Chapter 10
Advanced Issues of Health Informatics and Clinical Decision Support System in Global Health Care

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ABSTRACT

This chapter indicates the advanced issues of health informatics; the advanced issues of Clinical Decision Support System (CDSS); CDSS and Computerized Physician Order Entry (CPOE); the false positive alerts in CDSS; and CDSS and biomedical engineering. Health informatics and CDSS are the advanced health care technologies with the support of many technological fields. Health informatics and CDSS apply various computerized devices to provide enhanced health-related outcomes in terms of problem solving, analytical thinking, and decision making. Health informatics and CDSS help clinicians and health care providers to make complex information useful in supporting clinical decisions, thus delivering the best standard of care for each patient. The chapter argues that utilizing health informatics and CDSS has the potential to increase health outcomes and reach strategic goals in global health care.

INTRODUCTION

Nowadays, medicine and health fields are getting more and more involved with computer science (El-Fakdi, Gamero, Melendez, Auffret, & Haigron, 2014). Health informatics is an emerging field that is important to the effective delivery of modern health care (Lui, 2013) and applies the information science methods to analyze the health care information, to execute from raw data to knowledge, for the effective problem solving, decision making, and care delivery (Dalrymple, 2011). Medical and health activities can greatly benefit from the effective utilization of health informatics (Michell, Rosenorn-Lanng, Gulliver, & Currie, 2014). The increasing application of information and communication technology (ICT) in health care has created the needs to secure the health professionals' knowledge and skills in health and nursing informatics (Saranto, Jylhä, & Kinnunen, 2011).

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The field of health informatics is at the intersection of information, computer science, behavioral science, and health care (Knott & Weller, 2014). Health informatics is a relatively new area which deals with mining large amounts of data to gain the useful insights (Narasimhamurthy, 2017). There is a need for health informatics to be fully integrated with each other and provide interoperability across various organizational domains for ubiquitous access and sharing (Naseer & Stergioulas, 2010). The interoperability framework, identifying citizens, providers, policymakers, and researchers is related to the improvement of understanding, access, trust, discourse, and practice toward the effective health care system (Juzwishin, 2010).

Clinical reasoning of healthcare professionals is rarely considered in the development of paper-based guidelines (Kilsdonk, Peute, Riezebos, Kremer, & Jaspers, 2016). Clinical guidelines are the important methods to improve the quality of health care while reducing the health care-related cost and supporting the medical staff (Douali & Jaulent, 2013). Poor design of CDSS interface can readily slow down health care practitioners as they may spend more time in searching for relevant information than in reviewing recommendations (Kilsdonk et al., 2016).

CDSS is the software designed to help clinicians make decisions about patient diagnosis using technical devices (Moon & Galea, 2017) toward bringing more confidence in health care for the physicians (Ruiz-Fernandez & Soriano-Paya, 2011). CDSS can improve guideline adherence by health care practitioners and support health care practitioners in the effective medical decision making (Jaspers, Smeulers, Vermeulen, & Peute, 2011). CDSS tends to be integrated into many systems, such as sensor technology, hardware, software, and communications (Pombo, Garcia, Bousson, & Felizardo, 2015), enough to help diagnose the patient's disease and prescribe the proper medication (Kareem & Bajwa, 2013).

This chapter is based on a literature review of health informatics and CDSS. The extensive literature of health informatics and CDSS provides a contribution to practitioners and researchers in order to maximize their impact in global health care.

BACKGROUND

The market of tools, devices, and processes for both medical treatments and medical diagnosis has been growing at a very fast pace, driven by the multidisciplinary development of innovative technologies (Catapano & Verkerke, 2011). Health care providers require the timely and accurate information about their patients (El Morr, 2014). Health informatics is the use of devices and resources to collect, store, move, and retrieve data to support health care (Mahmood, 2008). Health care systems are complex and often approach a deterministic chaos in the number and types of interactions that occur among health care providers and patients (Johnson & Tashiro, 2011).

Health informatics is the science of health information (Perry et al., 2008). Regarding health informatics, ICT helps improve the communication along processes in health care settings (Saboor, Hörbst, & Ammenwerth, 2013). From a technical perspective, the rapid transformation of the health care sector through health informatics is achievable (Brear, 2010). A fundamental premise of continuity in patient care and safety suggests the timely sharing of health information through health informatics among different health care providers at the point of care and after the visit (Gundlapalli, Reid, Root, & Xu, 2011). The practice of health informatics is faced with the complexities of multijurisdictional, multidisciplinary, and multicultural partner-based approaches to the problem-solving perspectives (LeRouge, Tolentino, Fuller, & Tuma, 2013).

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