ± 1.1) was statistically significant, as compared to the pre-test practice score (11.5 ± 1.9), $P = 0.0001$ [Table 2].

During the post-test, the medication log sheet [Figure 1] maintained by the caregivers was checked and scores were given according to the maintenance as per the instruction, where the majority (88%) of caregivers scored in the good category.

The association of knowledge and practice score of caregivers regarding glaucoma medication was correlated with demographic variables included in secondary outcome measures. There was a statistically significant association between the pre-test and the post-test knowledge scores of caregivers with the educational status of caregivers, $P = 0.001$. Those caregivers with higher educational status had an increased knowledge score. There was a significant association between caregiver's knowledge with family monthly income, $P = 0.001$ and those with higher monthly income have better knowledge [Table 3]. However, there was no statistically significant association between caregiver's knowledge score with other demographic variables such as age, gender, marital status, and relationship to child, number of children with glaucoma, birth order, occupation, and type of family.

There was a significant association between caregiver's pre-test practice score and gender, $P = 0.004$, female caregivers have better practice compliance with a mean score 12.08 ± 1.90 compared to male 10.68±1.65. There was also a significant association between caregiver's pre-test and post-test practice score with relationship to child, $P = 0.004$, mother of children has better practice compliance ($P = 0.003$) compared to father ($P = 0.090$) and others ($P = 0924$) [Table 4]. There was no statistically significant association between caregivers' practice score with other demographic variables, that is, age, gender, marital status, relationship to child, number of children with glaucoma, birth order, occupation, and type of family.

Table 1: Sociodemographic profile of caregivers

n=60	
Sociodemographic variables	**Frequency (%)**
Age of caregivers (years)	
18–30	43 (71.7)
31–50	15 (25.0)
>50	2 (3.33)
Gender	
Male	25 (41.7)
Female	35 (58.3)
Marital status	
Married	56 (93.3)
Unmarried	4 (6.8)
Relationship to child	
Mother	38 (63.3)
Father	17 (28.3)
Others	5 (8.3)
Number of children with congenital glaucoma	
1	52 (86.7)
2	8 (13.3)
Birth order of the child	
First	26 (43.3)
Second	24 (40.0)
>2	10 (16.7)
Educational status	
Primary	23 (38.3)
Secondary	24 (40.0)
Graduate and above	13 (21.7)
Occupation	
Unemployed	39 (65.0)
Self-employed	5 (8.3)
Private job	14 (23.3)
Government	2 (3.3)
Family monthly income	
<5000	11 (18.3)
5001–10,000	25 (41.7)
10,001–20,000	16 (26.7)
20,001 and above	8 (13.3)
Type of family	
Nuclear family	24 (40)
Joint family	36 (60)

Discussion

A major problem in glaucoma management is poor compliance and adherence. This is often because patients and caregivers do not understand the disease and the necessity for proper use of medication. This study looked at the effect of educating caregivers on the use of medication.

The mean pre-test knowledge score was 7.3 ± 2.19. More than half of the caregivers (56%) had poor knowledge, 40% had good knowledge, and only 3% had excellent knowledge. Kadam and Shinde similarly looked at the effectiveness of structured education on caregivers knowledge, regarding colostomy care, in which the mean pre-test knowledge score was 7.43 ± 2.40, most of the caregiver (60%) had a poor score, 26.7% had an average score, 10% with a good score, and only one sample had a very good score.[7]

In our study, the mean pre-test practice score was 11.5 ±

Table 2: Pre-test and post-test mean and standard deviation for knowledge and practice assessment

n=60				
Variables	**Mean±SD**		**Mean difference±SD**	***P*-value**
	Pre-test	**Post-test**	**Pre-test and post test**	
Knowledge score	7.3±2.1	12.2±1.3	−4.9±1.6	0.0001
Practice score	11.5±1.9	18.0±1.1	−6.6±1.7	0.0001

Paired *t*-test *$P<0.05$. Significant increase of knowledge and practice after IEC package administration at $P<0.05$. IEC: Information, education, and communication

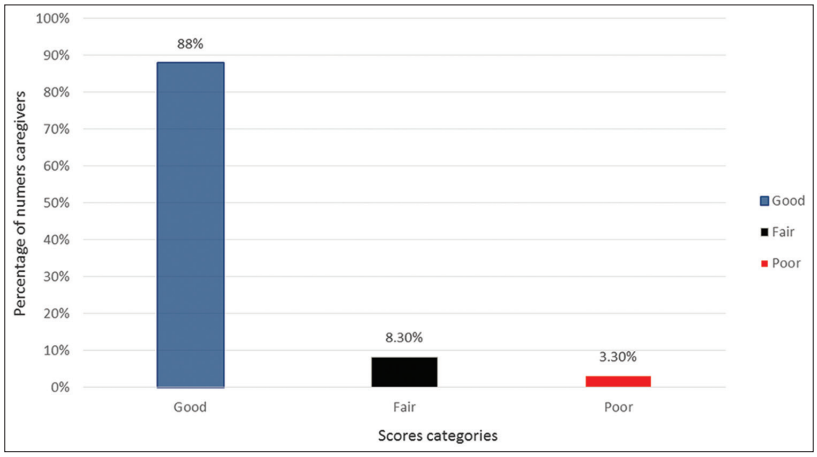

Figure 1: Percentage of caregivers' scores in maintaining medication log sheet. n=60. Majority (88%) of caregivers scored good in maintaining the medication log sheet

Table 3: Association between knowledge of caregivers and selected sociodemographic variables

		n=60					
Variables	***n***	**Mean±SD K**	***P*-value**		**Mean±SD K1**	***P*-value**	
Age (years)†							
18–30	43	6.97±1.90	0.069		12.09±1.26	0.209	
31–50	17	8.11±2.68			12.58±1.58		
Gender†							
Male	25	6.84±1.77	0.172		12.08±1.38	0.468	
Female	35	7.62±2.42			12.34±1.37		
Marital status†							
Married	56	7.28±2.18	0.852		12.28±1.37	0.271	
Unmarried	4	7.7±2.64			11.50±1.29		
Divorced	Nil						
Relationship to child‡§							
Mother	38	7.57±2.42	0.399		12.42±1.38	0.089	
Father	17	6.70±1.53			12.17±1.28		
Other	5	7.2±2.28			11.00±1.00		
Number of child with glaucoma†							
1	52	7.30±2.24	0.945		12.23±1.42	0.970	
2	8	7.25±1.98			12.25±1.03		
3 and above	Nil						
Birth order of child in the family‡§							
First	26	7.88±2.32	0.198		12.23±1.42	0.496	
Second	24	6.83±2.03			12.41±1.50		
>2	10	6.9±2.07			11.80±0.78		
Educational status‡§							
Primary	23	6.65±1.87	0.0160*	1.00	11.69±1.22	0.009*	0.712
Secondary	24	7.12±1.80		0.014*	12.12±1.22		0.001*
Graduate and above	13	8.76±2.80		0.076	13.38±1.26		0.013*
Occupation‡§							
Unemployed	39	7.25±2.13	0.958		12.10±1.35	0.603	
Self-employed	5	7.2±1.92			12.40±1.51		
Private job	16	7.43±2.52			12.50±1.41		
Family monthly income‡§							
<5000	11	6.27±1.27	0.0013*	1.00	11.90±1.51	0.041*	1.00
50,001–10,000	25	6.88±2.26		0.94	11.84±1.28		1.000
10,001–20,000	16	7.37±1.74		0.076	12.56±1.20		0.0.539
20,001 and above	8	9.87±2.10		0.001*	13.25±1.28		0.001*
				0.02*			0.062
				0.028*			0.1.000

**P*<0.05, †Independent *t*-test, ‡one-way ANOVA, §Bonferroni test. Significant association between pre-test and post-test knowledge scores of caregivers with educational status of caregivers, p = 0.001, and with family monthly income, *P*=0.001

Table 4: Association between practice score of caregivers and selected demographic variables

		n=60					
Variables	***n***	**Mean±SD**	***P*-value**		**Mean±SD**	***P*-value**	
		P			**P1**		
Age (years)†							
18–30	43	11.44±1.96	0.712		18.00±0.97	0.365	
31–50	17	11.64±1.83			18.29±1.44		
Gender†							
Male	25	10.68±1.65	0.004*		17.88±1.30	0.239	
Female	35	12.08±1.90			18.22±0.97		
Marital status†							
Married	56	11.55±1.90	0.074		18.05±1.15	0.447	
Unmarried	4	10.75±1.10			18.50±0.57		
Divorced	Nil						
Relationship to child‡§							
Mother	38	12.15±1.82	0.0013*	0.003*	18.34±0.96	0.036*	0.004§*
Father	17	10.41±1.32		0.064	17.76±1.03		0.090
Other	5	10.2±2.28		1.000	17.20±1.92		0.924
Number of child with glaucoma†							
1	52	11.67±1.73	0.084		18.07±1.11	0.911	
2	8	10.37±2.72			18.12±1.24		
3 and above	Nil						
Birth order of child in the family‡§							
First	26	11.53±1.92	0.898		18.07±1.12	0.266	
Second	24	11.37±1.97			18.29±0.90		
>2	10	11.7±1.94			17.6±1.50		
Educational status‡§							
Primary	23	11.21±1.76	0.086		17.91±1.12	0.155	
Secondary	24	11.20±2.26			17.95±1.26		
Graduate and above	13	12.53±1.05			18.61±0.65		
Occupation‡§							
Unemployed	39	11.64±2.12	0.745		17.94±1.14	0.452	
Self-employed	5	11.2±1.64			18.40±1.14		
Private job	16	11.25±1.48			18.31±1.07		
Family monthly income‡§							
<5000	11	10.81±1.94	0.521		17.63±1.20	0.175	
50,001-10,000	25	11.6±2.02			17.92±1.18		
10,001-20,000	16	11.5±1.96			18.43±0.96		
20,001 and above	8	12.12±1.45			18.50±0.92		

*P<0.05, †independent-t test, ‡one-way ANOVA, §Bonferroni test. Significant association between caregiver's pre-test practice score with gender, P=0.004, and pre-test and post-test practice score with relationship to child, P=0.004

1.91, of which 50% of the caregivers had poor practice and 50% had a good practice. This finding was also supported by Salunkhe and Dias (2014) who reported a mean practice score of 6.52, with a maximum possible score of 20, in which 50% of the subjects had poor practice score and 50% an average score on the effectiveness of demonstration regarding cardiopulmonary resuscitation among subjects.[8] The high mean score in the present study may be due to the frequency of eye drop administration and some awareness regarding the same.

The results of the present study show a significant increase in caregiver's post-test knowledge score 12.2 ± 1.36 from pre-test score 7.3 ± 2.19 with a mean score difference of 4.93 ± 1.69 and approximately 33% increase in the score following education about the disease and its treatment. The present finding is in accordance with the study findings of Negi *et al*. who reported the post-test mean score of 38.51 ± 2.96 from the pre-test mean score 23.98 ± 4.74, with a mean difference of 14.53, on "Identification and management of the behavioral problem in children (IMBP)" among school teachers.[9]

Our study also showed a 28.26% increase in caregiver's post-test practice mean score 18.08 ± 1.12 from the pre-test score 11.5 ± 1.91, with a mean score difference of 6.58 ± 1.72. Ekata *et al*. reported a mean post-test practice score on day 1 as 10.40 ± 1.95, day 2 as 11.80 ± 1.95, and day 3 as 10.76 ± 2.26 which was significantly higher than mean pre-test scores on day 1 (7.00), day 2 (6.66), and day 3 (8.76) regarding knowledge and practice of post-operative care among parents of children with cleft lip and cleft palate.[10]

The mean knowledge and practice score increased significantly one month after IEC package administration program. The high score in our study may be due to one to one teaching, demonstration, and return demonstration. Feng *et al*. reported a significant increase in post-test knowledge after an education program through hand out and short instructional video.[11] McVeigh and Vakros also reported an impressive improvement in handwashing, shaking bottle before use, punctal occlusion techniques, and discarding bottles after 28 days from 68% to 92% after an education program.[12]

This study additionally showed a good acceptance and maintenance of medication log sheets in which 88% of caregivers scored were good grade and 12% were fair, 1 month after IEC package administration. Chae *et al*. also showed similar findings.[13] This study showed a significant association between knowledge scores with educational status and family monthly income. Wilson *et al*. reported a significant association between oral health knowledge and education with household income caregivers.[14] Ashkanani and Al-Sane also reported that caregivers with higher education have better knowledge[1] Okorie *et al*. also reported that caregivers with higher educational status had significantly better nutritional knowledge and exercise behavior.[15]

In this study, the practice score was significantly associated with the caregiver's gender and relationship to the child. Ashkanani and Al-Sane reported that mothers with higher education have better practice score compared to other caregivers.[16] Al-Busaidi *et al*. reported that (72.2%) females overall performed better than males (27.2%) in the good technique of eye drop instillation.[17]

Conclusion

This study revealed that an IEC package and short teaching session significantly increased the knowledge and practice of caregivers. Therefore, we recommend a demonstrative teaching session for caregivers to enhance compliance and adherence to timely medication application.

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3. Dr. Dewang Angmo: Critical inputs in designing and conducting the study, wrote the first draft, and final approval of the version submitted
4. Dr. Ramanjit Sihota: Development of protocol, data collection, providing language help, writing manuscript, and statistic.

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