EVALUATION OF LITERATURE SEARCH STRATEGY FOR BEST EVIDENCE IN MEDLINE AMONGST POSTGRADUATE STUDENTS OF K.M. SHAH DENTAL COLLEGE: A QUALITATIVE STUDY

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Abstract: Scholarly electronic publications (also known as e-articles) published on the internet have a number of benefits that scholarly print papers lack. With increase number of e-publications over the past few years it has become imperative to have a correct scientific search strategy. In the era of evidence-based dental practice the correct literature search strategy is very vital. Hence this study was planned to assess the literature search strategy among the postgraduate students of our institute. Qualitative study was designed to assess the literature search strategy among six post graduate students selected through homogeneous sampling. This qualitative observational study demonstrated that the search technique for students will differ from one person to another. The search strategies employed should be uniform in nature to give consistent and similar results. This research outcome demonstrates the need for proper training regarding the literature search strategy to promote the habit of evidence-based practice.

Key words: Evidence-based medicine, Medline, PubMed, review literature, systematic review, decision making

Introduction: The availability of dental literature both in print and online form has grown explosively in the past decade. In our daily settings clinicians come across various clinical conditions or scenarios that mandates the precise evidence based treatment option. It can be daunting and time consuming to ask and answer clinical questions during regular practice. Before shifting from traditional to evidence-based search approaches, it is critical to consider why scholars use MeSH keywords, filters, and bullions in Advanced search techniques in scholarly electronic environments, as well as their significance and relevance. Knowing the tools available to answer a particular clinical query will lead to a search approach that is more reliable and successful and therefore to a more applicable solution depending on the amount of evidence available. A methodical and systematized literature search for all of the literature published on a subject is very important. The most reliable and effective approach to find sound facts on the issue we are studying is a well-structured literature quest. The first step is to construct a well-focused query. This

will help to decide useful keywords and subject constraints. Keeping clear about analysis puts us on track and saves us precious time.[1]

This research, which is intended to investigate authors' searching abilities in scholarly electronic environments, not only offers an in-depth understanding of scholars' searching abilities, but also determines how they can be strengthened in scholarly electronic environments. Qualitative analysis relies on a humanistic or idealistic approach to interpreting a research question. To understand people's views, experiences, attitudes, behavior, and interactions, a qualitative approach is used. Qualitative research is now recognized for its ability to add a new dimension to the studies that cannot be obtained through measurement of variables alone. There are three broad categories in qualitative studies in clinical research; observation studies, interview studies and documentary/textual analysis of written record. Qualitative research can have a great impact on data collection its analysis and interpretation of results. The proper and precise Literature search strategy is a very important step towards right evidence on the topic. Hence this research attempts to evaluate the Literature search strategy for best evidence in Medline amongst postgraduate students of Dental College by qualitative analysis.[2,3]

Materials and methods: This qualitative study was carried out among the postgraduate students of a Dental College after prior permission from the Institutional Ethical Committee (SVIEC/ON/DENT/RP/1524). Informed Consent of participants was obtained. The present study was an observational type of qualitative study where the students were observed while searching the literature for best evidence.

Qualitative approaches are sufficient for uncovering and comprehending the underlying causes of any poorly known phenomena.

Six postgraduate students from a Dental Collegewere selected in a present study. The Homogeneous sampling was based on a conclusion drawn in the systematic review conducted by Guest et al. (2006).[4] The studies with high level of homogeneity, a sample of minimum 6 interviewers may be sufficient to enable development of meaningful themes and useful interpretation. Hence the postgraduate student with similar training or exposure for search strategy of a Dental College were included in the present qualitative study. The students who have already undergone the detailed training in searching evidence and evidence based decision making were excluded from the study.

Participants at the college were provided with information about the details of the study including its purpose, benefits and timeframe of the study. Participants were guaranteed that their information would be held in strict confidence and the responses would be unidentified. Each data collection period was open to a specific student population so as to prevent any interference.

The data collection strategies were put in form of observation and taking screenshots of their search results. The result output on Medline was recorded for meaningful interpretation.

Study was conducted in two phases. The 6 postgraduate students from the Dental College with similar traits were selected for the study. Their skills for literature search were analyzed by observation during the clinical scenarios for which they had to formulate a search strategy.

The clinical theme provided was searched for best evidence on MEDLINE regarding clinical scenario given to the participants as "etiology of dental caries in young children". The elements were then assessed using the constant comparison technique to determine their searching strategies. In second phase the participants were provided with guide for search strategy and the use of filter and bullions were explained. For evidence-based search, this search technique was augmented with Research and Subject Guides from the University of Illinois at Chicago. (Fig 2 and Fig 3)

Results: The six postgraduate students with similar traits were purposively selected for the study. Their skills for literature search was analyzed by observation during electronic search of clinical scenario for which they had to formulate a search strategy.
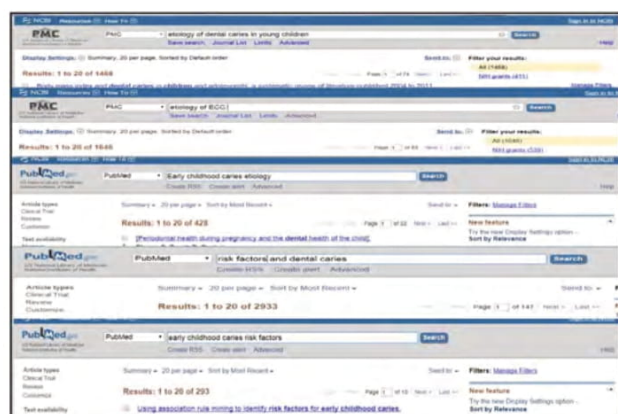

Fig. 1 Results of Literature Search by students in Phase I

Participants conducted search of the dental literature to determine "etiology of dental caries". (Figure 1) Search strategy employed along with number of citation MEDLINE provided for each search strategy are listed in table 1.

Table 1: Results of search strategies for etiology of dental caries in children		
	Search Strategy (keywords entered for search option)	NO. of MEDLINE Citation Listed
Participant 1	etiology of dental caries in children	1468
Participant 2	Etiology of ECC	1646
Participant 3	Early childhood caries etiology	428
Participant 4	Risk factor and ECC	2933
Participant 5	Early childhood caries risk factor	293
Participant 6	Cause of early childhood caries	354

The phase I outcome of search strategy was quite enormous which was then supplemented with search guides and instruction sheets for Phase II. The clinician must take this vast array of electronic information and limit it to the area of interest. Clearly the search strategies must be employed to reduce the volume to a usable size for the reader.

The task of the student was to uncover all the articles on the given topic; however, this task is difficult because the full complement of articles is never known. To improve the likelihood of identifying all relevant papers, there has been considerable development and discussion of optimal approaches and strategies. After the qualitative analysis of their Knowledge and Skill in Literature search, they were instructed for the proper methodology for literature search. "Searching PubMed-Evidence Based Medicine" - Research and Subject Guides at University of Illinois at Chicago were used as a guide for the

search strategy2. One of which is given in figure 2 and 3 for specific situation as an example:

Fig. 2 Instruction for search in Medline:

Fig 3 Sample Search on Etiology

To aid the search process, methodological search filters that filter-out those studies using the research method of interest have been developed.These methodological filters are predetermined search strategies that use terms related to research design to identify all those studies using the research method of interest to the reviewer[3]. These methodological terms are then combined with subject terms that appear in titles, abstracts, or indexes to identify studies using the research method of interest and addressing the review topic. The purpose of these search filters is not to retrieve all publications on a topic, but rather to filter only those most relevant to the topic. This approach has been used with great success for the identification of articles. The similar approach was used by students in phase II wherein the search resulted in improved outcome. (Table 2, Figure 4)

| Table 2: Results of search strategies for etiology of dental caries in children		
	Search Strategy (keywords entered for search option)	NO. of MEDLINE Citation Listed
Participant 1	Risk factor and dental caries and children	2
Participant 2	Risk factor and dental caries and children below 6 years	4
Participant 3	Cause and dental caries and 3 to 6 year old children	2
Participant 4	Risk factor and ECC and children	4
Participant 5	Early childhood caries risk factor	3
Participant 6	Risk factor and dental caries in young children	8
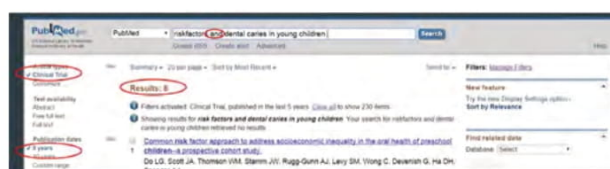
Fig. 4, Search results after using filters and Instructions regarding literature search

The effect of the instruction on their

knowledge and skills was then analyzed. The analysis revealed that the students in phase II had varied outcome as can be seen in table 2. The outcome was varying for various participant as the keywords or the MeSH terms used were differing. It is also important to note that the various searches conducted by different participants vary on the basis of filters chosen by them for Best evidence few students only chose randomized controlled trials and used bullions 'AND' along with limited filters. Analysis of this observational qualitative study clearly reveals that the students search strategy may vary from one individual to another. The MeSH terms used for search with added bullions and filters can easily narrow down the search for the best evidence and in desired direction. The search strategies employed should be of uniform pattern to provide uniformity in the outcome, otherwise it may lead to varied results of search and may further confuse or may give varied literature outcome.

Discussion: The recognition of applicable research would become more difficult with the ever-increasing amount of health care literature. The thorough quest of systematic reviews will, in response, become an essential way of finding, interacting and documenting this analysis. Many research risks getting lost in the overwhelming amount of health care literature without this record. Additionally, without effective methods of identifying relevant qualitative research, individual studies are unlikely to have an impact beyond the local clinical area of the researchers4. our data showed there is absolutely no consensus within the medical community about. This also suggests that the effectiveness of electronic database searches may be improved by using a number of different search strategies and incorporating a number of different databases. Having defined the search topic and identified the key concepts, we need to produce a list of keywords that will be used as our search terms when we begin our search. Keywords should consist of all possible words or phrases that might be used to describe our subject. However, as a result of the greater depth of indexing of qualitative research in Medline, this database should be a major focus of any search for this type of research.[5]

In this study students were asked to search for best evidence on given clinical scenario. Their skills for literature search were analyzed by observation during the one clinical scenario for which they formulate a search strategy. Large Number of articles were found during their search. It was humanly not possible to go through all articles. This task is challenging because the full complement of articles is never known. To develop the possibility of identifying all relevant papers, there has been substantial development and discussion of best approaches and strategies.[6] After the qualitative analysis of their Knowledge and Skill in Literature search, they were instructed for the proper methodology for literature search. The effect of the instruction on their knowledge and skills were by then analyzed "Searching PubMed-Evidence Based Medicine".[7]

The search results show that there is a considerable inconsistency in the application of the search methods. Since participants were guided with the same attributes, the search result was expected to be more predictive and meaningful. Instructions were given regarding proper search process, methodological search filters that filter out those studies using the research method of interest have been developed after instruction. These

methodological filters are predetermined search strategies that use terms related to research design to identify all those studies using the research method of interest to the reviewer. These terms are then combined with subject terms that appear in titles, abstracts, or indexes to identify studies using the research method of interest and addressing the review topic. The purpose of these search filters is not to retrieve all publications on a topic, but rather to filter only those most relevant to the topic. This approach has been used with great success for the identification of articles.The average success rate of any search will be further increased by recognizing that only two or three key search concepts are used in most successful literature searches, while most unsuccessful searches fail due to the incorrect use of MeSH® terminology, the inability to choose alternative search terms, the use of overly difficult search statements and word errors.[8,9]

This paper suggests that the identification of qualitative research in electronic databases is both complex and difficult. These problems relate to the lack of suitable search terms in the titles of some of this research, variable quality of abstracts, and different indexing practices utilized across databases. It appears these issues have received little attention and on this basis, it is suggested that this area needs further investigation. It is hence necessary to train the postgraduate students for the correct literature search strategy through demonstrations and hands-on training. This learning shall be evaluated in structured manner through Direct Observation of their searching skills. Subsequently, we need to develop a matrix indicating which elements of searching literature should be learned and educated at an early phase of medical education, tailoring the conceptualization of evidence based practice fulfilling the specific needs of our students throughout curriculum.[10]

Limitations and strengths of this study: The main drawback is that, unlike quantitative studies, the results cannot be statistically projected to the subject under study. The constant comparative approach itself lends support to the study's validity. The study's strength is that the data were collected systematically and a meaningful search strategy was provided, which increases the transferability of the results.

Conclusion: This research helped to understand the knowledge and skills regarding the literature search strategy for best evidence among the postgraduate students of the institution. Though the postgraduate students included in the study were trained for literature search in phase II, still the outcome was varying for each one of them, which is suggestive of differences in literature search strategy. The outcome of study clearly reveals that the role of MeSH used for searching literature and the various bullions and filters applied may change the literature results outcomes. This suggest that there is a need for training the students through hands-on demonstration and the learning outcome should be evaluated by direct observation of the skills so as to ensure the competency of the skills acquired.

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