

Patient Relationship Management Method, an Approach toward Patient Satisfaction: A Case Study in a Public Hospital

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Abstract

Introduction: The aim of this project is to investigate the concepts of patient relationship management (PRM), patient satisfaction and their relationship. As healthcare industry has its own complexity, the so well defined idea in marketing which is CRM could not be implemented directly in health industry. Consequently the concept of PRM has been introduced.

Methods: Qualitative research has been executed over the recently developed methods. The main indices of patient satisfaction based on new findings have been discussed. Besides PRM method has been investigated. Finally via data mining on questionnaire that we have gained on a public hospital in Tehran we analyzed the case and based on the data we recommended a PRM solution to tackle the problems.

Results: While CRM is the best practice for marketing segmentation, increasing customer satisfaction and avoiding customer retention, in the health industry PRM is the main template to improve patient satisfaction and consequently avoiding patient churn. It has been found CRM with the profit maximization motto could not be used directly in health industry. Instead, PRM with the main objective of using the patient data effectively for prediction of disease trend over time, classification of the type of disease and using follow up system could improve the quality of care that is provided for the patient. As a result this would directly lead to increased patient satisfaction and best retention strategy for health industry. In the case study we found that the main problems arise from the lack of efficient communication between medical staff and patients. A system of PRM to tackle this problem is provided.

Conclusion: PRM, Service quality and Patient satisfaction are inter related concepts. With the help of PRM it is possible to avoid the outbreak of new disease, improve the service quality and saving the time in process of care services which they result in increased patient satisfaction. Data mining on patient satisfaction questionnaire is an efficient way to find the main problem and obstacles in front of patient satisfaction. Via PRM method we can find a solution to alleviate the situation and increase patient satisfaction.

Keywords: Patient Relationship Management, Patient Satisfaction, Data Mining, Clustering

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Introduction

Health industry because of its relation to the human well-being and the intricacy of life of patients has very important position. As in the other industries the concepts of CRM (Customer Relationship Management), customer satisfaction are well introduced and actually well deployed, we are aiming to see the changes and implication of these concepts in health care. In this article first we introduce PRM (Patient Relationship Management), Service quality, patient satisfaction and their relationship with each other. This study is based on the recent researches in this area. We are at the verge of a change from the economy of trade toward the economy of relationship. It means in this context, knowing customer needs, strengthening relation with the customers and equipping with the IT technologies is the essential prerequisite to sustain in rivalry world of business. Consequently the ideas like CRM and ECRM have been emerged to fulfill these demanding needs [1]. Customer relationship management in health care is defined as patient relationship management. PRM is a com-

mitment to understand the individual patients, communicating efficiently with them, acquiring the right information from them and employment of right personals for patients as they wish PRM has its main benefit in these specified [2].

In the past few years, patient satisfaction and safety are on top of the list of priorities for healthcare IT leaders, according to the Healthcare Information and Management Systems Society. Reducing errors and streamlining processes are keys to increasing patient satisfaction [3]. In addition, more healthcare organizations are taking a cue from the private sector by putting the customer in this case, the Patient at the center of service-oriented process improvement efforts [4].

Methods

This descriptive analytic study aimed to describe the systematic and realistic relationship between PRM and patient satisfaction. Information of this article was collection from library resources, articles and dissertations, and related



websites. Therefore, to identify and assess Health care and the relationship between PRM and patient satisfaction are discussed.

The main indices of patient satisfaction based on new findings have been discussed. Besides PRM method has been investigated. Finally via data mining on questionnaire that we have gained on a public hospital in Tehran we analyzed the case and based on the data we recommended a PRM solution to tackle the problems [5].

Customer Relationship Management (CRM) concept: Customer relationship management is to pay attention to the customer, defining the strategies of business with the goal of maximizing the profit via Information technology[6].

In health care as continuing relationship with the patient is a crucial issue for health provider, getting assistance from CRM to develop this value is the focus of health industries [7].

Increasing the patient satisfaction and developing the loyalty is the core goals of health industries. A health organization which is established with discrepancies and faults would not be successful in developing and maintaining firm relationship with the patients. Patients will trust to the World Health Organizations (WHO) provide perfect and precise information about their health status and the evolution of their health. As a result patient will not tolerate any mistake in medical information just because of huge amount of data and scarcity of discipline [8].

In today world knowing more about present and future patients is to provide more efficient health care system which is a must. This idea has its roots in this reality that having more knowledge about the patients means to be more responsive toward present and future patients' needs [9]. This would be rectified as to be more predictive about future of patients and their upcoming situations and their needs as well as their illness trend. Thereby, CRM will be

an effective tool to provide health industries in Strategic planning, consulting services, relationship establishment, CRM for Physician, Campaign management, structure of data warehouse, predictive categorization and relationship strategies as depicted in figure 1 [10].

Empowerment with IT technology to minimize medical mistakes

Minimizing operational and procedural activities and facilitating the communication with patient

Establishment of best practice in patient physician relationship

Development of comprehensive data warehouse

According to Lewis Dolan (2010), application of PRM are as follow:

Preventing from outbreak of new diseases

Improvement and consistency with the process of caring

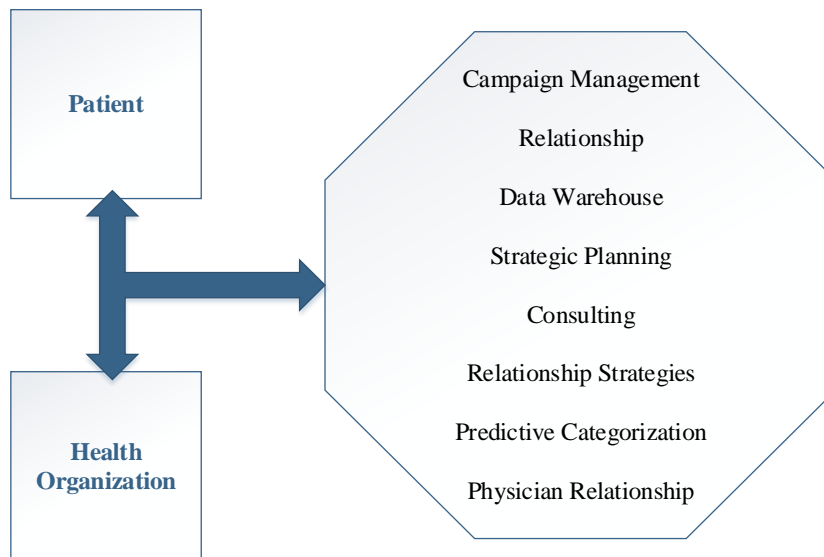
Facilitating in the day to day processes like: reception, referral, release,

Saving documents electronically and retrieving them without delay in time

Atomization of active communication

Decrease in missing appointments

By using PRM it is possible to create knowledge for the organization systematically. Conceptual framework for organizational knowledge creation, known as the 7C model. The model suggests that the following seven Cs play a critical role in the creation of organizational, knowledge: Connectivity, Concurrency, Comprehension, Communication, Conceptualization, Collaboration and Collective intelligence. The first two Cs (connectivity and concurrency) are somewhat trivial. They point out that connectivity of all stakeholders with the joint information space and with people (potentially concurrently) is provided in a technologically sound manner through the Web, wireless and mobile applications and other technologies.



Patient Relationship Management (PRM):
Figure 1. CRM healthcare help

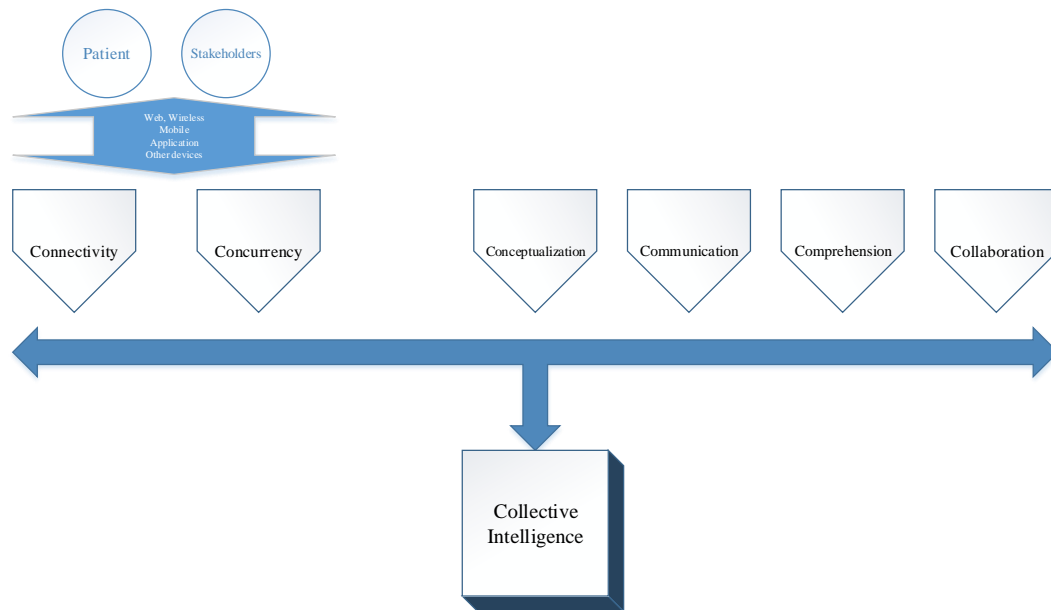


Figure 2. 7C model

These may promote options and allow freedom of choice with contextual support, providing users with a rich environment for comprehending and communicating information they find. Knowledge is conceptualized as artifacts, which serve as a vehicle for collaboration through interaction between information producers and consumers, within a team of coworkers or among other stakeholders. All six preceding Cs contribute to the growth of collective intelligence. In a hospital, physicians and nurses can learn and understand new things (comprehension) while they perform their routine work. They can then share their work-related experiences with colleagues (communication). As they share, they finally add to the knowledge of the group and create best-practice guidelines (conceptualization) to may perform better in the future (collaboration)[11]. Over time, as these processes repeat, the hospital unit will be more efficient at providing care for its patients (collective intelligence) [12].

The final results of using PRM system are as follow:

- Improvement in relationship between physician and patient
- Transparency in medical decision making
- Improvement in communication between different sections of hospital
- Increase in collective intelligence especially for nurses
- Improved Follow up system of caring
- Possibility to identify patient churn
- Decrease in cost and preventing from repeated referral

As it can be concluded one of the main aspect of health management is the relationship between health provider and patient[13]. This relationship includes mutual perception, trust, and participation of patient in decision for caring. These items would effect on the patient satisfaction and lead to the loyalty of patient toward the organization [14]. As one of the criteria to know the efficiency of PRM system is patient satisfaction measurement in the following section, this index will be introduced in more details [15].

Patient Relationship Management toward Patient Satisfaction: Different Approach has been identified toward

patient satisfaction definition. Hsieh and Kagle JD (1991) believe that patient satisfaction is final synthetic of complex experience including patient expectation, condition of health, individual characteristic and healthcare characteristic [16]. Lee (1988) believe that patient satisfaction is a complex structure resulting from the comparison between the experience of patient and his (her) predefined mindset standards [17].

As a result patient satisfaction has been accepted as one of the best criteria for performance of any health providing system[18]. Patient satisfaction can be evaluated via four main factors:

- Care
- Empathy
- Reliability
- Responsiveness [19]

Through factor analysis, Tucker and Adams (2001) reduced these variables to two primary dimensions thought to affect patient evaluations [20]:

- 1) Provider performance – found to be the most significant in patient evaluations, associated with interpersonal relations and patient-caregiver interactions.
- 2) Access – variables related to the patient's ability to gain care and the impediments to that process [2].

Results

Analysis of patient satisfaction on a Hospital in Tehran

A survey of patient satisfaction is carried out on 553 records for patients and questions were designed on Likert scale. As it is evident the items of patient satisfaction are based on service quality index. So, the interrelation of patient satisfaction and service quality can be inferred. We are interested to differentiate between the types of responses. By use of clustering method and Davis Bouldin index we found the best numbers of clusters are 3. We used Rapid Miner software and clustering method via K-means on the responses. The questions are as follow:

Table 1. Questionnaire Item

Item	Average (centroid data)
Physicians	
Behavior and respect	3.79
Punctuality of physicians	3.65
Satisfaction about physician training	3.24
Responsiveness of physicians	3.44
Respecting private zone by physicians	2.71
Introducing themselves	2.04
Nursing personnel's	
Behavior and respect	3.56
Responsiveness to the call ring	3.06
Performance	3.72
Training and explanation	3.00
Respecting private zone	2.11
Guidance about religious questions	2.98
Introducing themselves	1.80
Operation(surgery) room	
Behavior	3.88
Punctuality	3.77
Explanation of situation	3.22
Clothing before , while and after surgery	3.87
Security	
Behavior and respect	3.41
Information	
Sufficiency of guidance	3.20
Efficiency of panels and signs	3.18
Reception	
Behavior and respect	3.83
Waiting time	3.54
Diagnostic services	
Satisfaction about the radiology, sonographer and CT scanning, ... services	3.87
Satisfaction about the lab services	3.57
Behavior and respect	3.81
Respecting private zone	3.27
Environment and services of sections	
Behavior and respect	3.75
Transfer to the caring section and displacement between different sections	3.81
Cleanliness of section	3.36
Quality and replacements of sheets, blankets and clothes	3.35
Amenities (chairs, cooler, telephone, lighting, beds, prayer, and ventilation of rooms, etc.)	3.11
Quality of foods and time of serving	2.86
Hospital management	
Satisfaction about the office	3.03
Availability of prescribed drugs	3.61
Satisfaction about submitting and responsiveness of objection and complaints	2.99
Facilities like copying machine, ATM, etc.	3.88
Satisfaction about the practice of social workers	3.02
Overall satisfaction level	3.26
If needed Ready to use the service of hospital or recommend to others	

Table 2. Davis Bouldin results

Number of clusters	Davis Bouldin index
2	-2.881
3	-2.917
4	-2.876
5	-2.891
6	-2.677
7	-2.72

As it is known, when Davis Bouldin index is minimized the best number of clustering is found. We named the

clusters as highly satisfied, satisfied and not satisfied. The number of each cluster are as follow:

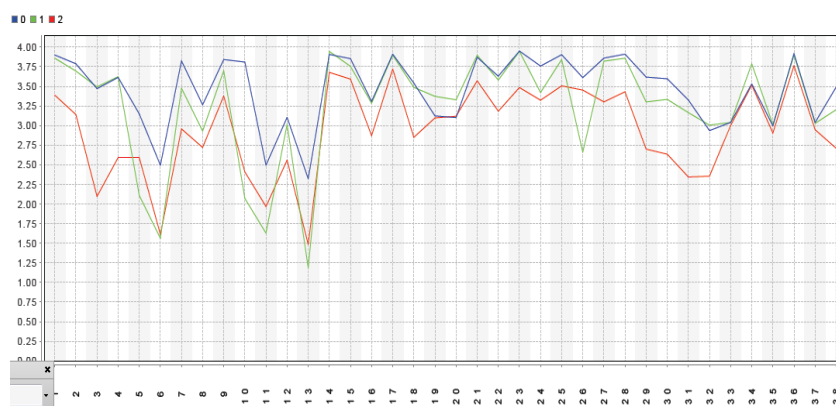
Table3. Number of each cluster

cluster	Name assigned	numbers
Cluster0	Highly satisfied	277
Cluster1	Satisfied	183
Cluster2	Not satisfied	93

The average demographic properties of each cluster are as follow:

Table 4. Demographic properties of each cluster

Clusters	sex	age	education
Cluster0	51% female 49% male	98% between 18-60	63% primary school
Cluster1	57% female 43% male	81% between 18-60	87% diploma or lower
Cluster2	62% female 38 % male	97% between 18-60	61% diploma or higher

**Diagram 1.** Cluster model

As we can see the expectation of patients from services become higher as their education level become higher consequently the level of their satisfaction become lower. Moreover the clusters of unsatisfied people are mainly women. The graph below shows the centroid plot for three Clusters.

Based on these clusters we found:

The items which are below 2.5 for all clusters: 3, 6, 10, 11, 13.

The items below 2.5 only for not-satisfied cluster: 31, 32

The items above 3.5 for clusters including not satisfied cluster: 1, 2, 4, 7, 10, 11, 14, 15, 17, 21, 22, 23, 27, 28 and 36.

The items which are above 3.5 even for not satisfied cluster: 14, 15, 17, 21, 36.

Discussion

From this analysis, below conclusion can be drawn:

Physician and nurse communication with cluster2 are not satisfactory.

Nurses have to be more concerned about respecting patients' private zone.

Amenities and food quality have to be modified.

Physicians, nursing personnel's, diagnostic equipment's and the people in charge as well as facilities like ATM, copying machine are satisfactory.

One of the main issue in this hospital arise from lack perfect communication between physician- patient and nursing staff- patient. This would be rooted in:

The limitation of time to allocate for each patient for physicians

The over load of work for nursing staff

The misunderstanding of patients from guidance and counseling of medical staff

By using PRM and designing an IT structure to facilitate the communication between medical staff and patient this problem will be solved. One solution to tackle this problem is to build a data warehouse of similar patients with similar symptoms and fining a trend between them. By using data mining it is possible to code the guidance for

the patients. Afterward by designing an IVR system, patients are able to receive the information in hospital and in home that they need.

The recommended plan to implement in this hospital is depicted as follow:

Patients communicate their problems including the symptoms of their diseases.

These data are stored in a data ware house which include patient data,

Symptoms, similar cases, solutions and recommendation from the doctors and nursing staff.

The communication between medical staff including physician and nurses is being carried out via 7C system.

The data mining and coding is being applied on the data warehouse.

An IVR system is being updated and the patient question is being replied via new data. In Figure below we recommended PRM solution

Conclusion

The practice of CRM in Health industry is converted to PRM. Thereby, healthcare providers have to use powerful marketing strategies and quality assurance programs to maintain patient satisfaction and patient loyalty. This is not an easy task because of the following reasons.

- Limited marketing capabilities of hospitals
- Sensitive nature of patients as customers
- Difficulty in providing personalized care for each Patient
- Difficulty in retaining patients for preventive care
- Difficulty in promoting new facilities and services
- Current patient information management

As PRM is implemented in health organization the outcome will result in facilitating the follow of information in the system, transparency of decisions and resulting in collective intelligence.

The extra costs due to revisiting, allocating more time for retrieval of information and waiting for the routine procedural caring services will be minimized. These benefits will

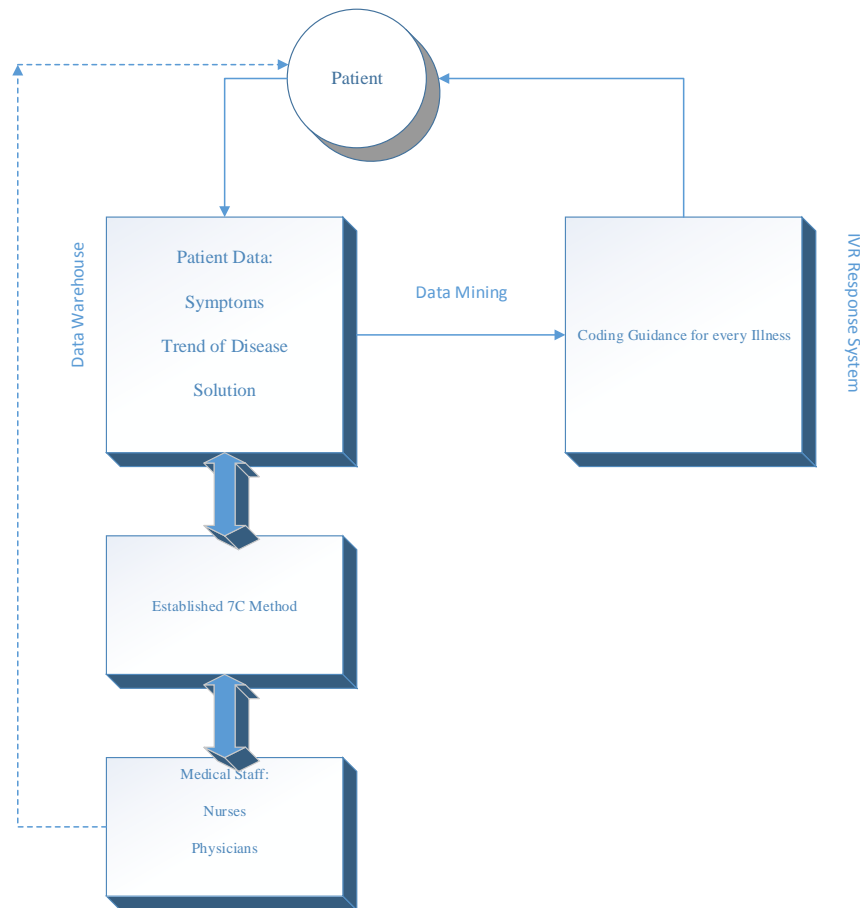


Figure3. Recommended PRM solution

lead to elevation of patient satisfaction and as a result success of health organization in winning its market share. About the special case on a Hospital based on patient satisfaction data we found that increasing amenities and food quality is a must. Besides technical services, physician and nursing staff services are at satisfactory level. The main problem arise from lack of efficient communication between patients and medical staff which a PRM solution to tackle the problem is provided.

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