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Govindarajan R  
govindarajanthamba@gmail.com

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# **Recommendations for Effective Information Use - A Study among Ophthalmologists in India**

**Dr. R. Govindarajan**

Librarian, Aravind Eye Hospital & Postgraduate Institute of Ophthalmology,  
Madurai – 625 020, Tamil Nadu.  
govindarajanthamba@gmail.com

**Dr. S. Dhanavandan**

Deputy Librarian, Central University of Tamil Nadu,  
Tiruvarur - 610005, Tamil Nadu,  
dhanavandan@gmail.com

## **Abstract**

### **Background:**

Ophthalmologists – Eye Doctors working in academic eye hospitals need, seek and use information for their services towards patient care, teaching, research, etc. The present study attempted to determine the recommendations for effective information use as preferred by the ophthalmologists.

### **Methodology:**

The study design is cross sectional and convenience sampling method is adopted. A structured questionnaire was used to collect data. SPSS 18 PASW Statistical package was used for statistical analysis. Frequencies, percentages, Mann Whitney U test, Kruskal-Wallis test, Factor Analysis, Wilcoxon signed rank test were used in the study.

### **Findings:**

Around 633 ophthalmologists working in 47 academic eye hospitals from 16 states of India were included in the study. The study results revealed that majority of the ophthalmologists recommended "Advanced tools should be developed to access information" which is followed by "Allocate adequate funding for journal subscription" and "Library collection should be improved". The statistical test results showed up that there exists a significant difference between recommendations of ophthalmologists and age group, designation, experience, institution type. The two major factors of ophthalmologists' recommendations for effective use were for library and in general. General recommendation was significantly higher than the recommendations for library factor.

### **Conclusion:**

The study results will be helpful to the ophthalmic libraries, ophthalmic institutions, information service providers, and ophthalmic community to provide adequate steps in line to enhance the ophthalmologists' information use.

**Keywords:** Information use; Recommendations; Ophthalmologists; information behavior; information need; information seeking behavior;

## **1. Introduction:**

Information Behavior studies describes how people need, seek, search, use, manage, store, organize, share and create information in different contexts. It amplifies to explore the combination of the “individual and situation”. Situation refers the locus point of framing an investigation. The studies further delve into the individuals’ interaction with information and information utilization. The Information behavior studies of Professionals describe clearly the characteristics of the professionals and detail all their information behavior in comprehensive way. The outcomes of the studies will not only help the key stakeholders but also to nurture the particular professional field. So the Information Behavior studies of professionals which provide meaningful information to the community are more significant among all the Information Behavior studies.

Ophthalmologists – Eye Doctors working in academic eye hospitals need, seek and use information for their services towards patient care, teaching, research, etc. The present study attempted to determine the recommendations for effective information use as preferred by the ophthalmologists and investigate if the preferences differed based on their individual characteristics and institution characteristics. The characteristics chosen for examination were gender, age, designation, working experience and institution type. This study will help to identify the ophthalmologists’ recommendations for effective information use. This will help the libraries, institutions, information service providers, ophthalmic community to provide adequate steps in line to enhance the ophthalmologists’ information use.

## **2. Review of Literature**

Anasi (2006) attempted to find the patterns of the internet use by undergraduate students of University of Lagos, Nigeria. The study brought out that the level of the internet use was found low among students as they were lacking the search strategies to locate information.

Recommendations stated that adequate computer laboratory, proper power back up system, integration of the internet and computer literacy program are to be provided.

Kumbar et al. (2007) studied the use of periodical literature in the University of Agricultural Sciences Daharwad. The study attempts to bring out the extent of use of periodical literature by agriculture scientists. Data was collected from random sample through questionnaire. The analysis showed that 74.35% respondents viewed the current issues of the journals. Most of the users preferred print journals over electronic journals. It was recommended to arrange the periodicals properly and inform the new arrivals to the users for effective usage.

Bansode and Pujar (2008) conducted a study to examine the use of the internet by research scholar in Science, Social Sciences and Humanities. Out of 150 researchers among whom the questionnaires were distributed 122 responded. Scholars were using the Internet mainly for the purpose of exchanging information through e-mail. The study also recommends to conduct a training on the effective usage of information technology tools to get required information.

Biswasand (2009) explored through their study on the information seeking behaviour of the students at University of Kalyani, West Bengal that guidance in the use of library resources and

services is necessary to help students to meet their information requirements. The data was collected through questionnaire from 60 students. It was found that journals, textbooks and lecture notes are the most popular sources of information for the students' course work. The study recommended that the CD-ROM databases of journal archives and reference books be added and users should be guided to use the resources of the library.

Patil and Parameshwar (2009) undertook a study to find out the information needs and usage of electronic resources by the faculty members and research scholars in various PG departments and to assess whether their information needs were fulfilled through the e-resources facilities provided in the Gulbarga University, Gulbarga, India. The study showed that the information needs was satisfied using the electronic resources available in the University Library. It was recommended to include more number of journals in the UGC-Infonet Consortium.

Pradip and Nikose (2010) conducted a study on information seeking behaviour of users of private higher technical education libraries in Chandrapur District, Maharashtra. The study was conducted in 4 engineering colleges. Data was collected through closed ended questionnaire which was distributed among the students and lecturers. In addition interviews were also conducted among some professors for special opinion. The study recommended the libraries to understand the information seeking behaviour of users and reengineer their services. The study primarily recommended conducting user education program regularly.

Bhatia and Rao (2011) surveyed the information seeking behaviour of students at DevSamaj College, Chandigarh. The aim of the study was to explore the use of information technology by the college students for seeking information and to know how they access e-resources. A questionnaire was circulated to randomly selected 100 students who visited the library out of which 64 students responded. The study revealed majority of the students were not aware of e-resources instead the students used search engines as a major source to access for their information needs and to update their knowledge their subject. The study recommends to conduct program.

Chaurasia and Chaurasia (2012) explored the Information Seeking Behaviour of Students and Scholars in Electronic Environment: The electronic journals were most preferred E-Resources by over 70% Research Scholars; electronic databases by 60% Research Scholars; whereas the electronic books were preferred by only 27% Research Scholars, further e-resource by over 65% P.G. Students. While more than 60% P.G. Students preferred electronic journals to seek information for their needs. In order to overcome the hindrances in accessing the E-Resources, the study recommends awareness programmes for the students and to provide training on EResources and retrieval skills.

Acheampong and Dzandu (2015) investigated the information-seeking behaviour of crops research scientists in Ghana using the Council for Scientific and Industrial Research, Crops Research Institute (CSIR-CRI), Kumasi, Ghana scientists seek information in terms of use, type,

when, where and the purpose for which they use information as well as how they search for information. Wilson's Information Behaviour Model was adopted as the theoretical framework for the study.. The study revealed that the crop research scientists used information centers/libraries for research purposes and prefer to use journals articles (both print/electronic) but preferred electronic format to other types of materials. The study also revealed that scientists used scientific meetings as part of information sources. The study recommended that scientific information centers/libraries should subscribe to current print/electronic journals and also train the crop research scientists in information searching and retrieval skills.

### **3. Objectives of the study**

- To identify the recommendations for effective information use by the ophthalmologist
- To examine the recommendation preferences among both male and female ophthalmologists
- To find out the recommendation preferences among ophthalmologists in different age groups
- To measure the recommendation preferences among ophthalmologists working in different designations
- To examine the recommendation preferences among ophthalmologists with different working experience
- To find out the recommendation preferences among ophthalmologists working in different institution types

### **4. Hypotheses of the study**

1. The recommendations for effective information use as preferred by the ophthalmologists differs by gender
2. The recommendations for effective information use as preferred by the ophthalmologists differs by age group
3. The recommendations for effective information use as preferred by the ophthalmologists differs by designation
4. The recommendations for effective information use as preferred by the ophthalmologists differs by experience
5. The recommendations for effective information use as preferred by the ophthalmologists differs by institution type

### **5. Methodology**

The main purpose of the study was to find out the recommendations for effective information use as preferred by the ophthalmologists. The research design adopted for this study was cross sectional. Convenience sampling method was found appropriate to enroll the wide-spread ophthalmologist population and the same was followed in the study. A structured questionnaire was used as a data collection tool to record the recommendations of ophthalmologists. A total of

633 ophthalmologists from 47 academic eye hospitals in 16 states of India were included in the study. The collected data were entered into data-entry software, purposefully developed for the study. The software was developed in Microsoft Visual Basic 6.0 with backend SQL Server 2000. For further analysis, the data stored in SQL Server 2000 was extracted into Ms-Excel 2007 spreadsheets. MS-Excel 2017 was used to organize and tabulate the data. SPSS 18 PASW Statistical package was used for statistical analysis. Frequency counts and Ranks were used to find out the most common recommendation of ophthalmologists. The Mann Whitney U test was used to examine ophthalmologists' recommendations with gender. The Kruskal-Wallis test was used to examine the ophthalmologists' recommendations with age, designation, experience, and institution type. Factor Analysis, Wilcoxon signed rank test were used to determine and analyze the key factors in the recommendations of ophthalmologists.

## 6. Analysis

Recommendations for effective information use as preferred by the ophthalmologists had been ascertained based on ten variables with a five point scale such as "1-Strongly Disagree", "2-Disagree", "3-No Opinion", "4-Agree", "5-Strongly Agree". The internal consistency of the variables were measured by Cronbach's alpha (Alpha >0.70 is considered as acceptable). The alpha coefficient for the variables is 0.9231 which indicates that the variables have relatively high internal consistency. Number of responses, percentage, mean, standard deviation, median and rank were shown in Table 1. Ranks were assigned based on mean and standard deviation.

**Table 1: RECOMMENDATIONS FOR EFFECTIVE INFORMATION USE – SUMMARY**

S.No.	Description	Strongly Disagree (%)	Disagree (%)	No Opinion (%)	Agree (%)	Strongly Agree (%)	Mean (SD)	Median	Rank
1	Library collection should be improved	14 (2.2%)	47 (7.4%)	97 (15.3%)	352 (55.6%)	123 (19.4%)	3.83 (0.9)	Agree	3
2	Library amenity & facility should be improved	12 (1.9%)	52 (8.2%)	121 (19.1%)	319 (50.4%)	129 (20.4%)	3.79 (0.92)	Agree	5
3	Library services should be improved	16 (2.5%)	56 (8.8%)	132 (20.9%)	315 (49.8%)	114 (18%)	3.72 (0.94)	Agree	6
4	Library working hours should be increased	18 (2.8%)	96 (15.2%)	161 (25.4%)	246 (38.9%)	112 (17.7%)	3.53 (1.04)	Agree	10
5	Library staff should be supportive	22 (3.5%)	72 (11.4%)	162 (25.6%)	272 (43%)	105 (16.6%)	3.58 (1.01)	Agree	9
6	Library orientation Programme should be strengthened	14 (2.2%)	44 (7%)	162 (25.6%)	308 (48.7%)	105 (16.6%)	3.7 (0.9)	Agree	7
7	Authorities should provide funding to compensate the subscription fees	13 (2.1%)	46 (7.3%)	196 (31%)	274 (43.3%)	104 (16.4%)	3.65 (0.91)	Agree	8
8	Associations / societies / professional bodies should take	7 (1.1%)	28 (4.4%)	153 (24.2%)	327 (51.7%)	118 (18.6%)	3.82 (0.82)	Agree	4

	initiatives in providing information								
9	Allocate adequate funding for journal subscription	10 (1.6%)	25 (3.9%)	142 (22.4%)	322 (50.9%)	134 (21.2%)	3.86 (0.85)	Agree	2
10	Advanced tools should be developed to access information	7 (1.1%)	29 (4.6%)	100 (15.8%)	344 (54.3%)	153 (24.2%)	3.96 (0.83)	Agree	1

It can be seen from the table 1 that "Advanced tools should be developed to access information" was the first recommendation of ophthalmologists. It is followed by "Allocate adequate funding for journal subscription" and "Library collection should be improved" which was their second and third recommendations. The least recommendation was "No opportunity to learn". The mean value of the responses ranges between 3.53 and 3.96. The standard deviation of the responses ranges between 0.82 and 1.04.

The recommendations among both the female and male ophthalmologists were analyzed further and ranks were assigned based on mean and standard deviation. The mean, standard deviation, rank and Mann Whitney U test results were shown in Table 2

**TABLE 2: RECOMMENDATIONS FOR EFFECTIVE INFORMATION USE Vs GENDER**

S.No.	Description	Female	Male		
		Mean (SD)	Rank	Mean (SD)	Rank
1	Library collection should be improved	3.85 (0.9)	2	3.8 (0.9)	5
2	Library amenity & facility should be improved	3.77 (0.91)	5	3.81 (0.93)	4
3	Library services should be improved	3.72 (0.94)	6	3.72 (0.95)	6
4	Library working hours should be increased	3.52 (1.01)	10	3.55 (1.06)	10
5	Library staff should be supportive	3.58 (0.97)	9	3.58 (1.04)	9
6	Library orientation Programme should be strengthened	3.7 (0.85)	7	3.71 (0.94)	7
7	Authorities should provide funding to compensate the subscription fees	3.61 (0.88)	8	3.68 (0.94)	8
8	Associations / societies / professional bodies should take initiatives in providing information	3.79 (0.81)	4	3.85 (0.83)	3
9	Allocate adequate funding for journal subscription	3.79 (0.83)	3	3.92 (0.86)	2
10	Advanced tools should be developed to access information	3.91 (0.81)	1	4 (0.83)	1

Rank is derived for each gender group based on the mean and standard deviation of ophthalmologists' responses. The ranks show up that most of the female and male ophthalmologists recommend "Advanced tools should be developed to access information".

A Mann Whitney U test was conducted to determine whether there is any difference between ophthalmologists' recommendations and gender. The mean rank for male ophthalmologists was 319.74. The mean rank for female ophthalmologists was 313.84. The test showed that there doesn't exist a significant difference between ophthalmologists recommendations and gender (P-value=0.685)

The recommendations as preferred by the ophthalmologists in different age groups were analyzed further and ranks were assigned based on mean and standard deviation. The mean, standard deviation, rank and Kruskal-Wallis test results were shown in Table 3

**TABLE 3: RECOMMENDATIONS FOR EFFECTIVE INFORMATION USE Vs AGE GROUP**

S.No.	Description	Less than or equal to 30		31 to 40		41 to 50		51 to 60		61 and above	
		Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Rank
1	Library collection should be improved	3.71 (0.96)	4	3.88 (0.84)	4	4.01 (0.82)	2	3.71 (1.23)	2	3.38 (0.74)	6
2	Library amenity & facility should be improved	3.68 (0.95)	5	3.85 (0.87)	5	3.94 (0.96)	6	3.57 (1.16)	6	3.38 (0.74)	6
3	Library services should be improved	3.59 (0.96)	6	3.77 (0.94)	6	3.97 (0.85)	4	3.48 (1.12)	7	3.38 (0.74)	6
4	Library working hours should be increased	3.38 (1.08)	10	3.62 (1.02)	10	3.66 (0.94)	10	3.43 (1.21)	8	3.38 (0.74)	6
5	Library staff should be supportive	3.42 (0.99)	9	3.63 (1.03)	9	3.84 (0.89)	8	3.38 (1.16)	9	3.5 (0.76)	2
6	Library orientation Programme should be strengthened	3.53 (0.92)	7	3.76 (0.89)	7	3.96 (0.77)	5	3.67 (1.15)	3	3.63 (0.92)	1
7	Authorities should provide funding to compensate the subscription fees	3.51 (0.97)	8	3.74 (0.88)	8	3.78 (0.82)	9	3.33 (0.91)	10	3.5 (0.76)	2
8	Associations / societies / professional bodies should take initiatives in providing information	3.73 (0.86)	3	3.88 (0.78)	3	3.91 (0.81)	7	3.67 (1.02)	3	3.5 (0.76)	2
9	Allocate adequate funding for journal subscription	3.74 (0.88)	2	3.94 (0.81)	2	3.98 (0.83)	3	3.62 (0.92)	5	3.5 (0.93)	2
10	Advanced tools should be developed to	3.82 (0.81)	1	4.05 (0.79)	1	4.08 (0.87)	1	3.86 (1.01)	1	3.38 (0.74)	6



access information										
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Rank is derived for each age group based on the mean and standard deviation of ophthalmologists' responses. The ranks show up that most of the ophthalmologists in the age group "Less than or equal to 30", "31 to 40", "41 to 50", "51 to 60" recommend "Advanced tools should be developed to access information". Most of the ophthalmologists in the age group "61 and above" recommend "Library orientation Programme should be strengthened"..

A Kruskal-Wallis H test was conducted to determine if ophthalmologists' recommendations differ with age groups. The mean ranks for the age groups were Less than or equal to 30 (277.43), 31 to 40 (334.72), 41 to 50 (362.30), 51 to 60 (304.62), 61 and above (258.81) respectively. The test showed that there exist a significant difference between ophthalmologists recommendations and age groups ( $\chi^2(2) = 19.469$ , P-value=0.001).

The recommendations as preferred by the ophthalmologists in different designation groups was analyzed further and ranks were assigned based on mean and standard deviation. The mean, standard deviation, rank and Kruskal-Wallis test results were shown in Table 4

**TABLE 4: RECOMMENDATIONS FOR EFFECTIVE INFORMATION USE Vs DESIGNATION**

S.No.	Description	Medical Officers		Fellows		Senior Resident	
		Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Rank
1	Library collection should be improved	3.86 (0.91)	3	3.77 (0.91)	4	4.07 (0.27)	7
2	Library amenity & facility should be improved	3.83 (0.93)	5	3.7 (0.91)	5	4.43 (0.51)	1
3	Library services should be improved	3.78 (0.94)	6	3.61 (0.95)	7	4.21 (0.8)	4
4	Library working hours should be increased	3.54 (1.01)	10	3.52 (1.07)	9	3.5 (1.22)	10
5	Library staff should be supportive	3.67 (0.97)	8	3.44 (1.05)	10	3.86 (0.95)	9
6	Library orientation Programme should be strengthened	3.75 (0.89)	7	3.62 (0.91)	6	3.93 (0.92)	8
7	Authorities should provide funding to compensate the subscription fees	3.66 (0.9)	9	3.6 (0.93)	8	4.14 (0.77)	5
8	Associations / societies / professional bodies should take initiatives in providing information	3.85 (0.82)	4	3.77 (0.82)	3	4.14 (0.66)	5
9	Allocate adequate funding for journal subscription	3.89 (0.85)	2	3.79 (0.84)	2	4.36 (0.5)	2
10	Advanced tools should be developed to access information	3.99 (0.85)	1	3.89 (0.79)	1	4.29 (0.61)	3

Most of the ophthalmologists in the designation groups "Medical Officer", "Fellows" recommend "Advanced tools should be developed to access information". Most of the ophthalmologists in the designation group "Senior Resident" recommend "Library amenity & facility should be improved"

A Kruskal-Wallis H test was conducted to determine if ophthalmologists' recommendations differ with designation groups. The mean ranks for the designation groups were Medical Officers (330.72), Fellows (292.26), Senior Resident (408.00) respectively. The test showed that there exist a significant difference between ophthalmologists recommendations and designation groups ( $\chi^2(2) = 10.243$ , P-value=0.006).

The recommendations as preferred by the ophthalmologists in different experience groups were analyzed further and ranks were assigned based on mean and standard deviation. The mean, standard deviation, rank and Kruskal-Wallis test results were shown in Table 5.

**TABLE 5: RECOMMENDATIONS FOR EFFECTIVE INFORMATION USE Vs EXPERIENCE**

S.No.	Description	Less than or equal to 5 years		6 to 10 years		11 to 15 years		16 to 20 years		21 and above years	
		Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Rank
1	Library collection should be improved	3.78 (0.93)	3	4.03 (0.77)	6	4.1 (0.92)	4	3.65 (0.91)	6	3.9 (0.82)	4
2	Library amenity & facility should be improved	3.74 (0.92)	5	3.85 (0.98)	9	4.17 (0.95)	2	3.65 (0.88)	5	3.88 (0.89)	5
3	Library services should be improved	3.66 (0.96)	6	3.93 (0.86)	8	4.13 (0.94)	3	3.61 (0.84)	7	3.77 (0.94)	6
4	Library working hours should be increased	3.46 (1.04)	10	3.58 (1.06)	10	3.83 (0.95)	8	3.42 (0.99)	10	3.74 (1.03)	8
5	Library staff should be supportive	3.49 (1)	9	4 (0.91)	7	3.77 (1.04)	10	3.61 (0.92)	7	3.69 (1.03)	9
6	Library orientation Programme should be strengthened	3.62 (0.91)	7	4.08 (0.66)	3	4.03 (0.85)	6	3.77 (0.99)	2	3.76 (0.89)	7
7	Authorities should provide funding to compensate the subscription fees	3.59 (0.93)	8	4.05 (0.81)	4	3.83 (0.91)	9	3.58 (0.76)	9	3.67 (0.86)	10
8	Associations / societies / professional bodies should take initiatives in providing information	3.76 (0.83)	4	4.1 (0.71)	1	3.93 (0.94)	7	3.77 (0.8)	2	3.94 (0.79)	3
9	Allocate adequate funding for journal subscription	3.8 (0.87)	2	4.05 (0.78)	4	4.07 (0.94)	5	3.77 (0.8)	2	3.99 (0.75)	2
10	Advanced tools should be developed to access information	3.91 (0.82)	1	4.1 (0.78)	2	4.17 (0.91)	1	3.84 (0.93)	1	4.07 (0.81)	1

Rank is derived for each experience group based on the mean and standard deviation of ophthalmologists' responses. The ranks show up that Most of the ophthalmologists in the experience groups "Less than or equal to 5 years", "11 to 15 years", "16 to 20 years", "21 and above years" recommend "Advanced tools should be developed to access information". Most of the ophthalmologists in the experience group "6 to 10 years" recommend "Allocate adequate funding for journal subscription".

A Kruskal-Wallis H test was conducted to determine if ophthalmologists' recommendations differ with experience groups. The mean ranks for the experience groups were Less than or equal to 5 (299.76), 6 to 10 (372.94), 11 to 15 (398.20), 16 to 20 (303.29), 21 and above (340.43) respectively. The test showed that there exist a significant difference between ophthalmologists recommendations and experience groups ( $\chi^2(2) = 15.582$ , P-value=0.004).

The recommendations as preferred by the ophthalmologists working in different institution types were analyzed further and ranks were assigned based on mean and standard deviation. The mean, standard deviation, rank and Kruskal-Wallis test results were shown in Table 6.

**TABLE 6: RECOMMENDATIONS FOR EFFECTIVE INFORMATION USE Vs INSTITUTION TYPES**

S.No	Description	Government		NGO		Corporate	
		Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Rank
1	Library collection should be improved	3.78 (0.93)	3	4.03 (0.77)	6	4.1 (0.92)	4
2	Library amenity & facility should be improved	3.74 (0.92)	5	3.85 (0.98)	9	4.17 (0.95)	2
3	Library services should be improved	3.66 (0.96)	6	3.93 (0.86)	8	4.13 (0.94)	3
4	Library working hours should be increased	3.46 (1.04)	10	3.58 (1.06)	10	3.83 (0.95)	8
5	Library staff should be supportive	3.49 (1)	9	4 (0.91)	7	3.77 (1.04)	10
6	Library orientation Programme should be strengthened	3.62 (0.91)	7	4.08 (0.66)	3	4.03 (0.85)	6
7	Authorities should provide funding to compensate the subscription fees	3.59 (0.93)	8	4.05 (0.81)	4	3.83 (0.91)	9
8	Associations / societies / professional bodies should take initiatives in providing information	3.76 (0.83)	4	4.1 (0.71)	1	3.93 (0.94)	7
9	Allocate adequate funding for journal subscription	3.8 (0.87)	2	4.05 (0.78)	4	4.07 (0.94)	5
10	Advanced tools should be developed to access information	3.91 (0.82)	1	4.1 (0.78)	2	4.17 (0.91)	1

Rank is derived for each institution type group based on the mean and standard deviation of ophthalmologists' preferences. The ranks show up that most of the ophthalmologists from the institution types "Government" and "Corporate" recommend "Advanced tools should be

developed to access information". Most of the ophthalmologists from the institution type "NGO" recommend "Associations / societies / professional bodies should take initiatives in providing information".

A Kruskal-Wallis H test was conducted to determine if ophthalmologists' recommendations differ with institution types. The mean ranks for the institution types were Government (456.99), NGO (308.52), Corporate (299.19). The test showed that there exist a significant difference between ophthalmologists recommendations and institution types ( $\chi^2(2) = 26.051$ , P-value=0.000).

### **Determining the major factors of ophthalmologists' recommendations for effective information use**

Factor analysis with varimax rotation is used to determine the major factors of ophthalmologists' recommendations for effective information use. The table 7 shows up the factor analysis results of the ophthalmologists' recommendations. The 10 items neatly loaded on 2 factors with a total of 72.513% variance and total Eigen value of 7.251. The criteria used for identifying the factors were based on the following criteria.

- a) Eigen value of factor is greater than one.
- b) Two or more items are loading in each factor.
- c) Factor loadings are greater than 0.5.

**Table 7: Ophthalmologists' Recommendation for Effective Information Use: Factor Analysis Results**

S.No.	Items	Component	
		Factor 1	Factor 2
1	Library collection should be improved	.828	.277
2	Library amenity & facility should be improved	.864	.241
3	Library services should be improved	.884	.265
4	Library working hours should be increased	.717	.240
5	Library staff should be supportive	.712	.335
6	Library orientation Programme should be strengthened	.590	.500
7	Authorities should provide funding to compensate the subscription fees	.421	.722
8	Associations / societies / professional bodies should take initiatives in providing information	.249	.865
9	Allocate adequate funding for journal subscription	.305	.838
10	Advanced tools should be developed to access information	.213	.833
	Eigenvalue	5.979	1.272
	Percentage of variance	59.794	12.719

*Note: (N = 633) Factor 1 =Library; Factor 2 = General*

The factors are named as follows:

### Factor 1- Library:

Six items loaded on this factor having the highest Eigen value of 5.979 with 59.794% of variance. Loadings range from 0.590 and 0.884. This factor emphasis the ophthalmologists' recommendations for library improvement. The items are:

1. Library collection should be improved
2. Library amenity & facility should be improved
3. Library services should be improved
4. Library working hours should be increased
5. Library staff should be supportive
6. Library orientation Programme should be strengthened

### Factor 2- General:

Four items loaded on this factor having the Eigen value of 1.272 with 12.719% of variance. Loadings range from 0.722 and 0.865. This factor emphasis the ophthalmologists' recommendations in general to the information community and ophthalmic community. The items are:

1. Authorities should provide funding to compensate the subscription fees
2. Associations / societies / professional bodies should take initiatives in providing information
3. Allocate adequate funding for journal subscription
4. Advanced tools should be developed to access information

The Wilcoxon signed ranks test was used to test the differences of the scores of the two factors. Table 8 shows up the test results.

**Table 8: Ophthalmologists' Recommendation Factors: Wilcoxon Signed Rank Results**

		N	Mean Rank	Sum of Ranks
General - Library	Negative Ranks	173 (a)	201.44	34849.00
	Positive Ranks	268 (b)	233.63	62612.00
	Ties	192 (c)		
Total		633		
Z	-5.190	Asymp. Sig. (2-tailed)		.000
(a) General < Library				
(b) General > Library				
(c) General = Library				

Table 8 shows up that the recommendation in General factor was significantly higher than the recommendations for Library factor (Z=-5.190; P value = 0.000).

### 7. Conclusion

Around 633 ophthalmologists working in 47 academic eye hospitals from 16 states of India were included in the study. The aim of the study is to investigate the recommendations for effective information use as preferred ophthalmologists. The study results revealed that majority of the ophthalmologists recommended "Advanced tools should be developed to access information " which is followed by "Allocate adequate funding for journal subscription" and "Library collection should be improved". The statistical test results showed up that there exists a significant difference between recommendations of ophthalmologists and age group, designation, experience, institution type. The two major factors of ophthalmologists' recommendations for effective use were for library and general. The general recommendation was significantly higher than the recommendations for library factor.

The study results will be helpful to the ophthalmic libraries, ophthalmic institutions, information service providers, and ophthalmic community to provide adequate steps in line to enhance the ophthalmologists' information use. Few more suggestions from the author to enhance the information use among ophthalmologists are listed here.

The ophthalmic libraries should ensure to make the information to reach more ophthalmologists. They should focus on collection development and build repositories. They should avail the ICT advancements and extend their services through websites / mobile apps. They may also provide information literacy training programs to ophthalmologists.

The ophthalmic institutions should provide priority to the libraries of their institutions by allocating them enough budget, facilitating them grants. They should facilitate with good library ambience, collection & resources, skilled library staff.

The Information providers like ophthalmic associations, ophthalmic publishers and ophthalmic online database providers should focus on meeting the constant changing requirement of the ophthalmologists and provide quality, hassle free, low risk information services to the ophthalmologists.

The ICT community should focus on developing platforms for effective, inexpensive, user friendly information services platforms for storing information, sharing it with others, networking with people, connect through the community easily. It should also focus on innovations for secured and low risk information services.

The government should render support to the open access movement and waive all the restrictions in accessing information. It should provide grants to promote effective information use and provide the required infrastructure. It can also provide technology services like free internet / wifi for effective information use.

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