



Guideline-based Clinical Decision Support Systems as an Inseparable Tool for Better Cancer Care Management

Leila SHAHMORADI, Ahmadreza FARZANEH NEJAD, *Goli ARJI

Dept. of Health Information Management, Faculty of Allied Medical Sciences, Tebran University of Medical Sciences, Tebran, Iran

***Corresponding Author:** Email: G-Arji@razi.tums.ac.ir

(Received 11 Dec 2015; accepted 24 Jan 2016)

Dear Editor-in-Chief

Cancers are the major reason of morbidity and mortality worldwide, with approximately 14 million new cases and 8.2 million cancer-related deaths each year (1). Cancer control and prevention is a challenging task in health care. The objective is to reduce the incidence of cancer and patient's mortality and morbidity. There are significant variations at all steps of cancer care. Therefore, worldwide interest is to develop clinical practice guidelines (CPGs) on the basis that they can help to improve the quality of care by disseminating research results and evidence-based practice more effectively. There are significant issues about the practical use of CPGs such as problems of dissemination, guideline content maintenance issues, and compliance problems with such guidelines in the clinic (2).

The recent utilization of information technologies allows for the extensive dissemination of computerized versions of CPG (3). Oncology domain is a promising field of application for guideline based decision support system, because pharmaceutical treatment protocols are largely algorithmic and complex (4). Designing computer-based decision support systems able to implement and integrate guideline recommendations into clinical workflow (5). Most important CPGs formalization languages are Arden Syntax, GLIF, PROforma, Asbru, PRODIGY, GUIDE and EON.

A variety of decision support systems based on PRO forma technology has been developed within cancer disease domains. ERA, has been developed to assist general physician in making decisions about whether or not to refer suspected cancerous patients for specialist treatment (6). CADMIUM uses symbolic analysis to relate information obtained from image processing to radiologists decisions making (7). ARNO is a pain control system for cancer sufferers. LISA is a decision support system for collaborative care in childhood acute lymphoblastic leukemia (8). CREDO is developed to support an entire breast cancer care pathway from the initial diagnosis through to treatment and follow-up (9). OncoCure project evaluate the performances of an Asbru-based decision support system applying treatment protocols for breast cancer, which extract data from an oncological electronic patient record (10).

Treatment of cancerous patients requires administration of various chemotherapy drugs or radiotherapy, management of the side effects of treatment and post-operation complications, following laboratory tests, maintaining intensive care practice, and improving the patients' physical and emotional relief. The use of clinical guidelines is essential in the management of cancer in health care setting.

Utilizing guidelines such as standard care plans, care pathways and protocols in different clinical settings may cause reduction of practice differences and care costs, and improving quality of patient care. Decision support based on a CPG is an effective tool for assisting clinicians in the management of cancer disease. The use of these systems significantly improves the quality of care, especially when used in conjunction with health information systems such as electronic health record systems (11, 12). The use of guideline-based decision support system is essential to collect the data about patients' needs, to identify risk factors or problems, to choose diagnosis and interventions based on the patients' needs, to monitor care outcomes, and in general to manage care. These systems are employed to solve problems encountered during the provision of health care by analyzing the data specific to the patients and to decide on the best solution among the alternatives. Guideline-based CDSS supports users to decide on current choices for care, encourage the continuous learning of beginner, and contribute to the update of knowledge for experience by means of various alerts and reminders also proven to have several other benefits, ranging from the decrease in medical errors to the improvement in the quality of patient care and outcomes.

Acknowledgement

The authors declare that there is no conflict of interests.

References

1. World health organization report (2012). Key prevention and control intervention for reducing cancer burden in the WHO African region, A Handbook for Leaders and Managers. Available from: www.afro.who.int/index.php
2. Fox J, Patkar V, Chronakis I, Begent R (2009). From practice guidelines to clinical decision support: closing the loop. *J R Soc Med*,102: 464-473.
3. Fasola G, Macerelli M, Follador A, Rihawi K, Aprile G, Mea VD (2014). Health Information Technology in Oncology Practice: A Literature Review. *Cancer Inform*,13: 131-139.
4. Ecchera C, Seyfangb A, Ferroc A (2014). Implementation and evaluation of an Asbrubased decision support system for adjuvant treatment in breast cancer. *Comput Methods Programs Biomed*,117: 308-321.
5. Doerr M, Edelman E, Gabitzsch E, Eng C, Teng K (2014). Formative Evaluation of Clinician Experience with Integrating Family History-Based Clinical Decision Support into Clinical Practice. *J Pers Med*, 4:115-136.
6. Humber M, Butterworth H, Fox J, Thomson R (2001). Medical Decision Support via the Internet: PROforma and Solo. Available from: <http://archive.cossac.org/PUBLICATIONS/ms368.pdf>.
7. Emery J, Walton R, Murphy M, Austoker J, Yudkin P, Chapman C, et al. (2000). Computer support for interpreting family histories of breast and ovarian cancer in primary care: comparative study with simulated cases. *BMJ*, 321.
8. Bury J, Hurt C, Roy A, Cheesman L, Bradburn M, Cross S, et al. (2005). LISA: a web-based decision-support system for trial management of childhood acute lymphoblastic leukaemia. *Br J Haematol*,129(6):746-54.
9. Patkar V, Hurt C, Steele R, Love S, Purushotham A, Williams M, et al. (2006). Evidence-based guidelines and decision support services: a discussion and evaluation in triple assessment of suspected breast cancer. *Br J Cancer*, 95: 1490 - 1496.
10. Eccher C, Scipioni A, Miller AA et al. (2013). An ontology of cancer therapies supporting interoperability and data consistency in EPRs. *Comput Biol Med*,43: 822-832.
11. Choi J, Kim H. (2013). Developing a Computer Interpretable Guideline with Nursing Knowledge: A Pilot Study of a Pressure Ulcer Risk Assessment and Prevention. *Online J Nurs Inform*, 17 (1); Available from: <http://ojni.org/issues/?p=2393>
12. Eguzkiza A, Trigo JD, Martínez-Espronedca M, Serrano L, Andonegui J (2015). Formalize clinical processes into electronic health information systems: Modelling a screening service for diabetic retinopathy. *J Biomed Inform*,56: 112-126.