



International Workshop on Healthcare Interoperability and Pervasive Intelligent Systems
(HiPIS 2017)

Step Towards Prediction of Perineal Tear

Francisca Fonseca^a, Hugo Peixoto^b, Filipe Miranda^b, José Machado^{b*} and António Abelha^b

^aUniversity of Minho, Campus Gualtar, Braga 4710, Portugal

^bAlgoritmi Research Center, University of Minho, Campus Gualtar, Braga 4710, Portugal

Abstract

The aim of this study is to predict, through data mining tools, the incidence of perineal tear. This kind of laceration developed during child delivery might imply surgery and entails a set of several consequences. Clinical Decision Support Systems, with the information collected from patients' electronic health records combined with the data mining techniques, may decrease the incidence of perineal tears during labour.

© 2017 The Authors. Published by Elsevier B.V.
Peer-review under responsibility of the Conference Program Chairs.

Keywords: Data Mining; Obstetrics; Perineal Tear; Decision Support Systems.

1. Introduction

It is estimated that 85% of women had perineal tear during child birth¹. These lacerations, which are resultant from episiotomies or spontaneous obstetrics tears that may happen during vaginal deliveries, have severe consequences including chronic perineal tear, dyspareunia, urinary incontinence and fecal incontinence^{1,2}. Predicting these situations, based on the information collected during pregnancy, would allow obstetricians along with pregnant women to take some early measures in order to reduce the risk of developing perineal tears.

Decision Support Systems (DSS) can be defined as an interactive computer based systems that supports several phases of the decision making process^{3,4}. Applying DSS in healthcare will provide knowledge and information on a

* Corresponding author. Tel.: +351 253 604 430; fax: +351 253 604 471.
E-mail address: jmac@di.uminho.pt

specific person, which was intelligently filtered and presented at appropriate times enhancing health and healthcare^{5,6}. Knowledge based systems are the most popular type of Clinical Decision Support Systems (CDSS). Being also known as expert systems, these systems may perform different types of clinical tasks from alerts and reminders on a patient's condition to diagnostic assistance or recognition and interpretation of clinical images. Allying CDSS with electronic health records will provide the best practice and high quality care to the patient minimizing the errors that may occur^{7,8}. An example of a CDSS based on Knowledge Discovery from Databases (KDD) and Agent-Based Systems paradigms, whose target area is intensive care medicine, is INTCare^{4,9}. This multi-agent approach collects and processes data in real time providing new knowledge. Besides, it allows the prediction of clinical events or diseases with high sensitivities rates, which might be, for example, organ failure and patient outcome, using data mining techniques and adapting data mining models^{4,9}.

Data mining, which is a set of approaches that allows the extraction of information from data through its analysis in an automatic/semi-automatic way, is a descriptive or a predictive technique. Since the data referred to is often presented in large datasets, the descriptive processes, which might be, for example, automatic clustering, bring out knowledge present among all the data. On the other hand, the predictive (or explanatory) processes, as classification or scoring for qualitative data and as regression for quantitative, anticipate new information based on the present facts^{10,11,12}. Moreover, data mining refers to a precise step of the overall process of discovering useful knowledge from data known as KDD. Unlike data mining, which is only the application of particular algorithms to remove patterns from data, KDD process includes other steps like data preparation, data selection, data cleaning, integration of prior knowledge and also analysis of the results in order to provide valuable knowledge¹³.

This article includes six sections. After the Introduction, the second section, Background and Related Work, presents a brief description of the perineal tear role in obstetrics and its consequences followed by some studies similarly to this one. On Methodology, the third section, the tools and methods used are mentioned and described. Section four, Knowledge Discovering Process, all the process of data mining, where Cross Industry Standard Process for Data Mining was adopted, is presented as well as the results. These results are discussed on the fifth section being the conclusion and future work the last section.

2. Background and Related Work

2.1. Perineal Tears in Obstetrics

Not only is obstetrics the surgery sub-specialty responsible for providing care to women throughout pregnancy but also for surgeries related to child delivery¹⁴. Obstetricians follow future mothers during appointments along their pregnancy. Thus, potential problems might be detected and the patients advised on their future steps to avoid any pregnancy complications. When a woman feels signs of labour, her obstetrician and other medical staff implement the required delivery procedures¹⁵. During these delivery procedures women might develop perineal tears mostly because of the soft tissue of the birth canal overstretching. The severity of the tear, depending on their depth, varies from first degree, when the tear is small and it only involves skin and will heal naturally – only if it had affected the perineal muscles, as it happens in second degree tears, the mother would have needed stitches –, to fourth degree, where the tear affects not only the vaginal wall but also the area since the perineum to the anal sphincter (this same thing happens on third degrees tears) with an additional damage to the lining of the bowel. With the exception of the first degree tear, the other of the three degrees are only treated by surgery, and the reasons behind the occurrence of a perineal tear aren't yet clear¹. In contrast, the consequences, as the ones referred to in the introduction, might have quite an impact in day-to-day life mainly due to the poor functional outcomes, after traditional surgery, to repair lacerations involving the anal sphincter complex².

2.2. Related Work

Given the constant progression of data mining and DSS, the applicability of these tools on the healthcare sector may minimize errors, where lives and their quality are involved, by supporting decision-making. Pereira et al. (2015) developed a model for the *Centro Hospitalar do Porto* with the aim of helping physicians making quick decisions on the most advisable type of delivery for a certain patient when following the traditional guidelines is

Download English Version:

<https://daneshyari.com/en/article/4960767>

Download Persian Version:

<https://daneshyari.com/article/4960767>

[Daneshyari.com](https://daneshyari.com)