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A Webometric Analysis of Medical Tourism Websites in Kerala

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Abstract

Medical Tourism is any kind of travel to make a person or a member of his family healthier (Raj,2006). The word Medical Tourism was coined when people started looking outside west for cheaper medical treatment with international quality. It can be broadly defined as provision of 'cost effective' private medical care in collaboration with the tourism industry for patients needing surgical care and other forms. Kerala has become one of the leading Medical Tourism destinations of India and gained international attention for health tourism and is becoming a popular health tourism hub. There are a number of speciality hospitals in Kerala that offer specialized care for complex medical conditions. Patients from all over the world are becoming medical tourist in Kerala for low cost and health restorative alternative treatments. Speciality hospitals in Kerala are at the forefront of Medical Tourism. Many of the hospitals offer a complete package that includes consultancy with a medical specialist, diagnosis, appropriate medical treatment, pre and post operative care etc. The quality of health care offered by the doctors, nurses and support staff, makes Medical Tourism in Kerala the preferred choice of patients seeking healthcare solutions in World. Kerala has an excellent track record in the fields of tourism and health care. The Confederation of Indian Industry (CII) has declared 2006-2007 as Medical Tourism Year in Kerala and they organized an International conference and exhibition on Health tourism in 2013 at Kochi, Kerala. According to the CII-Mc Kinsy report Medical Tourism industry in Kerala is expected to be worth \$4 billion by 2017.

Confederation of Indian Industry along with Kerala Government is organizing an International Conference on Health Tourism 2015 at Le Meridian, Kochi, Ernakulam on 30-31of October 2015. The event aims to promote Kerala as the hub for Medical Tourism in the country by 2020. The competitiveness of Kerala in health tourism is enhanced by the attractiveness of the alternative systems of medicine, especially ayurveda, for the foreign tourists. Kerala is also known as land of Ayurveda for its traditional medicines which aim at providing rejuvenation, longevity and relaxation to stressed and strained. More over Kerala has a potential to attract tourists around the world due to its cultural diversity, perfect beaches and fabulous cuisine mixed with a pinch of oriental mysticism. Kerala and Ayurveda have virtually become synonymous with each other. World-class facilities are also available in the other traditional forms of medicine as well as modern medical treatment.

Keywords: Webometrics, Medical Tourism, Websites, Searching Engines, Retrieval Efficiency.

Introduction

The term webometrics was coined by Thomas C. Almind and Peter Ingwersen (1977). The persons associated with webometric studies are known as webometricians. Webometrics is the quantitative study of web resources. In other words webometrics is the application of informetric methods to World Wide Web. Bojorneborne and Ingwersen(2004) defined it as

“the study of the quantitative aspects of the construction and use of information resources, structure and technologies on the World Wide Web drawing on informetric and bibliometric approaches”. Webometrics is also known as cybermetrics. Bibliometrics, Informetrics, Scientometrics, Web mining and Virtual ethnography are related and similar scientific fields of webometrics

The science of webometrics tries to measure the World Wide Web to get the knowledge about the number and types of hyper links structure of the World Wide Web and usage patterns. Thelwall (2007) defines Webometrics as “the study of web based content with primarily quantitative methods for social science research goals using techniques that are not specific to one field of study”. Interdisciplinary research is getting more significant by enlarging the types of subjects of study and the techniques used. This field of study requires contributions from information science, computer science and statistical science. Webometrics is an emerging research field in library and information science.

Webometric covers research of all network based on communications using informetric or other qualitative measures. Its methodology draws especially from bibliometrics. It is clear that informetric methods using word counts and similar techniques can be regarded as a citation network, where the traditional information entities and citations from them are replaced by web pages. These pages are the entities of information on the web with hyperlinks from them acting as citations. The use of info metric methods on www allows the analysis to be similar way as in the traditional citation database. Studies in webometrics focus on hyperlinks as a potential source of new information.

In bibliometrics studies journal article citations are analyzed where as in webometric studies links to journals are analyzed to find a journal impact factor. But quantitative studies of hyperlinks have broader potential applications than bibliometric studies of citations. Some have computer science goals such as improving web search engine performance, while others have information of science objectives such as using hyperlinks to help in building online document collections. One of the strength of the webometrics is that its object of the study, the web, which enjoys a widespread use that webometric result can benefit many different line of search. In short webometrics is concerned with measuring aspects of the web: domain, web sites, web pages, words in web pages, links, web search engine results and web impact factor (Jeyshankar, 2011). Thus webometrics is an emerging research field in library and information science

Webometric research has fallen into two main categories namely link analysis and search engine evaluation. Search engines are also used to collect data for link analysis. A set of measurements is proposed for evaluating Web search engine performance (Vaughan,2004). Some measurements are adapted from the concepts of recall and precision, which are commonly used in evaluating traditional information retrieval systems. Others are newly developed to evaluate search engine stability, which is unique to Web information retrieval systems. Overlapping of search results, annual growth of search results on each search engines, variation of results on search using synonyms are also used to evaluate the relative efficiency of search engines.

The recall is the ability of a retrieval system to obtain all or most of the relevant documents in the collection. Precision is the fraction of a search output that is relevant for a particular query. Overlapping of search engines means occurrence of same sites between or among the selected search engines. Stability is based on the number of pages retrieved,

sameness of sites in the top pages and arrangement of sites in consecutive tests over a short period of time. In this study the investigator attempt to conduct a webometric study on the topic Medical Tourism in Kerala using six search engines, of these include three general search engines namely Bing, Google and Lycos and three Metasearch engines namely Dogpile, ixquick and WebCrawler. Here these six popular search engines will use to retrieve the information from the World Wide Web on the topic Medical Tourism in Kerala to ascertain the amount of information retrieved through these six search engines and to evaluate the relative efficiency of them to identify the most relevant search engine in this field. It is therefore, significant for library and information professionals to conduct research on internet for optimum utilization of internet. Considering the above factor the investigator attempted to conduct a webometric study on the topic “Medical Tourism in Kerala”.

Literature Review

Shukla and Tripathi (2009) conducted webometric research for websites of Institutes of National Importance in India and reported the present scenario of *backlinks* structure of websites of Institutes of National Importance of India by examining the extent of the *backlinks* given by different domains to these Institutes. Moreover, percentage of deep link ratio, pattern of page pointing and link-type relationship has been examined in the study also by using software “Backlink Analyzer.” From the study, it has been found that websites of Institutes of National Importance attracted more *inlinks* from commercial Web domains than educational or any other Web domains.

Jeyshankar and Babu (2009) conducted a webometric study for websites of universities in Tamil Nadu and concluded the low WIF for all universities under consideration.

A similar study conducted by Babu *et al* (2010) for websites of central universities in India and found that citation analysis and link analysis are not analogous to each other. Further, they investigated the domain systems of the websites, WIF for central universities in India and their rankings based on WIF data.

Thanuskodi (2011) conducted a Webometric analysis for websites of private engineering colleges in Tamil Nadu by using AltaVista and found that websites of private engineering colleges of Tamil Nadu did not have much impact on the Web.

Islam, A. and Alam,S (2011) examined websites of 44 private universities of Bangladesh to calculate the WIF and absolute WIF. In a cross-sectional study, all the websites were analyzed and compared using AltaVista search engine and revealed the low WIF, selflink, external links and Absolute WIF as well as less impact on Web.

Vijaya kumar (2012) investigated to find inlinks and self-link WIFs for 19 Sri Lankan universities websites using AltaVista and it was found that universities of Sri Lanka are possessing varied domains for their home pages namely [.ac.net] and [.lk] but most of them (89.47%) prefer the sub level domain like [.ac].

Pechnikov and Nwohiri (2012) investigated the official websites of Nigerian universities and revealed the weak connectivity in the set of official websites of Nigerian universities. However, the connectivity becomes stronger when all the university websites were taken into account. It increases significantly with the addition of the only found Web

communicator to the university websites under National Universities Commission which approves the establishment of higher educational institutions in Nigeria. Further, suggested that all universities should switch to the use of [.edu.ng] as their top-level domains.

Thanuskodi (2012) investigated the selected Institutes of National Importance websites in India and focused mainly on the webpage content analysis of 10 selected Institutes of National Importance Libraries in India; and found that general information about homepage features is more in Indian Institutes of Technology and least in Indian Statistical Institute and Indian Institute of Science.

Aguillo (2012) analyzed the usefulness of Google Scholar database for bibliometric analysis and especially for research evaluation. Instead of names of authors or institutions, a webometric analysis of academic Web domains is performed by Aguillo and bibliographic records for 225 top level domains (TLD), 19,240 universities and 6380 research centers' institutional Web domains have been collected from the Google Scholar database. In the investigation, it has been found that 63.8% of the records were hosted in generic TLDs like [.com] or [.org], confirming that most of the Google Scholar data come from large commercial or non-profit sources. One-third of the other items were hosted by the 10,442 universities, while 3901 research centers account for an additional 7.9% from the total. Further, the individual analysis displayed that universities from China, Brazil, Spain, Taiwan and Indonesia were far better ranked than expected.

Objectives

- To compare and evaluate the relative efficiency of six search engines that is three general search engines with three Metasearch engines. Bing, Google, Lycos with Dogpile, Ixquick and WebCrawler in locating the web resources on Medical Tourism in Kerala and thereby identify and select relevant search engine in this field.
- To compare and evaluate the above search engines on the basis of their precision and recall.
- To find out the rate of stability of search results of these search engines.
- To find out the percentage of overlapping of websites among these search engines
- To estimate and compare the annual growth rate of web resources on Medical Tourism using these search engines.

Methodology

Methodology used for the study is the webometric study. Six search engines namely Bing, Google, Lycos, and Dogpile, Ixquick and WebCrawler are used to collect relevant information from the web. For it different variables on the topic Medical Tourism in Kerala are selected for key word searching. Quantitative analysis is done on these results for each search engine. Search on each category is done simultaneously due to the dynamic nature of the web.

Precision and recall, stability of results, extent of overlapping are studied for comparison and evaluation of search engines with Metasearch engines using different parameters. To compare the stability of search results, data are collected five times with same

keywords in 7-8 days apart, within a short period of one month and number of hits, order of arrangement and sameness of top sites in consecutive search results and their fluctuations are studied using six search engines.

For calculating annual growth rate of web sites on each search engine, data are collected two times with an interval of one year. Difference in percentage is analysed to find the annual growth rate. Search using synonyms of keywords is done and results are analysed to compare the variations in results.

Analysis of Search Results for Retrieval Efficiency

The retrieval efficiency of a search engine means the efficiency to retrieve more documents on a particular query. The variables selected for the key word searching are grouped into ten categories of sub headings in the topic Medical Tourism in Kerala for the analysis of retrieval efficiency of search engines as follows.

- 1) Medical Tourism in Kerala
- 2) Ayurveda Tourism in Kerala
- 3) Dental Tourism in Kerala
- 4) Fertility Tourism in Kerala
- 5) AYUSH in Kerala
- 6) Medical Tourism Hospitals in Kerala
- 7) IVF Hospitals in Kerala
- 8) Ayurveda Centers in Kerala
- 9) Dental Tourism Clinics in Kerala
- 10) Medical Tourism treatments in Kerala

Retrieval Efficiency of Search Engines on Medical Tourism in Kerala

For analysis of Retrieval efficiency of search engines on Medical Tourism in Kerala 10 representative variable from different sub sectors of Medical Tourism are selected as key words. Search was conducted on 26th September 2014 and number of hits retrieved for each query by all the six search engines were noted. The key words used and number of hits retrieved by each search engines are as shown in table 5.1.

Table 1: *Retrieval efficiency of search engines on Medical Tourism in Kerala*

No .	Key- words	Search Engines			Metasearch Engines			Total
		Bing	Google	Lycos	Dog- pile	Ixquick	Web Crawl er	
1	Medical Tourism	8980000	1240000	4330000	630	853580	270	15404480
2	Health Tourism	5080000	2950000	3260000	570	539420	490	11830480
3	Ayur- veda Tourism	1920000	2360000	140000	640	687789	530	6108959
4	Dental Tourism	320000	443000	281000	230	238659	210	1283099

1	Dental Tourism	194000	455000	195000	270	430	330	845030
2	Dental Clinics	191000	1040000	186000	270	420	360	1418050
3	Dental tourism Packages	143000	870000	114000	290	590	240	1128120
4	Dental Treatments	201000	392000	191000	300	540	450	785290
5	Cosmetic Dentistry	34300	87200	50500	270	520	250	172840
6	Dental Studios	122000	650000	294000	300	400	290	1066990
7	Smile Designers	321000	825000	320000	310	520	400	1467230
8	Dental Implants	24400	109000	20200	250	300	350	154500
9	Orthodontics	32100	619000	38100	300	560	410	690470
10	Root canal Treatments	881000	222000	2570000	820	550	240	3674610
Total		2143800	5269200	3978800	3380	4830	3320	11403330
Percentage		18.800	46.208	34.891	.030	.042	.029	

Retrieval efficiency of search engines on Fertility tourism in Kerala

Five variables in the topic Fertility tourism are selected as key words and number of hits by all six search engines was noted as in Table 4. On analysis it is found that from a total of 25727150 sites Bing retrieved 15485400 sites with 60.19 % followed by Lycos with 34.50 % and Google with 5.27% of results. Here also Metasearch engine Ixquick stands first among them followed by WebCrawler and Dogpile.

Table 4: Retrieval efficiency of search engines on Fertility tourism in Kerala

N o.	Keywords	Search Engines			Metasearch Engines			
		Bing	Google	Lycos	Dog pile	Ixqui -ck	WebC rawler	Total
1	Fertility Tourism	3070000	601000	3330000	230	550	450	7002230
2	Reproductive Tourism	2180000	469000	2150000	210	560	440	4800210

3	Surrogacy Tourism	9880000	143000	2950000	430	510	460	1297440 0
4	IVF	310000	81600	261000	580	480	530	654190
5	Neonatology	45400	62400	187000	510	420	390	296120
Total		1548540 0	1357000	8878000	191 0	2520	2270	2572715 0
Percentage		60.190	5.274	34.508	.007	.009	.008	

Retrieval Efficiency of Search Engines on Ayush in Kerala

AYUSH is an acronym of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy. Government of Kerala, with an aim to give a boost to traditional systems of medicines and incorporate them in the prevention and treatment of diseases, launched its AYUSH department on 5th August, 2015. The proposed department, designed on the model of the Centre's AYUSH department, is envisaged to focus on treatment, research and education in Ayurveda, Yoga, Unani, Siddha and Homoeopathy.

Five components of AYUSH are selected for the key word searching and number of hits retrieved by six search engines was tabulated as in Table 5.5. On analysis it is found that search engine Lycos retrieved 33285000 sites with 50.47% from a total of 65941370 sites followed by Bing with 46.23% and Google with 3.28%. Among the Metasearch engines Dogpile stands first with 0.004% of total results followed by Ixquick and WebCrawler.

Table 5: *Retrieval efficiency of search engines on AYUSH in Kerala*

N o.	Keywords	Search Engines			Metasearch Engines			Total
		Bing	Google	Lycos	Dog pile	Ixqu - ick	Web crwle r	
1	AYUSH	9630000	425000	1050000 0	570	350	330	2055625 0
2	Yoga & Naturopath y	1090000	219000	1350000	690	580	510	2660780
3	Unani	9800000	433000	1080000 0	590	550	390	2103453 0
4	Siddha	9790000	536000	1050000 0	570	520	370	2082746 0
5	Homeopat hy	176000	550000	135000	450	500	400	862350
Total		3048600 0	2163000	3328500 0	2870	2500	2000	6594137 0
Percentage		46.231	3.280	50.476	.004	.003	.003	

Retrieval efficiency of search engines on Medical Tourism Hospitals in Kerala

A number of Medical Tourism hospitals are there in Kerala. Ten hospitals selected from the top pages of all the six search engines were used to evaluate the retrieval efficiency of search engines on Medical Tourism hospitals. AIMS- Kochi, Ananthapuri-Trivandrum, Aster Medcity- Kochi, Indo American Hospital- Vaikom, KIMS- Trivandrum, Lakeshore-Kochi, Medical Trust- Kochi and Trichur Heart Hospital- Thissure are the selected hospitals and used as key words. Numbers of hits retrieved for each hospital by all six search engines were noted. Analysis shows that search engines Lycos and Bing retrieved almost same amount of hits with 46.90% and 46.26% respectively. As usual Google shows only a less amount of hits with 6.78% of results. Among Metasearch engines Ixquick comes first with 0.016% followed by WebCrawler and Dogpile as shown in Table 6. Diagrammatic representations of retrieval efficiency of search engines and Metasearch engines are shown in Figures 5.10 and 5.11 with different values on Y axis.

Table 6: *Retrieval efficiency of search engines on Medical Tourism hospitals in Kerala*

N o	Keywords	Search engines			Metasearch engines			Total
		Bing	Google	Lycos	Dog pile	Ixquick	WebC rawler	
1	AIMS, Kochi	955000	664000	958000	530	510	390	2578430
2	Ananthapu ri Trivandru m	8640	21100	13600	250	340	280	44210
3	Aster Medcity, Kochi	11700	30300	11600	300	330	370	54600
4	Indo- Amer. Hospital, Vaikom	2130	7130	2140	320	420	290	124300
5	KIMS, Trivandru m	27800	97000	27800	290	310	300	153500
6	Lakeshore, Kochi	40700	53300	40700	530	540	480	136250
7	Medi.Trust , Kochi	111000	157000	111000	310	330	360	380000
8	MIMS, Kottakkal	4350	15500	4220	290	310	300	24970
9	Specialists Hospital, Kochi	9500000	488000	9690000	410	500	430	1967934 0
10	Trichur Heart Hospital	89300	43100	40300	310	320	360	173690
Total		1075062 0	157643 0	1089936 0	354 0	3910	356 0	2323742 0

Percentage	46.264	6.784	46.904	.015	.016	.015	
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Retrieval efficiency of search engines on IVF hospitals in Kerala

Kerala is becoming one of the fertility tourism hubs of South India having a number of infertility clinics with world class facilities at affordable expense. IVF means In Vitro Fertilization which is an advanced reproductive technique. Hospital having infertility treatments are commonly called IVF hospitals. Five popular IVF hospitals selected from the top pages of six search engines were used as key words for finding retrieval efficiency of search engines on them. ARMC-Kozhikode, CRAFT Hospital- Thrissur, GIFT-Gyno IVF-Kochi, Lifeline Hospital-Adoor and Samad IVF- Trivandrum were the selected hospitals for the study.

Table 7: *Retrieval efficiency of search engines on IVF hospitals in Kerala*

No.	Keywords	Search Engines			Metasearch Engines			Total
		Bing	Google	Lycos	Dogpile	Ixquick	Web Crawler	
1	ARMC, Kozhikode	19900	5450	64200	340	310	330	90530
2	CRAFT Hosp.Tsr.	1060000	44400	1070000	470	500	410	2175780
3	GIFT-Gyno IVF, Kochi	132000	8830	132000	310	330	300	273770
4	Lifeline Hosp.Adr.	32200	9850	32300	270	340	280	75240
5	Samad IVF, Trivandrum	32200	5960	110000	220	330	250	148960
Total		1276300	74490	1408500	1610	1810	1570	2764280
Percentage		46.171	2.694	50.953	.058	.065	.056	

A total of 2764280 hits were retrieved by all the six search engines, of these Lycos stands first with 1408500 hits with 50.95% followed by Bing with 46.17% and Google at far behind with only 2.69% of hits. Here also Metasearch engine Ixquick comes first among them followed by Dogpile and WebCrawler as shown in Table 7.

Retrieval efficiency of search engines on Ayurveda Centers in Kerala

Kerala is known as the land or home of Ayurveda and treatment centers are known by name resorts, hospitals, vydyasalas, clinics ,spas, massage centers, ayurveda parlors etc; .Ayurveda tourism centers are there in all the 14 districts of Kerala. Here only five famous

and well established Ayurveda centers in Kerala namely Dhanvanthari, Dhathri, Kottakkal, Nagarjuna and Somatheeram Ayurveda centers are taken as the key words for collecting web resources by six search engines. On analysis it is found that a total of 1591900 sites were retrieved by all the six search engines and Google stands first with 963000 sites with 60.49% followed by Lycos with 22.90% of results and Bing with 16.27%. Among the Metasearch engines Ixquick stands first as usual followed by WebCrawler and Dogpile as shown in Table 8.

Table 8: Retrieval efficiency of search engines on Ayurveda Centers in Kerala

No.	Keywords	Search Engines			Metasearch Engines			Total
		Bing	Google	Lycos	Dog pile	Ixquick	WebCrawler	
1	Dhanvanthari Ayurveda	106000	123000	114000	370	720	570	344660
2	Dhathri Ayurveda	17500	113000	30500	190	290	250	161730
3	Kottakkal Ayurveda	51300	257000	64100	340	350	330	373420
4	Nagarg. Ayurveda	40600	361000	61600	260	450	410	464320
5	Somath. Ayurveda	43700	109000	94400	230	270	170	247770
Total		259100	963000	364600	1390	2080	1730	1591900
Percentage		16.276	60.493	22.903	0.087	0.130	0.108	

Retrieval efficiency of search engines on Dental Tourism clinics in Kerala

Foreigners flock to Kerala to receive cost effective and superlative dental treatment combined with taking a pleasure vacation. The government of Kerala has introduced strict guidelines to the hospitals to ensure high quality and highest level of medical care competitive with any facility in developed countries. A number of specialty dental clinics are there in all Districts. Only five clinics that are commonly present in the top pages of six search engines were selected and used as key words. Nechupadam Dental Clinic- Kochi, MIDAC Dental Clinic-Calicut, Mother Dental Super specialty Clinic- Kottakkal, Sanjoy Dental Clinic- Kottayam and Vijaya Dental Care-Calicut were the selected clinics and were used to retrieve web resources by six search engines as shown in Table 5.9. Here also Lycos shows high retrieval efficiency by retrieving 1724000 (64.63%) sites from a total of 2667440. Bing stands second with 32.82% of sites followed by Google at far behind with only 2.44% of

sites. Among the Metasearch engines WebCrawler retrieved 1430 (0.05%) sites followed by Ixquick with 0.02% and Dogpile With 0.01%.

Table 9: *Retrieval efficiency of search engines on Dental Tourism clinics in Kerala*

No	Keywords	Search Engines			Metasearch Engines			Total
		Bing	Google	Lycos	Dogpile	Ixquick	WebCrawler	
1	Nechupadam Dental Clinic, Kochi	527000	5600	645000	140	110	200	1178050
2	MIDAC Dental Clinic, Calicut	96800	1230	270000	80	80	310	368500
3	Mother Dent. Sup. Spec. Clinic, Kottakkal	109000	9910	330000	90	50	380	449430
4	Sanjoy Dent. Clinic, Kottayam	65900	31200	233000	100	200	290	330690
5	Vijaya Dental Care, Calicut	76800	17400	246000	120	200	250	340770
Total		875500	65340	1724000	530	640	1430	2667440
Percentage		32.821	2.449	64.631	0.019	0.023	0.053	

Retrieval efficiency of search engines on Medical Tourism Treatments in Kerala

Along with the ayurvedic, dental and infertility treatments some other major treatments for which foreigners come to Kerala were taken as key words for searching. Treatments and the number of hits retrieved by each search engine are tabulated in the Table 5.10. On analysis it is seen that from a total of 8451410 sites, Lycos collected 4997900 with (59.13%) sites and stands first followed by Google with 21.13% and Bing with 19.56% sites. Among Metasearch engines Ixquick stands first with 4870 sites followed by WebCrawler with 4310 sites and Dogpile with 4230 sites.

Table 10: *Retrieval efficiency of search engines on Medical Tourism Treatments in Kerala*

No	Keywords	Search Engines			Metasearch Engines			Total
		Bing	Google	Lycos	Dogpile	Ixquick	Webcrawler	

1	Angioplasty	20900	171000	88400	500	580	540	281920
2	Bypass surgery	342000	171000	326000	410	470	430	840310
3	Hip Replacement	25800	58300	289000 0	390	420	410	2975320
4	Knee Replacement	26100	91900	154000	430	470	450	273350
5	Liposuction	21600	114000	196000	400	420	420	332840
6	Hair Transplant	64300	195000	178000	240	270	260	438070
7	Mesotherapy	12200	19000	35500	210	220	170	67300
8	Infertility Treatments	108000	135000	146000	600	670	490	390760
9	Dental Treatments	312000	373000	297000	650	610	530	983790
10	Ayurveda Treatments	721000	458000	687000	400	740	610	1867750
Total		165390 0	1786200	499790 0	4230	4870	4310	8451410
Percentage		19.569	21.134	59.136	0.050	0.057	0.050	

Cumulative Results of the Web resources on Different Variables carried out in this study

Table 11 contains all the total results obtained from the above ten tables numbered from 1 to 10. Number of variables used under each heading is given in brackets. Thus a total results of 75 variables under 10 sub headings on the topic Medical Tourism in Kerala by six search engines are tabulated and the cumulative result of each search engine is calculated. On analysis it is found that a grant total of 776130233 sites were collected by all search engines, Of these Lycos retrieved 455501060 (58.68%) sites, Bing retrieved 288924790 (37.22%) and Google collected 27543160 (3.54%) sites and came at first, second and third positions respectively. Among Metasearch engines Ixquick retrieved 4105213 (0.52%) sites followed by WebCrawler with 28010 (0.004%) and Dogpile with 28000 (0.004%) sites. The result is diagrammatically represented in Figure 5.16.

It is to be noted that the first table 5.1 containing results of 10 representative variables from all the sub sectors of Medical Tourism in Kerala and the table 5.11 containing cumulative results of 75 variables from all sub sectors of Medical Tourism in Kerala are showing more or less same percentage of retrieval efficiency, that is more than 58% by

Lycos, more than 37 % by Bing and less than 4% by Google. The remaining 1% is shared by three Metasearch engines.

Table 11: *Cumulative Results of the Web resources on Different Variables Carried out in this study*

Sl. No.	Variables	No. of Hits found in						Total
		Search Engines			Metasearch Engines			
		Bing	Google	Lycos	Dog-pile	Ixquick	WebCrawler	
1	Med.Tour (10)	22306000	10786000	35194100	5160	4076523	3920	589872603
2	Ayu.Tour (10)	2934170	3502500	38023900	3380	5530	3900	44473380
3	Dent.tour (10)	2143800	5269200	3978800	3380	4830	3320	11403330
4	Fert.tour. (5)	15485400	1357000	8878000	1910	2520	2270	25727100
5	AYUSH (5)	30486000	2163000	33285000	2870	2500	2000	65941370
6	Medi. Tour. Hos. (10)	10750620	1576430	10899360	3540	3910	3560	23237420
7	IVF Hospitals (5)	1276300	74490	1408500	1610	1810	1570	2764280
8	Ayurveda centers (5)	259100	963000	364600	1390	2080	1730	1591900
9	Dent.tour Clin. (5)	875500	65340	1724000	530	640	1430	2667440
10	Med.Tour Treatments (10)	1653900	1786200	4997900	4230	4870	4310	8451410
Total		288924790	27543160	455501060	28000	4105213	28010	776130233
Percentage		37.226	3.548	58.688	0.004	0.528	0.004	3

Ranking of Medical Tourism Hospitals

In this study ranking of Medical Tourism hospitals are done on the basis of number of total hits retrieved by all the six search engines for a particular hospital. The same hospitals and number of hits retrieved for the study of retrieval efficiency of search engines are taken for the analysis of ranking.

Ranking of Medical Tourism Hospitals by Number of Hits

Ten popular Medical Tourism hospitals taken for the study of retrieval efficiency are arranged rank wise and number of hits retrieved for each hospital by six search engines is tabulated against them as in Table 12. On analysis it is seen that Specialists Hospital-Kochi attains first rank with 19679340 hits followed by AIMS-Kochi with 2578430 hits and Medical Trust –Kochi with 380000 hits. Fourth and Fifth ranks are bagged by Trichur Heart Hospital and KIMS- Trivandrum respectively. (Source of Data: Table 6)

Table 12: *Ranking of Medical Tourism Hospitals by number of hits*

Rank No.	Name of Hospital	Total No. of hits
1	Specialists Hospital, Kochi	19679340
2	AIMS, Kochi	2578430
3	Medical Trust, Kochi	380000
4	Trichur Heart Hospital, Thirure	173690
5	KIMS, Trivandrum	153500
6	Lakeshore, Kochi	136250
7	Indo-American Hospital, Vaikom	124300
8	Aster Medcity, Kochi	54600
9	Ananthapuri Hospital, Trivandrum	44210
10	MIMS, Kottakkal	24970

Hospitals and number of hits are plotted in Figure 5.17. Due to the large number of hits retrieved for the Specialists Hospital and AIMS- Kochi, the others are not comparable with the values in the Y axis. So by excluding these two hospitals.

Ranking of IVF Hospitals by Number of Hits

Five major IVF hospitals are arranged rank wise with the number of hits retrieved for them in Table 13. CRAFT- Thrissur got first rank with a total of 2175780 hits followed by GIFT- Gyno IVF-Kochi with 273770 hits. Samad IVF- Trivandrum, ARMC-Kozhikode and Lifeline-Adoor got third, fourth and fifth positions respectively.

Table 5.13: *Ranking of IVF Hospitals by Number of Hits*

Rank No.	Name of Hospital	Total No. of Hits
1	CRAFT , Thrissure	2175780
2	GIFT- Gyno IVF, Kochi	273770
3	Samad IVF, Trivandrum	148960
4	ARMC, Kozhikode	90530
5	Lifeline Hospital, Adoor	75240

Ranking of Ayurveda Centers by Number of Hits

Five most popular ayurveda centers are arranged rank wise with the number of hits retrieved for them in Table 5.14. On analysis it is found that Nagarjuna center with 464320 hits comes first followed by Kottakkal ayurveda center with 373420 hits. Dhanvanthari, Somatheeram and Dhathri ayurveda attain third, fourth and fifth positions respectively. All the results are plotted in Figure 5.20. (Source of Data: Table 5.8)

Table 14: *Ranking of Ayurveda Centers by number of hits*

Rank No.	Name of Hospital	Total No. of hits
1	Nagarjuna Ayurveda	464320
2	Kottakkal Ayurveda	373420
3	Dhanvanthari Ayurveda	344660
4	Somatheeram Ayurveda	247770
5	Dhathri Ayurveda	161730

Ranking of Dental Tourism Clinics by Number of Hits

Five selected Dental tourism clinics with their number of hits retrieved for them are tabulated in Table 15. Of these Nechupadam Dental clinic stands first with 1178050 hits followed by Mother Dental clinic with 449430 hits. MIDAC Dental clinic, Vijaya and Sanjoy Dental clinics come at third, fourth and fifth positions respectively.

Table 15: *Ranking of Dental tourism Clinics*

Rank No.	Name of Hospital	Total No. of hits
1	Nechupadam Dental Clinic, Kochi	1178050
2	Mother Dental Super specialty Clinic, Kottakkal	449430

3	MIDAC Dental Clinic, Calicut	368500
4	Vijaya Dental Care, Calicut	340770
5	Sanjoy Dental Clinic, Kottayam	330690

Conclusion

Medical Tourism in Kerala is an emerging field with a number of best hospitals, their infrastructure facilities, cost effective medical treatments and well trained human resources. But printed documents and reference sources are very less in this topic. Nascent information in primary sources are scattered in the journals of various disciplines like tourism, medicine business, economics, management etc. due to its multidisciplinary nature. But there are a number of web sources in the World Wide Web on Medical Tourism in Kerala. The exponential growth of the web resources propelled the rapid development of the web search engines which are the most effective tools to access information on various topics. They retrieve a huge amount of information with a number of irrelevant sites. In this study search engines and Metasearch engines are at two extremes in their retrieval efficiency, but their precisions are at the same range. Even though Metasearch engines show very low relative recall, their precision is same as that of search engines with high relative recall. Webometric studies on search engines are manifold, which provide some inputs to web site developers as well as search engine designers to make the search engines more capable.

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