Chapter 6
Pervasive Computing in Supporting Pediatric and Neonatology Care Unit Decision Process

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ABSTRACT

Neonatal units, and especially the sections devoted to intensive care require an individualized medical prescription, based on body weight and gestational age making them among the hospital settings where treatment errors are most likely to occur. These errors may harm patients and their families, as well as increase the duration of hospital stay and its costs. Tools such as Sabichão have sought, over the last years, to aid clinical decision-making to reduce clinical error. However, with the increased use and dissemination of mobile platforms, it's now possible and essential to bring the available assistance closer to the health providers and their practice. This paper describes a Framework that seeks to present itself as a more efficient and ubiquitous alternative to an existing Clinical decision support system.

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INTRODUCTION

Neonatal and pediatric services need more attention in clinical care once children and babies are more vulnerable than adults to medical errors. It is increasingly important that electronic clinical information systems ensure an improvement in the safety and quality of pediatric patient care. Due to the specific requirements of these patients it is necessary to guide Information Technology to their needs (Peverini, 2000; Technology, 2015; Lerner, 2008; Ruiz et al., 2015).

Neonatal and pediatric patients have particular guidelines for the administration of parenteral nutrition (PN) solutions. Prescribing a PN solution requires several calculations, consulting multiple tables, and considerations about the weight and clinical status of the baby / child. Thus, errors in drug dosing are the most common errors in hospital facilities and potentially the most harmful, with a higher incidence rate in the pediatric population than in the adult population. Therefore, the practice of safe medication becomes essential to improve patient safety which can be achieved by a continuous evolution of health care systems. The automation of prescriptions through the ease of calculation or query of tables aims at reducing this medical error (Peverini, 2000; Gonzales, 2010).

The neonatology or pediatrics appointments involve drug dosing and preparation of PN solutions, anthropometric analysis, specialized growth charts, recording of emergency occurrences and the evaluation of several clinical indicators. If the health professional is unable to effectively and efficiently interconnect all patient information (e.g., identification, weight, requests and administration of medications, reports, age-specific care, etc.), the medical appointment will be more time-consuming and may lead to increase the occurrence of errors (Technology, 2015).

This demand for a system that assists health professionals in the execution of their daily tasks has made Sabichão to be implemented in these services. Sabichão is a pervasive decision support system that allows interoperability between different information systems and helps physicians providing better care (Orwat, 2008).

This system provides a set of functionalities capable to overcome several obstacles that doctors face during an appointment of neonatology and pediatrics. The ease of understanding and utility of the application makes it useful and widely adopted in the centers where it was installed. Sabichão is being used and tested in the Intensive Care Units of Pediatric and Neonatology of the *Centro Hospitalar do Porto*, the *Centro Materno-Infantil do Norte* and the *Centro Hospitalar Tâmega e Sousa*.

The amount of data obtained in the information systems and the advantages related with applications such as Sabichão allow the access of vast functionalities and data driven perspectives in order to improve the provided health care (Orwat, 2008; Kovalchuk, 2015).

In this sense, this work is being done in order to facilitate this access in a web platform available for several users inside and outside the aforementioned healthcare units.

This paper is divided in five sections. The first one introduces the paper and the work and the second section refers to related works. The third intrudes important concepts and methodologies adopted. The four section indicates the architecture used and the functionalities associated with the platform. The last section, section five, presents the conclusions and future work.