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Online Information Seeking Behavior for Cancer Related Disease

A Developed and Developing Country Comparison

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Abstract— With the rapid development of information and communication technology, seeking information over the internet has been time efficient and easily available regardless of time and place. The channels that provide information through internet have improvised and grown broader. The ubiquity of internet and availability of information has caused people to acquire information about health easily for their respective purposes. In this study, examination of information seeking behaviour through search engine for cancer related disease from developed and developing country was conducted, using Malaysia and Singapore as case studies. The content analysis technique is used to analyse the information seeking behaviour about cancer related disease. The findings show that there are differences in the pattern of information seeking behaviour between those from developed and developing nations.

Keywords— Content analysis; cancer related disease, search engine; information seeking behaviour.

I. INTRODUCTION

With the vast variety of information provided over the internet on the medical information and the benefits internet usage, internet has been useful and helpful as a source for information seeking on cancer-related disease. Such avenue has enabled both patients and carers to better understand the nature of the illness itself and the varieties of treatment available. In addition, the internet has also been channel for communications among patients, where often alternatives for traditional treatments were shared, disseminated among those who seek for affordable treatment of the disease. Despite the varieties of information one can sought online on cancer, with the information and knowledge obtained, it is undeniable that internet had shaped the patients' decision-making on their health.

As such, it is imperative to understand the online users' search habit and possible factors that can affect their information seeking behaviour on a particular illness, such as cancer. By understanding the information that patients sought, health sectors would be able to identify the critical information that had been the concerns among patients and carers.

Cancer is a group of disease related to cell that grows in the cell of human body abnormally [18]. It is one of the chronic diseases that have become more and more prevalent as one of the main causes of death both in developed and developing countries. Hence concentrated efforts are needed to greater emphasis on reducing the number of deaths by creating awareness for the cancer disease [8]. It is also important that prevention strategies should be based on the national conditions due to the different burden of cancer in different regions of the world.

Countries with low health budget and weak or missing health systems will have greater impact on cancer occurrence. When cancer is detected, it can cause long-term human suffering for individuals and families, economic impact on active members of society and high costs for health-care system [18]. During this period, the supports from various required sources will come in helpful. Then, in developing countries, when cancers are detected at advanced stage, the disease become more harder to treat because the involved treatment will be more costly and less successful.

II. HEALTH INFORMATION SEEKING BETWEEN DEVELOPED AND DEVELOPING COUNTRIES

Based on research done by Maddock, Lewis, Ahmad, and Sullivan [9], it is found that cancer information seekers are looking for reliable information so that it can help them in decision making and choices about their healthcare and daily routines. Also, they are expecting broad range of both medical and nonmedical information [9].

Gavgani, Qeisari, and Jafarabadi studied the health information seeking behaviour of the members of five public libraries of Qazvin city of Iran, a developing country [4]. Despite ICT being developed and many information sources are available in the internet; it is found that "TV" is in the first place as the sources and channels used for health information, followed by the "discussions with family, relatives or close friends" and yet, book is the main and common information resource [4]. In addition, although there are many health websites available for health information seeking, search engines Google and Yahoo are broadly used where it shows the

lack of awareness about the health websites existence or language problems in international level [4]. Due to high internet cost and poor infrastructure with insufficient bandwidth in Iran has led to the lack of awareness of health websites existence. This has led the books to become the most common resource for collecting information [16].

Dupas [3] stated that in developing countries, the disease burden can affect people at younger age compared to the disease burden in developed countries where the implication is in the absence of enthusiastic health behaviour to seek prevention or treatment for the disease. Also, Dupas [3] mentioned that lack of information on disease prevention or efficiency and cost-effective of precautionary behaviours are caused by households underinvest in preventive health care in the developing countries. Due to the lack of information on the cause of the disease and treatment for the disease may cause the people to buy drugs that are not needed [3]. In contrary, in the developed countries awareness for the danger of purchasing prescription online is created [17]. Developing countries may rely more on obtained online health information compared to the people in developed countries due to the high cost to visit the medical expert personally [17]. In conclusion, factors such as education literacy and internet infrastructure are several factors that affect the health information seeking in different development of a country.

III. RELATED WORDS AS SEARCH TERMS

Kondracki, Wellman, & Amundson defined content analysis as “a process for systematically analysing messages in any type of communication” [6]. Then, Krippendorff defined content analysis as “a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use” [7]. However, Meyer defined content analysis as “a general set of techniques useful for analysing and understanding collections of text” [12]. Content analysis can be either in qualitative, quantitative or both. Content analysis has been used to establish specific hypothesis about a topic of interest in any type of communication where it provides a systematic technique for evaluation of data collected [6].

For this research, content analysis is performed on a popular search engine, Google. A web interface tool provided by Google called Google Trends is used generates graphs for evaluation. Google Trends provides the graph that illustrates the search traffic data for search terms done by the Google users through the Google search engine about cancer related disease. Also, through the traffic data of the search terms, it provides internet search data trending of the topics searched through the Google search engine. In addition, through the graph, we can understand the frequency of search done through Google about the cancer related disease.

Google Trends is an online tool provided by Google to provide the search traffic volume for specific search terms, topics and expressions over a specific period of time [2]. This tool is helpful to track real time trends for journalist, researchers or social media managers [5].

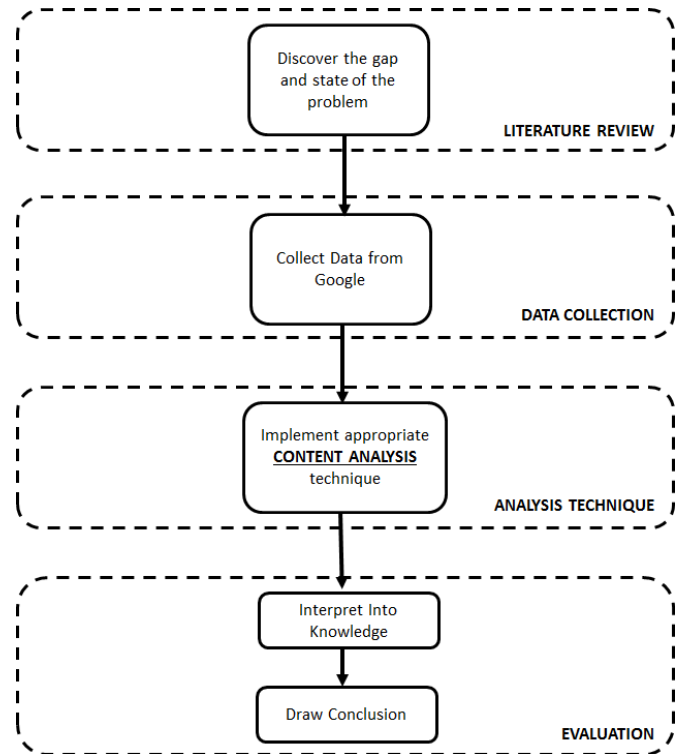


Fig 1. Research Framework

A. Literature Review

In this phase, the purpose is to collect the previous information related to the research through various resources: Internet, certain books, articles and journals. Those obtained materials are explored and assessed for specific knowledge and experience to discover gap. In this phase, the problem statement was discovered.

B. Data Collection

In this phase, the data extraction is performed Google. The search terms are limited to English language only. Google Trends is used to extract the traffic data for search terms that are cancer related disease from Google search engine for content analysis. A selection of search keywords related to cancer disease is prepared for extraction.

C. Analysis Techniques

In this phase, the analysis technique is applied to the source of data extracted from Google. Analyze the graphs extracted from the Google Trends.

D. Evaluation

In this phase, the result of the text mining and content analysis will be evaluated. Then, extracted information from the analysis will be formulated into a suggestion to generate into some useful information. All paragraphs must be indented. All paragraphs must be justified, i.e. both left-justified and right-justified.

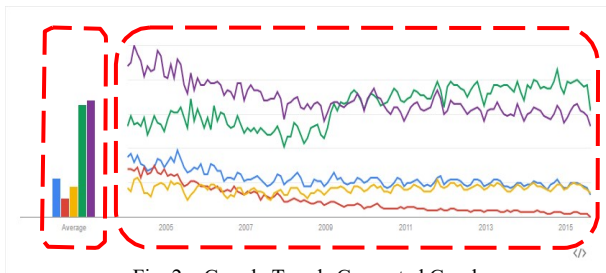


Fig. 2. Google Trends Generated Graph

The criteria is predefined for Google Trends to graph the traffic volume of the keyword search done on the Google by users for information seeking on cancer related disease. After providing the search criteria, graphs will be generated by Google Trends based on the criteria which have been provided. The graph is presented with two parts: Histogram and Line Graph (See Figure 2). The histogram shows the average of frequency of the web search interest by Google search engine user while the line graph shows the volume of frequency of the search done by the Google search engine user to search for the predefined search keywords.

For this research, there are several criteria that have been selected for the Google Trends data collection. Keywords which are related to the cancer disease for the Google search engine are predefined. The selected keywords are Cancer Disease, National Cancer Institute, Causes of Cancer, Symptoms of Cancer and Cancer Treatment. Each search keyword is represented with a colour code (Refer to Table I). The allowed keyword is up to maximum of 5.

TABLE I. COLOUR CODES REPRESENTING SEARCH KEYWORDS

Colours	Search Keywords
Blue	Cancer disease
Red	National cancer institute
Yellow	Causes of cancer
Green	Symptoms of cancer
Purple	Cancer treatment

IV. RESULT AND ANALYSIS

The information is extracted for the period of January 2012 to January 2015. The countries selected for extraction are Singapore and Malaysia. Based on World Health Organization, Malaysia and Singapore are part of World Health Organization (WHO) Western Pacific Region [18]. In addition, Malaysia is classified in the Upper middle income country while Singapore is classified in the high income country [18]. Apart from the selected countries being part of the ASEAN members [11], Malaysia is a developing country while Singapore is a

developed country. Thus, in this research, those factors are considered if there is any effect on the keywords search volume.

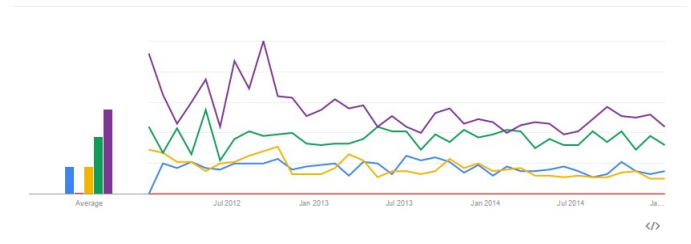


Fig 3. Malaysia Web Search between Jan 2012 to Jan 2015

Based on Figure 3, it shows gradual deterioration for all the search keywords except National Cancer Institute. The National Cancer Institute shows a constant stagnant with no search throughout Jan 2012 to Jan 2015 where it can be caused by the different naming and language used in Malaysia. However, there is a spike in search for Cancer Treatment in Sept 2012 before it starts to deteriorate again. From the histogram, Cancer Treatment shows the highest average of frequency search.

Fig. 4. Singapore Web Search between Jan 2012 to Jan 2015

Based on Figure 4, there is persistent up and down for all search keywords except National Cancer Institute. The National Cancer Institute shows a constant stagnant of no search throughout Jan 2012 to Jan 2015 where it can be caused by the different naming as mentioned. From the histogram, Symptoms of Cancer is the highest average of frequency search.

Based on the result, there are some differences in the pattern of search keywords result. The result of Malaysia web search as shown in Figure 3 highlights that the seekers are more interested in finding information on the treatment rather than symptoms of cancer as reflected from Singapore web search trend. This perhaps due to the high cost of such treatment in developing countries, thus patient often opt to search for the best available treatment with feasible cost prior to undertaking any medical procedures.

The result of the Singapore web search trend as shown in Figure 4, on the other hand, shows an increasing awareness of the citizens on chronic disease like cancer. The education values-driven embedded in Singapore's education [15] may cause the users to seek information on the symptoms of cancer so that the disease can be detected early and seek early treatment to kill the cancer cells faster. It demonstrates that the development of the country affects the search keyword for cancer related disease.

V. CONCLUSIONS

Healthcare is a critical sector which requires tremendous improvement. As more and more people going online to search for health information, it is imperative for the health sector and

government to understand the information sought by its citizens. In relation to cancer, it is important that information sought through the internet either from social media or search engine, should be verified by experts for authenticity of the information. The condition of each patient may differ from one another. Thus, their attitude to seek and accept information to manage their cancer related disease will differ based on their condition [8]. Online information seekers have to be selective, cautious and judgmental on the information sought in regards to the cancer related disease because the information may be sensitive to a patient especially on the medication and treatment that the patients have to undergo [13].

There are many factors in the development of country that can cause the difference. Several factors of the country's development that can cause the different are as followed:

A. Education Literacy

Knowledge seeking is influenced by the environment in the country. With knowledge, the users understand that avoiding the disease is better than treatment. In this digital age, knowledge is able to help in strategizing the information seeking using the available technology efficiently. Dupas revealed that due to the low education levels in developing country, it causes lack of basic information and sometimes limited ability to process information [3]. Due to education values-driven environment in Singapore, people are encouraged to seek knowledge [15].

B. Infrastructure

With the vast use of internet, infrastructure in the country plays an important part in providing an efficient internet to the users. The efficient internet enables users to perform information seeking anywhere at any time for comfort and convenience of the users to conduct information seeking. In addition, with the efficiency of internet, it creates interest in the medical organizations to provide eHealth service with health information online for the health information seekers. For instance, rural areas in Malaysia will face lack of infrastructure causing obstruction to obtain the required information [1].

C. Economy

Manyika & Roxburgh mentioned that economy fastens and drives the Internet-related growth [10]. Also, internet has positive impact to all levels of society and the speed to deliver information to them [10]. Lack of information on illness prevention or effectiveness and cost-effectiveness of preventative behaviors are the reason for developing countries to underinvest in preventative healthcare [3].

As the trend to use internet for information seeking is growing, the accessibility and convenience of the usage play a role in the information seeking behavior. Infrastructure plays another important factor to obtain and deliver information apart from educating about seeking information. For instance, if the internet is not accessible in an area, the people will not be exposed and information will not be able to be sought to increase their knowledge on the health matters. Dupas mentioned that it is an important role for public policy when it comes to health and he identified four important demand-side policy tools: information, mandates, price subsidies and

financial incentives [3]. Thus, it shows the correlation of the development of countries with the health information seeking.

In health information seeking, people have to seek expertise to provide them with knowledge on the condition, risk and alternative to minimize the consequences to a patient [8]. Thus, in this digital age, people need to play their role as users with great responsibility by judging the information using their skills and knowledge. If the information is not comprehensive, the users need to approach expertise for explanation to clear their doubt [8]. Apart from that, the informants who provide the information should be responsible enough to provide authentic and correct information for the users.

Individual can seek information actively and efficiently for knowledge purpose. However, the exercise to use such information gathered – particularly related to health information – should be done with caution. If the information seeker is not a medical expert, thus, deriving conclusion and making any medical decision on oneself should be done after an extensive research from credible sources (online and offline). Medical experts who share the information to the public should also be cautious and conscious on the information shared to the public. They need to understand the impact to the information seeker.

Knowledge is in the hands of the user to manage and use it wisely. Also, the medical experts play an important role on the information shared over the internet. Wrong information shared and used will cause a great regret in the future.

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