



Conference on ENTERprise Information Systems / International Conference on Project
MANagement / Conference on Health and Social Care Information Systems and Technologies,
CENTERIS / ProjMAN / HCist 2015 October 7-9, 2015

The Influence of Information Systems in the Management of Patients Service in the Hospital of Leiria

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Abstract

Hospital patients prefer to access the Emergency Department to be treated; this preference leads to some concern by the directors of public hospitals. Though, it is important to understand how consultation management is defined, especially in terms of information technology that can help in patients' management. Among several Information Systems it was evaluated a specific SMS service, checking if it responded to the patients' needs, whether patients were satisfied with the service and if it was efficient as expected, to reduce absence in scheduled encounters. So, it was followed a methodology: check faults to medical consultations and rebooking, along October 2014, then conduct questionnaires to patients by telephone, in order to understand if they are satisfied with the SMS service to recall a scheduled medical consultation, and if the service failure has or not to do with their faults. Among 2337 patients that fault in a month, 113 patients were questioned by phone (from 441 selected), 87.6% had received SMS on the mobile phone to alert the consultation day and 79.6% feel satisfied with the messaging service. Thus, the SMS service is expected to have an impact on reducing absence to scheduled consultations once patients are satisfied.

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Peer-review under responsibility of SciKA - Association for Promotion and Dissemination of Scientific Knowledge

Keywords: Patients management; Scheduled consultations; Faults to scheduled consultations; Information Systems; SMS service.

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1. Introduction

Patient management comprises different processes according to the area; in the Administrative area level there is the Reception to follow up requests for first consultation and surgeries into the Waiting Lists, here is dealt with the list for surgery and for consultation waiting. These, associated with patients management, have several tasks like delivery of patient belongings, data collection for billing, delivery of orders with clinical information; statistics; patients transport and also the clinical file of legal cases / procedures, as well as deaths processing. There are the General Secretariat services: Inpatient, Outpatient, Ambulatory Surgery, and Emergency Departments, Obstetric Emergency and Pediatric Emergency. Throughout this article we emphasize on the patients management in External Consultation (*Consultas Externas*) of the Hospital.

It was defined interest to study the impact of Information Systems (IS) use that are directly linked to patient Management Service, namely in the External Consultation, due to a concern based on the patients' demonstration of a personal preference to use the Emergency Department instead of External Consultation [1]. So it was relevant to ascertain if the patients' management in External Consultation was well defined and if the SI were helping to improve the patients' attendance and satisfaction with SI. The question: How is defined and how External Consultation management works since the patients prefer to use the emergency instead of scheduled consultations? The purpose of the present article is to start to pursue the answer to this very question. Thus, it was intended to summarize the IS used in the patients' management namely associated to scheduling encounters in External Consultations service, performing queries about the satisfaction of users to a particular IS, the Short Message Service (SMS service).

This article is divided in five chapters; chapter 1 is the Introduction, which presents the main ideas and the SI related to patients' management, the numbers consultations and specialties; chapter 2 presents the state of the art related to consultations, faults and patients' satisfaction; chapter 3 is the description of the Hospital subject of this study and methodology used; chapter 4 presents the results obtained and, finally, chapter 5 presents the study conclusions.

1.1. Available Information Systems

The patient management service includes a large number of administrative tasks supported by SI, the Hospital global management system named *Sistema Integrado de Gestão Hospitalar* (SIGHEP), which includes the Patients' management IS subsystem (*Subsistema de Gestão de Doentes*, SIGED). This IS allows to have direct access to the National Register (*Registo Nacional de Utente*, RNU) within the patient form, having a direct access to RNU database, and access to all types of secretariat referrals and waiting lists for consultation, including Consultation on Time Program system (*Consulta a Tempo e Horas*, CTH), where requests are received, coming from consulting the Health Center at the SI Alert@P1. Alert-P1 presents a tool called Match that allows the user to search the Hospital patients' database and thus associate data recorded. In the area of consultation scheduling and respective effectiveness is used SIGED and the respective automatic service of sending SMS.

The SIGED presents a manager application with twelve options to choose, including the module "External Consultation" that allows to perform requests for consultation and after patients' triage is possible to perform consultation scheduling [2].

1.2. External Consultation indicators

The Hospital External Consultation has the main objective to perform medical consultations, diagnosis and therapy to patients belonging to National Health System (SNS, *Serviço Nacional de Saúde*) in the district of Leiria, where there may be the necessary training to medical internship trainees as well as nursing, always supervised and upon patient's acceptance.

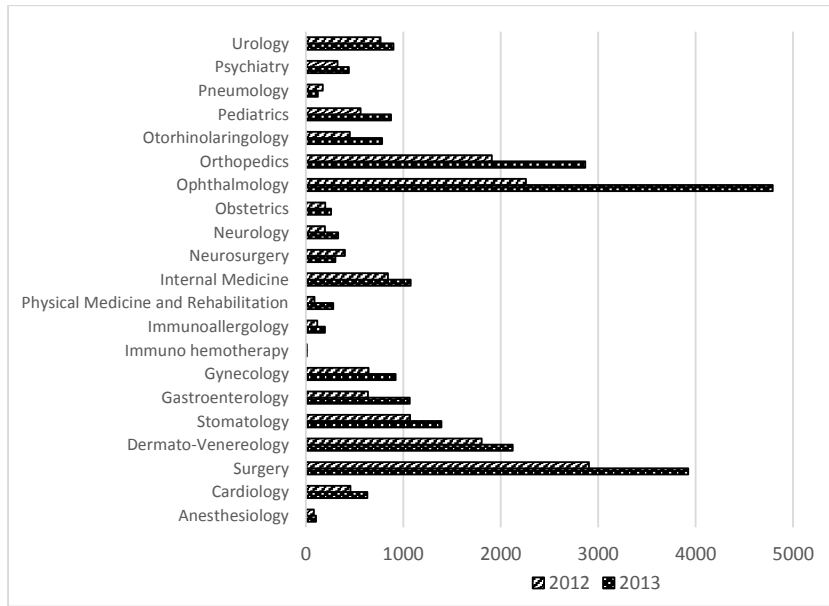


Fig. 1. Number of CTH program consultations in 2012 and 2013 [3], [4].

With the introduction of the Consultation on Time Program (CTH) and the implementation of the IS directed to requests coming from primary healthcare centers, there is an increase in the number of first consultations of each specialty from 2012 to 2013 [3], [4] (Figure 1).

From 2003 to 2012 there has been a general growth of the two types of consultations, except in 2006, where there was a slight decrease in the case of first consultations and in 2010 in the case of subsequent consultations [5][6]. Subsequent consultations are the type of query that has always presented higher values. Although, patients from Leiria prefer emergency then scheduled consultations for health care [1].

2. State of the Art

This state of the art is related to compliance with the maximum response time after implementation of SI in Portuguese public hospitals, realizing how patients are adapted and recognize the relevance of new technology. Also some problems raised in the External Consultations and improvements that have been considered, and access the patients' satisfaction related to medical consultations.

2.1. Compliance with the Guaranteed Response Maximum Times

In the year 2013, the Health Regulatory Entity conducted a study on the compliance of the Guaranteed Maximum Response Times (*Tempos Máximos de Resposta Garantida*, TMRG) in first consultations of hospitals belonging to the SNS. By analyzing the results it was concluded that the times were not met in most of them, including in the Hospital of Leiria, due to errors in orders coming from the primary healthcare centers, including: incorrect geographical reference; incorrect specialty reference or insufficient clinical information. Also due to implemented IS problems, such as, failure to intercommunication between the Alert-P1 and the main Hospital Management IS, *Sistema integradO de iNformação HOspitalar* (SONHO); lack of attention to the period of consultation request by the Alert-P1; delay in providing computer support service for data correction or modification, and patient reference not supported by the CTH system, problems identified in the Hospital of Leiria [7].

After surveying, it was recommended the provision of health care entities in the SNS to use SI which are currently prepared to fulfill the TMRG like SONHO and Alert P1, CTH system developed by the company ALERT Life Sciences Computing, SA [7]. To comply with TMRG were created strict administrative rules, which refer to the number of days for effecting the first consultation, as its triage [8], [9]. In the case of hospital internal applications, there is no law stating any stipulated time to meet.

To make an appointment, technical assistant must know how to distinguish a First Consultation (*Primeira Consulta*, PC), coming from an Alert-P1 order, or a First Hospital Consultation (*Primeira Hospitalar*, PH) from internal applications' order or a paper order. To check the priority of requests for medical consultation, the triage responsible start to mark the higher priority, then lower level of priority and finally the normal requests, then register the consultation in IS and print a call with date, time and location to send by post mail to the patients' address. The patient should be informed within at least 5 working days before the consultation [9].

In the Hospital of Leiria, if the patient has its' mobile number data available, four days before the consultation the patient receives an SMS to recall the consultation date and the respective time through the SMS system that is interconnected to SIGED. The patient when receiving the call at home to inform the date of the first scheduled appointment, if is unable to attend should notify the fault and ask to redial consultation via telephone, fax, email or directly on the Outpatient service.

2.2. Patient satisfaction in External Consultation

The best way to verify the effectiveness of implementation of new IS in public hospitals before the process External Consultation is to observe the user satisfaction by making use of surveys.

In the years 2008 and 2009, the Portuguese Health System Central Administration (*Administração Central do Sistema de Saúde*, ACSS) sought to analyze SNS hospitals through patients' questionnaires who resorted to hospitals to provide health care, including in External Consultation, through telephone contact. Two important results were obtained in relation to EPE Hospitals technological innovation (IS) and in relation to the concern that exists with the patient, where were obtained scores of 7.9 and 8 (2008) and of 8 and 8,3 (2009), on a scale of 1 to 10, where in one (1) means "Strongly Disagree" and ten (10) "Strongly Agree". Other study was related to the admission process in the External Consultation, focused on the ease of obtaining a consultation, with the score of 7 (2008), and the score of 7.2 (2009), on a scale of 1 to 10 where one (1) means "Very Bad" and ten (10) means "very good" [10], [11].

3. Methodology

The subject of this study belongs to Leiria Hospital Center (*Centro Hospitalar de Leiria – Entidade Pública Empresarial*, CHL-EPE), which consists of three hospitals: Hospital Santo André (HSA) located in Leiria, Hospital Distrital de Pombal (HDP) in Pombal and Hospital Alcobaça Bernardino Lopes de Oliveira (HABLO) in Alcobaça. In March 2011 there was a fusion between the HSA and the HDP resulting in Centro Hospitalar de Leiria-Pombal - E.P.E. (CHLP-EPE) [2] that went through the accreditation process in 2012 by the Joint Commission International (JCI) [3] and finally, in 2013, there was the junction of HABLO, forming the current CHL. The CHL's mission is the provision of different health care, in addition to primary care, preventing and promoting the health of users of health centers and hospitals in the SNS, looking also to ensure research conditions.

The method used in this work was the questionnaire method, which was prepared based on reports made by the ACSS and performed *via* telephone [10], [11]. The population of the present study are the patients who did not attend an appointment and they made request for rescheduling the encounter in the External Consultation service of HSA.

To carry out the questionnaire, it was necessary to get permission from CHL Administration Council and request Technical Computer Specialist to access database data, namely, a list of users who lacked an appointment in October 2014 and applied for reschedule the consultation. This was the sample population of interest, identifying the full name of each user, the hospital's patient number, the date and time of consultation that was scheduled and then rescheduled, as well as consulting specialty in order to able to use the SIGED and search through the hospital patient number in the patients' record their telephone number or mobile phone in order to make the questionnaire, through

phone call.

3.1. Preparation of patients sample list

For the preparation of the list of interviewed, Technical Specialist Computer began to withdraw from the database the faults of HSA patients, where there is the SMS sending service to remember a consultation. Among 53696 SMS sent in a month, it were identified 2337 cases available in an Excel file with 9 columns corresponding: to the hospital the user number (COD_DOENTE); the full name of the user (DNT_NOME); the date (DATE) and time (TIME) query that was not honored; the type of query: PH, PC, SH (TYPE); the query code (COD_EXAM); the query name (EXM_NOME); the personnel number of the doctor (COD_M) and the doctor's name (NAME). Upon receipt of this data, it were eliminated lines that did not interest to the study, in particular the cases of consultation "Without the Patient Presence" and Medical Oncology Consultations, eliminating patients. These lines have been eliminated, since the goal of the study is directed to patients who for some reason did not attend a consultation, and the case of Medical Oncology consultations were also eliminated because they are cases of great care to address, because of their sensitive situation.

Analyzing the processed data, confirming the consultation redial orders in paper, there were two distinct examples: one of them came in the treated list and the others don't. Two hundred ninety four patients have been identified in the treated list presenting the state "M" in the field "Consultations rescheduling" of SIGED, but other cases were not signed with state "M" due to the transfer of the consultation to another date, representing missing data and demonstrating that the query in the database was not effective. This also confirms that administrative process to rescheduling are not fully defined and followed. To obtain a complete list of patients, it were collected by hand in the paper redial consultation, which are filed in the Outpatient reception. This collecting data was performed checking eight large dossiers reporting the consultations of October, taking into account that applications for rescheduling are in date order, the task lasted for three days to cover all data, confirming the existing cases and identify the 148 missing ones. This resulted in 442 cases to perform the questionnaire, with complete information, including a telephone contact number.

3.2. Questionnaire Constitution

The questionnaire was applied referring to the patient the specialty, date and time of the consultation followed by the four questions with predefined answers. The first question is "What was the reason that led you to make a request for consultation rescheduling?" with the following response options: "personal reasons "; "Forgetfulness"; "Reason related to the appointed day, was not appropriate"; "Other reason". If this last option was the answer it was requested to indicate a reason and it was allowed to mention more than one. The following questions were all to indicate: "Yes" or "No": "The scheduled consultation resulted in an effective encounter?" "You had received SMS on your mobile phone to confirm the day of the appointment that you did not show up?" and "Were you satisfied with the SMS sending service to remember the date and time of an appointment?". If the answer was negative, the patient was asked for reason. This questionnaire was prepared in the online tool Google Forms in order to improve the data processing, being stored in a personal page of Google Drive.

4. Results

Analyzing the 441 cases, based on paper report the justifications for asking for rescheduling resulted in five percent said they had to make a request for consultation rebooking because of forgetting of consultation date, 24% said that the appointment day was not convenient, 9% admitted to be related to personal reasons (Figure 2).

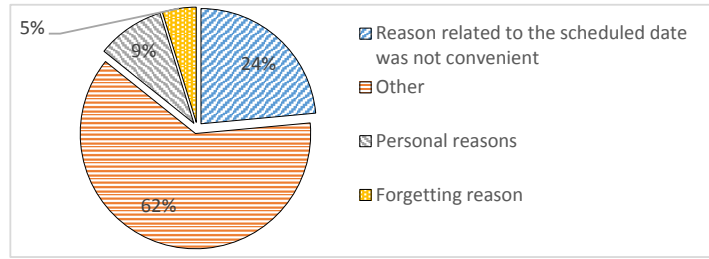


Fig. 2 Graphic reporting the reasons presented to justify asking for rescheduling a consultation.

The reason related to the appointed day, when the date was not convenient, was reported by 104 patients, and these related to: surgery (8%), an appointment in the same day and same time to another specialty (1%), school-related reasons (20%), exam required and missing for the consultation (9%), not compatible time (2%), going to another health facility (20%), unavailability, not having time (2%), professional reasons (31%) and medical examinations scheduled to do the same day (7%).

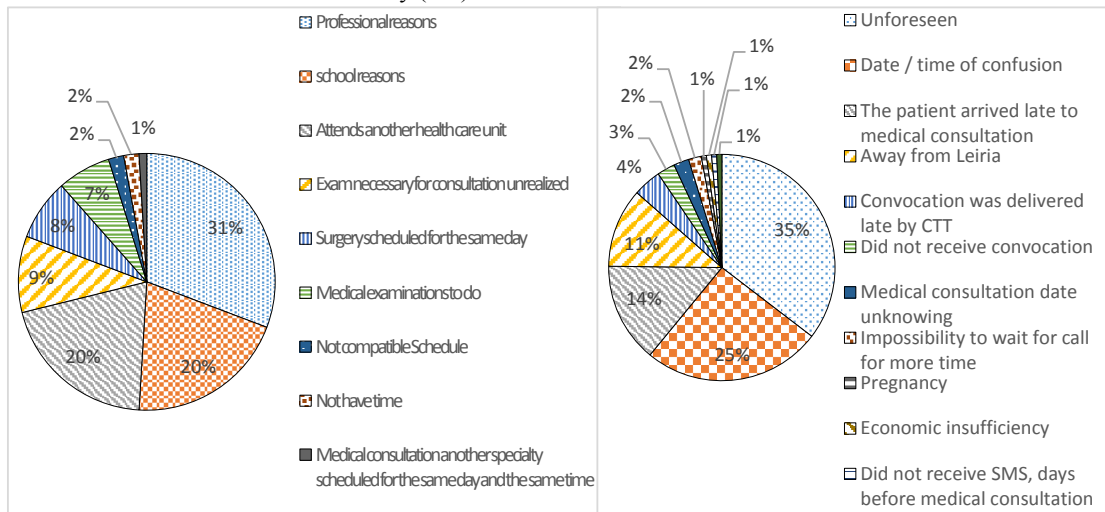


Fig. 3. Graphics concerning the faults reasons: (a) when the day was not convenient and (b) other reasons.

When there were other reasons, it were reported the following justification: did not receive SMS days before the medical consultation (1%), there were no human resources to take the recluse to the consultation (1%), delay (14%), absence of Leiria (17%), date/ time confusion consultation (25%), late convocation delivered by post mail (4%), there was no knowledge of the scheduled medical consultation (2%), 1% admitted not being able to go be in pregnancy phase, 2% indicated that it could not wait any longer by medical consultation call, 35% complained of consultation forgetfulness, and only 1% had the economic failure problem and 3% received no convocation (Figure 3).

These are the preliminary results of 113 interviews performed to HSA patients, recognizing the relevance of SI, still there is a huge number of rescheduling consultations for a wide variety of reasons. Patients with telephone contact, the majority, admitted to be satisfied with the messaging service, concluding that in fact the new technologies are improving the patient care services, as revealed by the ACSS [10], [11]. SMS sending service is really very important to avoid the faults consultations by patients, as shown the three international studies.

In 2006, the SMS sending service has improved the appearance of patients scheduled appointments, assessing their operational and financial efficiency, obtaining the following results: 90.2% of 22658 patients receiving SMS to remember an appointment between October and December 2004 attended, compared with 80.5% of 22452 patients

who attended the consultation but who had not yet given his mobile number, between October and December 2003, concluding that fact the rate of failure to attend the consultations decreased, compensating the cost of sending SMS and considering the effective service [12]. Another study in London, in 2008, taking into account Ophthalmology consultation, the messaging service improved results: 11.2% of the 447 patients who received SMS failed an appointment of Ophthalmology and 18.1% of the patients who did not receive SMS did not attend the consultation, concluding that the utilization of SMS as a reminder of an appointment reduced 38% probability of patients to fail to appear in the consultations [13]. In a review, was presented a test of three types of reminder: by phone manually, by SMS or by automated telephone calls, where 29 revised articles, except one, admitted a benefit when sending SMS to remind patients of an appointment, also indicating that de manual calls are more effective in relation to automated phone calls, concluding that in fact all hospitals should consider automatic service reminders to reduce the failure to attend [14].

5. Conclusions

In a month the SMS service sent 53696 written messages to patients, still in October 2014, by database query, 2337 patient did not go to a scheduled consultation. From this Excel file only 294 were identified as requested for redial, but other 148 patients asked to transfer the consultation, giving a total of 442 patients that applied for rescheduling the consultation in a certain specialty in the External Consultation service.

By checking the consultation redial requests we could conclude that among the 62% that had diverse reasons to fail the consultation, the majority have justifications related to date confusion (25%), time confusion, getting late (14%) and forgetfulness (35%). From these 442 patients, 113 were interviewed and 87,6% received the SMS to remind the scheduled consultation. Although there is a large percentage of consultation dial forgetfulness and confusion of dates, there is no direct correlation with the SMS service that should remind and clarify the scheduled appointment date. The majority of those that answered the questionnaire recognized the relevance of the SI, namely the SMS sending service. It must be taken into account the dissatisfaction and improve the process in order to avoid absences to scheduled consultations cultivating the preventive medical practices.

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