Abstract

**Background:** Clinical Decision Making is the formulation of diagnosis based on the patient information and domain knowledge gathered from various sources. Delay in receiving these information can affect patient care. In this regard, Clinical Decision Support System (CDSS) can be seen as a promising tool to equip and support the healthcare professionals with patient information and domain knowledge to assist in quality decision making during patient care and evaluation. Cancer control and prevention highly depends on instant availability of health information and clinical knowledge related to cancer care, where CDSS can play a very crucial part. Design, development and implementation of Clinical Decision Support System is dependent on the knowledge, utilization pattern, perception and expectation of oncologists regarding this.

**Aim:** To design and develop a customized clinical decision support system in Oncology. **Objectives:** To assimilate the knowledge and to understand the utilization pattern of existing information system and assess the perception and expectation of Oncologists in respect of clinical decision support system.

**Methodology:** The research was conducted in three phases: **Phase 1** consisted of assessing the awareness and utilization pattern of existing information system and identifying the perception and expectation of Oncologist towards CDSS. A descriptive study was conducted among 100 Oncologists of 12 cancer hospitals and research centers of Southern India. A validated survey questionnaire consisting of open and closed ended questions related to knowledge of information system, utilization of existing information system in practice, perception and expectations of Oncologists in respect of CDSS was provided to the participants who were asked to mark their response on a 5-Point Likert Scale i.e. from Strongly Agree to Strongly Disagree and Yes & No. A time motion study was also conducted to understand the issues related to the access
of patient information and domain knowledge. In Phase 2, a web enabled Clinical Decision Support System “OncoSys” was developed using MS SQL Server 2005 and ADO.NET. During Phase 3, a user acceptance test was conducted using validated questionnaire based on 5-Point Likert Scale of Strongly Agree to Strongly Disagree. The questionnaire consists of questions related to user interface, decision making interface and documentation and statistics interface to determine the acceptance level of the Oncologist about OncoSys.

**Result:** The survey result revealed that the oncologists’ knowledge related to the computer and peripheral devices was good but the knowledge related to handling electronic images, electronic health records, ICD-10, ICD-Oncology, Format of health records, data entry and report generation was found to be average to good. The oncologists reported that the existing information system partially support them in documentation, statistics, research, education and reporting but does not support quality decision making during patient care. The assessment of perception related to clinical decision support system were found to be significant where the oncologists felt that the implementation of CDSS will decrease the cost of healthcare and increase the productivity of the hospital. They also felt that implementation of CDSS is unavoidable in healthcare practice. The Oncologists expected that the system should have features which could completely support them in capturing the complete information of the patient, clinical knowledge, practice guidelines and updates related to cancer care. The time motion study revealed that the Oncologists spend the maximum part of this time in documentation & retrieval of patient information during patient care and evaluation because they largely depend on printed text. Based on the result received from the oncologists, a web enabled CDSS has been developed and implemented using MS SQL Server 2005 and ADO.NET. Modules such as Patient Database, Knowledge Base, Search
Engine, Case Base and Statistical Analysis have been included to completely support the oncologist in clinical decision making in patient care. Once implemented, the system was tested against the requirement of the Oncologists where the system was found to be highly acceptable by the Oncologists. The only suggestion received from the oncologists was that the OncoSys support system should cover complete Oncology domain and this is the scope for future work. **Conclusion:** Fulfillment of the expectations and requirements of the end users is crucial in making the CDSS more acceptable and sustainable. The finding of the present research supports this fact and will continue to guide oncologists in all the future work related to CDSS.