Accessing of Retrospective Information by the Ophthalmologists in India: A Study

R. Govindarajan[1] and S. Dhanavandan[2]

[1]Librarian, Aravind Eye Hospital & Postgraduate Institute of Ophthalmology, Madurai, Tamil Nadu, India
[2]Deputy Librarian & Head, Central Library, Central University of Tamil Nadu, Thiruvarur, Tamil Nadu, India
E-Mail: govindarajanthamba@gmail.com, dhanavandan@gmail.com

Abstract - Health information has high value in society. The accumulated health information empowers the health professionals to serve for millions of lives. The purpose of the study is to examine Ophthalmologists' – Eye Doctors retrospective information retrieval behaviour. 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, Friedman test, Wilcoxon signed-rank test were used in the study. Around 633 ophthalmologists working in 47 academic eye hospitals from 16 states of India were included in the study. The study results revealed that the majority of the ophthalmologists prefer Review articles. The statistical test results showed up that the ophthalmologists' retrospective information retrieval preferences differ by experience, institution type. The three major factors of ophthalmologists' retrospective information retrieval behaviour were identified as Related Resources, Experts / Peers and Information Sources. The Related Resources factor was significantly higher than the Experts / Peers factor and Information Sources factor. The ophthalmic community should motivate the ophthalmologists to publish more review articles. The ophthalmic libraries and information service providers can add a list of related literature for each of their resources.
Keywords: Retrospective Information, Ophthalmologists, Information Search, Information Seeking Behaviour, User Study

I. INTRODUCTION

Health information has high value in society. The information ranges from disease trends, diagnostic tests, medications, treatment ranges, treatment outcomes, complications and risk factors. The health information can be in any of the forms like books, journal articles, patents, etc. The accumulated health information empowers the health professionals to serve for millions of lives.

Ophthalmologists – Eye Doctors adopt different strategies to retrieve retrospective information. Readings of retrospective information will be more different from the current information in several aspects. The ophthalmologists directly involve in retrieving the retrospective information. They follow up the footnotes, endnotes, references found in books, articles or they begin with a citation, retrieve all the works which cited the citation. They search through journal back volumes, subject catalogues, bibliographies and abstracting and Indexing (A & I) services, review articles. They also retrieve the information through other channels like librarians, social networking professional groups, colleagues, friends, experts, consultants to find out the relevant retrospective literature.

The purpose of the study is to examine ophthalmologists' retrospective information retrieval behaviour. The expected outcome of the study will be helpful to the librarians, information providers. Survey method is used to collect the retrospective information retrieval habits of ophthalmologists. 633 ophthalmologists working in 47 academic eye hospitals from 16 states of India were included in the study. This particular study is a part of the main study "Information Needs and Seeking Behaviour of Ophthalmologists in Academic Eye Hospitals in India".

II. REVIEW OF LITERATURE

Tenopir, C., King, (2009) investigated the electronic journals and changes in scholarly article seeking and reading patterns. They examined what are all the ways, the faculty members using to become aware of and locate articles. The two prominent ways were browsing and persons (colleagues, authors, etc.).The faculties retrieve recent articles through browsing and older articles through citations.

Engel, D., (2011) studied about the information-seeking habits of engineering faculty. The study enrolled 903 engineering faculty members. Majority of the respondents chose Citations at the end of journal articles to become aware of less recent journal articles.

Patra, B. K. (2016) examined the user Experience of Library Services of Asansol Engineering College, Asansol, West Bengal. A total of 114 students participated in the study. Most of the respondents collect reference from internet followed by the subject teacher and senior students. For searching their required documents majority of the students take the help of the librarian.

Solomon, A. O. (2016) conducted a study to investigate the information seeking behaviour of medical doctors in IRRUA specialist teaching hospital. A total of 121 medical doctors were enrolled in the study. Majority of the medical

doctors prefer to use more of the Internet, research works, and reference materials to retrieve information.

Laltlanmawii, R., (2016) conducted a study to investigate the information Seeking Behaviour of Faculties and Research Scholars in School of Physical Sciences, Mizoram University. A total number of 53 faculties and research scholars were enrolled in the study. The faculties and research scholars use formal and information sources. They use the formal sources like Journal, books library catalogue and thesis and dissertation and informal sources like seminar / conferences / workshops, Social networking sites (SNSs), online forum discussion and personal contact with professional.

Judd, T., (2017) examined the selection and use of online learning resources by first-year medical students. The study data were drawn from a survey among 326 students and access log from medical school learning platform. Students select learning resources based on the recommendation of peers than of teaching staff.

III. OBJECTIVES OF THE STUDY

1. To determine the ophthalmologists' retrospective information retrieval behaviour.
2. To examine ophthalmologists' retrospective information retrieval behaviour and gender.
3. To check ophthalmologists' retrospective information retrieval behaviour and age group.
4. To investigate ophthalmologists' retrospective information retrieval behaviour and designation.
5. To examine ophthalmologists' retrospective information retrieval behaviour and experience.
6. To check ophthalmologists' retrospective information retrieval behaviour and institution type.

IV. HYPOTHESES OF THE STUDY

1. The ophthalmologists' retrospective information retrieval behaviour differs by gender.
2. The ophthalmologists' retrospective information retrieval behaviour differs by age groups.
3. The ophthalmologists' retrospective information retrieval behaviour differs by designation.
4. The ophthalmologists' retrospective information retrieval behaviour differs by experience.
5. The ophthalmologists' retrospective information retrieval behaviour differs by institution type.

V. METHODOLOGY

The research design adopted for this study was cross-sectional. Convenience sampling method was found appropriate to enrol 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 ophthalmologists' retrospective information retrieval behaviour. This particular study is a part of the main study "Information Needs and Seeking Behaviour of Ophthalmologists in Academic Eye Hospitals in India". A total of 633 ophthalmologists working in 47 academic eye hospitals from 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 spread sheets. 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 behaviour of ophthalmologists. The Mann Whitney U test was used to examine ophthalmologists' attitude with gender. The Kruskal-Wallis test was used to examine the ophthalmologists' attitude with age, designation, experience, and institution type. Factor Analysis, Friedman test, Wilcoxon signed-rank test were used to determine the retrospective information retrieval behaviour of ophthalmologists.

VI. ANALYSIS AND INTERPRETATION

Ophthalmologists' retrospective information retrieval behaviour had been ascertained based on nine variables with a five point scale such as "1-Never", "2-Rarely", "3-Seldom", "4-Often" and "5-Most Often". The internal consistency of the variables was measured by Cronbach's alpha (Alpha >0.70 is considered as acceptable). The alpha coefficient for the variables is 0.8055 which indicates that the variables have relatively high internal consistency. The number of responses, percentage, mean, standard deviation, median, and rank was shown in Table I. Ranks were assigned based on the mean and standard deviation.

It can be seen from table I that "Review articles" was the first preference of ophthalmologists. It is followed by ""References at the end of book chapters / Journal articles"" and it was their second preference. The least preference was "Social Networking Professional groups". The mean value of the responses ranges between 3.41 and 4.11. The standard deviation of the responses ranges between 0.62 and 0.99.

The retrospective information retrieval behaviour of female and male ophthalmologists was analysed 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 II.

TABLE I RETROSPECTIVE INFORMATION RETRIEVAL BEHAVIOR – SUMMARY

S. No.	Description	Never	Rarely	Seldom	Often	Most Often	Mean (SD)	Median	Rank
1	Citations at the end of book chapters/ Journal articles	0 (0%)	11 (1.7%)	95 (15%)	393 (62.1%)	134 (21.2%)	4.03 (0.66)	Often	3
2	References at the end of book chapters / Journal articles	0 (0%)	7 (1.1%)	86 (13.6%)	402 (63.5%)	138 (21.8%)	4.06 (0.63)	Often	2
3	Searching through journal back volumes	3 (0.5%)	43 (6.8%)	164 (25.9%)	340 (53.7%)	83 (13.1%)	3.72 (0.79)	Often	7
4	Retrospective searching on other information sources	4 (0.6%)	17 (2.7%)	160 (25.3%)	358 (56.6%)	94 (14.8%)	3.82 (0.73)	Often	5
5	Review articles	1 (0.2%)	7 (1.1%)	65 (10.3%)	408 (64.5%)	152 (24%)	4.11 (0.62)	Often	1
6	Through Librarian	27 (4.3%)	56 (8.8%)	156 (24.6%)	316 (49.9%)	78 (12.3%)	3.57 (0.96)	Often	8
7	Social Networking Professional groups	30 (4.7%)	79 (12.5%)	191 (30.2%)	270 (42.7%)	63 (10%)	3.41 (0.99)	Often	9
8	Through discussing with colleagues / friends	11 (1.7%)	29 (4.6%)	111 (17.5%)	396 (62.6%)	86 (13.6%)	3.82 (0.79)	Often	6
9	Through the consultation from a specialist / consultant	10 (1.6%)	26 (4.1%)	118 (18.6%)	368 (58.1%)	111 (17.5%)	3.86 (0.81)	Often	4

TABLE II RETROSPECTIVE INFORMATION RETRIEVAL BEHAVIOR VS. GENDER

S. No.	Description	Female		Male	
		Mean (SD)	Rank	Mean (SD)	Rank
1	Citations at the end of book chapters/ Journal articles	4.07 (0.66)	3	3.99 (0.65)	3
2	References at the end of book chapters / Journal articles	4.12 (0.61)	2	4.01 (0.64)	2
3	Searching through journal back volumes	3.8 (0.74)	7	3.65 (0.83)	7
4	Retrospective searching on other information sources	3.86 (0.7)	6	3.79 (0.76)	5
5	Review articles	4.14 (0.58)	1	4.09 (0.66)	1
6	Through Librarian	3.58 (0.95)	8	3.56 (0.98)	8
7	Social Networking Professional groups	3.45 (0.94)	9	3.37 (1.02)	9
8	Through discussing with colleagues / friends	3.87 (0.79)	5	3.77 (0.78)	6
9	Through the consultation from a specialist / consultant	3.87 (0.84)	4	3.85 (0.78)	4

TABLE III RETROSPECTIVE INFORMATION RETRIEVAL BEHAVIOR 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	Citations at the end of book chapters/ Journal articles	4.05 (0.63)	2	4.03 (0.65)	3	4.01 (0.7)	3	4.05 (0.74)	2	3.25 (0.71)	5
2	References at the end of book chapters/Journal articles	4.06 (0.64)	1	4.07 (0.62)	2	4.09 (0.61)	1	4.05 (0.74)	2	3.63 (0.52)	1
3	Searching through journal back volumes	3.67 (0.78)	7	3.73 (0.79)	7	3.85 (0.76)	5	3.67 (1.11)	6	3.5 (0.53)	3
4	Retrospective searching on other information sources	3.78 (0.66)	6	3.84 (0.76)	6	3.94 (0.7)	4	3.67 (1.06)	4	3.25 (0.71)	7
5	Review articles	4.04 (0.65)	3	4.18 (0.58)	1	4.07 (0.65)	2	4.14 (0.65)	1	3.63 (0.52)	1
6	Through Librarian	3.58 (0.91)	8	3.62 (0.95)	8	3.39 (1.08)	9	3.52 (1.17)	7	3.5 (0.53)	3
7	Social Networking Professional groups	3.46 (0.96)	9	3.4 (0.99)	9	3.42 (1.03)	8	3.1 (1.14)	9	3 (0.76)	9
8	Through discussing with colleagues / friends	3.85 (0.8)	5	3.85 (0.71)	5	3.78 (0.9)	6	3.38 (1.02)	8	3.25 (0.71)	7
9	Through the consultation from a specialist / consultant	3.92 (0.8)	4	3.88 (0.77)	4	3.75 (0.92)	7	3.67 (0.86)	5	3.25 (0.46)	5

Rank is derived for each gender group based on the mean and standard deviation of ophthalmologists' preferences. The ranks show up that most of the female and male ophthalmologists prefer "Review Articles". It was followed by "References at the end of book chapters / Journal articles". A Mann Whitney U test was conducted to determine whether there is any difference between ophthalmologists' preferences and gender. The mean rank for male ophthalmologists was 311.09. The mean rank for female ophthalmologists was 323.81. The test showed that there doesn't exist a significant difference between ophthalmologists preference and gender (P-value=0.379)

The retrospective information retrieval behaviour of ophthalmologists in different age groups was analysed further and ranks were assigned based on the mean and standard deviation. The mean, standard deviation, rank and Kruskal-Wallis test results were shown in Table III.

Rank is derived for each age group based on the mean and standard deviation of ophthalmologists' preferences. The

ranks show up that most of the ophthalmologists in age groups "Less than or equal to 30", "41 to 50", and "61 and above" prefer "References at the end of book chapters / Journal articles". The ophthalmologists in the age groups"31 to 40", and "51 to 60"prefer "Review Article".

A Kruskal-Wallis H test was conducted to determine if ophthalmologists' preferences differ with age groups. The mean ranks for the age groups were Less than or equal to 30 (318.29), 31 to 40 (324.01), 41 to 50 (315.47), 51 to 60 (272.31), 61 and above (155.31) respectively. The test showed that there doesn't exist a significant difference between ophthalmologists preference and age groups ($\chi2(2)$ =8.071, P-value=0.089).

The retrospective information retrieval behaviour of ophthalmologists in different designations was analysed further and ranks were assigned based on the mean and standard deviation. The mean, standard deviation, rank and Kruskal-Wallis test results were shown in Table IV.

TABLE IV RETROSPECTIVE INFORMATION RETRIEVAL BEHAVIOR VS. DESIGNATION

S. No.	Description	Medical Officer		Fellows		Senior Resident	
		Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Rank
1	Citations at the end of book chapters/ Journal articles	4.02 (0.68)	3	4.04 (0.63)	3	4 (0.55)	4
2	References at the end of book chapters / Journal articles	4.07 (0.59)	2	4.05 (0.68)	2	4 (0.55)	4
3	Searching through journal back volumes	3.71 (0.81)	7	3.74 (0.77)	7	3.64 (0.93)	7
4	Retrospective searching on other information sources	3.82 (0.77)	5	3.82 (0.69)	5	3.93 (0.47)	6
5	Review articles	4.12 (0.61)	1	4.1 (0.64)	1	4 (0.68)	3
6	Through Librarian	3.57 (0.96)	8	3.59 (0.94)	8	3.14 (1.41)	9
7	Social Networking Professional groups	3.41 (0.99)	9	3.39 (0.98)	9	3.57 (1.22)	8
8	Through discussing with colleagues / friends	3.81 (0.77)	6	3.81 (0.82)	6	4.21 (0.7)	1
9	Through the consultation from a specialist / consultant	3.84 (0.81)	4	3.87 (0.81)	4	4.21 (0.58)	1

Rank is derived for each designation based on the mean and standard deviation of ophthalmologists' preferences. The ranks show up that most of the ophthalmologists in designation groups "Medical Officer", "Fellows" prefer "Review Articles". The ophthalmologists in the designation groups"Senior Resident"prefer "Through discussing with colleagues / friends".

A Kruskal-Wallis H test was conducted to determine if ophthalmologists' preferences differ with designation groups. The mean ranks for the designation groups were

Medical Officer (315.99), Fellows (317.86), and Senior Resident (327.57) respectively. The test showed that there doesn't exist a significant difference between ophthalmologists preference and designation groups ($\chi2(2)$ =0.064, P-value=0..968).

The retrospective information retrieval behaviour of ophthalmologists in different experience groups was analysed further and ranks were assigned based on the mean and standard deviation. The mean, standard deviation, rank and Kruskal-Wallis test results were shown in Table V.

TABLE V RETROSPECTIVE INFORMATION RETRIEVAL BEHAVIOR 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	Citations at the end of book chapters/ Journal articles	4.03 (0.61)	2	3.95 (0.78)	3	3.97 (0.76)	2	3.81 (0.83)	3	4.12 (0.67)	3
2	References at the end of book chapters / Journal articles	4.02 (0.62)	3	4.1 (0.55)	2	4.07 (0.64)	1	3.9 (0.7)	2	4.21 (0.63)	2
3	Searching through journal back volumes	3.69 (0.79)	7	3.8 (0.72)	6	3.77 (0.73)	5	3.58 (1.06)	6	3.83 (0.76)	6
4	Retrospective searching on other information sources	3.79 (0.72)	6	3.93 (0.62)	4	3.83 (0.7)	3	3.61 (1.02)	5	3.96 (0.72)	4
5	Review articles	4.08 (0.63)	1	4.15 (0.53)	1	3.8 (0.61)	4	4.06 (0.73)	1	4.28 (0.55)	1
6	Through Librarian	3.58 (0.96)	8	3.53 (0.93)	8	3.1 (1.12)	9	3.48 (1.12)	7	3.7 (0.88)	8
7	Social Networking Professional groups	3.41 (0.98)	9	3.4 (0.93)	9	3.37 (0.85)	8	3.03 (1.11)	9	3.5 (1.01)	9
8	Through discussing with colleagues / friends	3.85 (0.76)	5	3.78 (0.77)	7	3.67 (0.88)	6	3.42 (0.99)	8	3.85 (0.77)	5
9	Through the consultation from a specialist / consultant	3.91 (0.76)	4	3.88 (0.79)	5	3.57 (0.94)	7	3.61 (0.84)	4	3.83 (0.89)	7

Rank is derived for each experience group, based on the mean and standard deviation of ophthalmologists' preferences. The ranks show up that most of the ophthalmologists in experience groups "Less than or equal to 5 years", "6 to 10 years", "16 to 20 years", "21 and above years" prefer "Review Articles". The ophthalmologists in the experience group "11 to 15 years" prefer "References at the end of book chapters / Journal articles".

A Kruskal-Wallis H test was conducted to determine if ophthalmologists' preferences differ with experience groups. The mean ranks for the experience groups were Less than or equal to 5years (314.69), 6 to 10 years (309.09), 11 to 15 years (269.40), 16 to 20 years (240.05), 21 and above years (358.98)respectively. The test showed that there exist a significant difference between ophthalmologists preference and experience ($\chi2(2) =14.229$, P-value=0.007).

The retrospective information retrieval behaviour of ophthalmologists working in different institution type was analysed further and ranks were assigned based on the mean and standard deviation. The mean, standard deviation, rank and Kruskal-Wallis test results were shown in Table VI.

TABLE VI RETROSPECTIVE INFORMATION RETRIEVAL BEHAVIOR VS. INSTITUTION TYPE

S. No.	Description	Government		NGO		Corporate	
		Mean (SD)	Rank	Mean (SD)	Rank	Mean (SD)	Rank
1	Citations at the end of book chapters/ Journal articles	3.95 (0.59)	4	4.03 (0.66)	3	4.05 (0.65)	3
2	References at the end of book chapters / Journal articles	4.12 (0.56)	2	4.05 (0.64)	2	4.06 (0.61)	2
3	Searching through journal back volumes	3.66 (0.96)	7	3.73 (0.78)	7	3.7 (0.8)	5
4	Retrospective searching on other information sources	3.61 (0.92)	8	3.83 (0.7)	5	3.9 (0.79)	4
5	Review articles	4.05 (0.63)	3	4.1 (0.63)	1	4.18 (0.6)	1
6	Through Librarian	3.27 (1.2)	9	3.69 (0.87)	8	2.95 (1.11)	9
7	Social Networking Professional groups	3.8 (0.87)	6	3.44 (0.95)	9	2.95 (1.16)	8
8	Through discussing with colleagues / friends	4.2 (0.64)	1	3.82 (0.77)	6	3.57 (0.88)	7
9	Through the consultation from a specialist / consultant	3.85 (0.76)	5	3.9 (0.79)	4	3.62 (0.92)	6

Rank is derived for each institution type based on the mean and standard deviation of ophthalmologists' preferences. The ranks show up that most of the ophthalmologists in institution types "NGO", "Corporate" prefer "Review Articles". The ophthalmologists in the institution type"Government"prefer "Through discussing with colleagues / friends".

A Kruskal-Wallis H test was conducted to determine if ophthalmologists' preferences differ with institution type. The mean ranks for the institution types were Government (322.74), NGO (326.67), and Corporate (249.25) respectively. The test showed that there exist a significant difference between ophthalmologists preference and institution type ($\chi2(2) =12.213$, P-value=0..002).

A. Determining the Major Factors of Ophthalmologists' Retrospective Information Retrieval Behaviour

Factor analysis with varimax rotation is used to determine the major factors of ophthalmologists' retrospective information retrieval behaviour. The table 7 shows up the factor analysis results of the ophthalmologists' retrospective information retrieval behaviour. The 9 items neatly loaded

on 3 factors with a total of 69.781% variance and total Eigen value of 6.280.

The criteria used for identifying the factors were based on the following criteria.
1. Eigen value of factor is greater than one.
2. Two or more items are loading in each factor.
3. Factor loadings are greater than 0.5.

TABLE VII OPHTHALMOLOGISTS' RETROSPECTIVE INFORMATION RETRIEVAL BEHAVIOUR: FACTOR ANALYSIS RESULTS

S. No.	Description	Component		
		Factor 1	Factor 2	Factor 3
1	Citations at the end of book chapters/ Journal articles	.891	.095	.081
2	References at the end of book chapters / Journal articles	.887	.135	.170
3	Searching through journal back volumes	.294	.152	.741
4	Retrospective searching on other information sources	.262	.050	.782
5	Review articles	.621	.079	.428
6	Through Librarian	-.039	.372	.608
7	Social Networking Professional groups	-.069	.746	.374
8	Through discussing with colleagues / friends	.177	.871	.086
9	Through the consultation from a specialist / consultant	.193	.818	.078
	Eigenvalue	3.635	1.631	1.015
	Percentage of variance	40.385	18.117	11.279

Note: (N = 633) Factor 1 = Related Resources; Factor 2 =Experts / Peers; Factor 3= Information Sources

The factors are named as follows

1. Factor 1- Related Resources

Three items loaded on this factor having the highest Eigen value of 3.635 with 40.385% of variance. Loadings range from 0.621 and 0.891. This factor emphasis the ophthalmologists' retrospective information retrieval behaviour of referring related information sources for their information need. The items are
a. Citations at the end of book chapters/ Journal articles
b. References at the end of book chapters / Journal articles
c. Review Articles

2. Factor 2- Experts / Peers

Three items loaded on this factor having the Eigen value of 1.631 with 18.117% of variance. Loadings range from 0.746 and 0.871. This factor emphasis the ophthalmologists' retrospective information retrieval behaviour of referring experts / peers for their information need. The items are
a. Social Networking Professional groups
b. Through discussing with colleagues / friends
c. Through the consultation from a specialist / consultant

3. Factor 3- Information Sources

Three items loaded on this factor having the Eigen value of 1.015 with 11.279% of variance. Loadings range from 0.608 and 0.782. This factor emphasis the ophthalmologists'

retrospective information retrieval behaviour of referring information sources for their information need. The items are
a. Searching through journal back volumes
b. Retrospective searching on other information sources
c. Through Librarian

The Friedman test was used to test the differences of the scores of the three retrospective information retrieval behaviour factors. The mean ranks of the factors were Related Resources (2.37), Experts / Peers (1.86), Information Sources (1.77) respectively.

The test results also revealed that there was a statistically significant difference in retrospective information retrieval behaviour depending on what type of resources was referred ($\chi2(2) = 213.957$, p = 0.000). To examine where the differences actually occur, Wilcoxon signed-rank tests on the different combinations of related factors were conducted. Table VIII shows up the Wilcoxon signed-rank test results.

The Wilcoxon signed-rank tests revealed that the Related Resources factor was significantly higher than the Experts / Peers factor (Z=-11.171; P value=0.000). The Related Resources factor was significantly higher than the Information Sources factor (Z=-13.326;P value=.000). The Wilcoxon signed-rank tests reveals that there doesn't exist any systematic differences within the factors Information Sources and Experts / Peers (Z=-.126; P value=0.900).

TABLE VIII OPHTHALMOLOGISTS' RETROSPECTIVE INFORMATION RETRIEVAL BEHAVIOUR FACTORS – WILCOXON SIGNED-RANK TEST RESULTS

Factors		N	Mean Rank	Sum of Ranks
Experts / Peers-Related Resources				
	Negative Ranks	292 (a)	202.40	59100.50
	Positive Ranks	85 (b)	142.97	12152.50
	Ties	256 (c)		
	Z	-11.171	Asymp. Sig. (2-tailed)	.000
(a) Experts / Peers<Related Resources (b) Experts / Peers>Related Resources (c) Experts / Peer>Related Resources				
Information Sources-Related Resources				
	Negative Ranks	315 (a)	193.23	60868.50
	Positive Ranks	53 (b)	132.59	7027.50
	Ties	265 (c)		
	Z	-13.326	Asymp. Sig. (2-tailed)	.000
(a) Information Sources<Related Resources (b) Information Sources>Related Resources (c) Information Sources=Related Resources				
Information Sources-Experts / Peers				
	Negative Ranks	205 (a)	177.86	36462.00
	Positive Ranks	175 (b)	205.30	35928.00
	Ties	253 (c)		
	Z	-.126	Asymp. Sig. (2-tailed)	.900
(a) Information Sources<Experts / Peers (b) Information Sources>Experts / Peers (c) Information Sources=Experts / Peers				

VII. CONCLUSION

Around 633 ophthalmologists working in 47 academic eye hospitals from 16 states of India were included in the study. The study aims to examine ophthalmologists' retrospective information retrieval behaviour. The study results revealed that the majority of the ophthalmologists prefer Review Articles. The statistical test results showed up that the ophthalmologists' retrospective information retrieval preferences differ by experience, institution type. The three major factors of ophthalmologists' retrospective information retrieval behaviour were identified as Related Resources, Experts / Peers and Information Sources. The Related Resources factor was significantly higher than the Experts / Peers factor and Information Sources factor.

The study results will be helpful to the ophthalmic librarians, information service providers and the ophthalmic community to understand the nature of the ophthalmologists' retrospective information retrieval behaviour. The ophthalmic community should motivate the ophthalmologists to publish more review articles. The ophthalmic libraries can enhance their digital libraries by adding up a list of related retrospective literature for each resource in the digital library. This requires a lot of understanding of the subject, archiving and resource building skills. The librarians should sharpen their skill for this. The ophthalmic institutions should allocate appropriate human resource and infrastructure for resource building. The ophthalmic information service providers can also add a list of related retrospective literature for their resources and promote the retrospective resources through social networking.

REFERENCES

[1] Tenopir, C., King, D. W., Edwards, S., & Wu, L. (2009, January). Electronic journals and changes in scholarly article seeking and reading patterns. *In Aslib proceedings, 61*(1), 5-32, Emerald Group Publishing Limited.

[2] Engel, D., Robbins, S., & Kulp, C. (2011). The information-seeking habits of engineering faculty. *College & Research Libraries, 72*(6), 548-567.

[3] Patra, B. K. (2016). User Experience of Library Services of Asansol Engineering College, Asansol, West Bengal: A Case Study. *International Research: Journal of Library and Information Science, 6*(4).

[4] Solomon, A. O. (2016). Information Seeking Behaviour of Medical Doctors in IRRUA Specialist Teaching Hospital.

[5] Laltlanmawii, R., & Verma, M. K. (2016). Information Seeking Behaviour of Faculties and Research Scholars in School of Physical Sciences, Mizoram University, Aizawl: A Study. *International Research: Journal of Library and Information Science, 6*(2).

[6] Judd, T., & Elliott, K. (2017). Selection and use of online learning resources by first-year medical students: cross-sectional study. *JMIR medical education, 3*(2).