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Hospital Information System for Motivating Patient Loyalty: A Systematic Literature Review

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Abstract

Healthcare service institutions (HIS) seeking to motivate patient loyalty have identified Hospital Information Systems (HIS) as a potential solution to gather, measure, and analyze the healthcare data necessary for this goal. The purpose of this systematic review of the literature is to reveal how prevalent the use of HIS with respect to motivating patient loyalty, and to investigate the efficacy of HIS in doing so. To generate data, published empirical studies and conference papers from the past five years were compiled from the following online databases: Scopus, ACM Digital Library, IEEE Xplore, ScienceDirect, and Emerald Insight. The search results indicate that, while the use of HIS in motivating patient loyalty is rare relative to other topics within the general field of HIS, HIS use have a significant positive impact on patient satisfaction, which is understood in the literature to be directly related to patient loyalty. There remains a gap in empirical studies on the direct application of HIS with the purpose of increasing patient loyalty. Future research may be required on the development of an HIS focused on motivating patient loyalty, which can be empirically tested in a real-world HSI setting.

Keywords: Hospital Information System, Patient loyalty, Patient satisfaction.

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Introduction

Due to cheap travel costs and rising healthcare standards in developing countries, more patients across the globe are choosing to go overseas for healthcare. In response, local governments, hospital administrators, and other stakeholders are seeking ways to retain their patients and motivate loyalty to their healthcare service institutions (HSIs).

There is a clear consensus in the relation between service quality, patient satisfaction, and patient loyalty. In brief, service quality variables influence patient satisfaction; patient satisfaction, in turn, influences patient loyalty (Mohebifar, et al., 2016; Shabbir et al., 2016; Tosyali et al., 2019). Thus, it has been argued in the literature that, to motivate patient loyalty, it would be necessary to motivate patient satisfaction by meeting the service quality variables laid out by (Parasuraman et al., 1988) namely, tangibility, reliability, responsiveness, assurance, and empathy (Asnawi et al., 2019; Kulsum et al., 2017).

A significant complication inherent in these variables is the observed differences, not just in the relative importance specific groups place on each variable, but also how the variables are conceived in the first place. For instance, (Ahmed et al., 2017) found that younger patients valued the variables of empathy and tangibles more than their older counterparts, while single patients valued reliability more than their married peers. Another example is the high value Ghanaian patients place on individual attention from HSI staff (Nkrumah et al., 2015), which is markedly different from Japanese patients, who were most satisfied when HIS staff treated them the same as other patients (Elleuch, 2008). Thus, if HSIs wish to motivate patient loyalty, the best result would likely require the data gathered from their own patient base, rather than from other HSIs that may cater to other segments of people.

HSIs attempting to meet all service quality variables require the gathering, measurement, and analysis of massive amounts of data in a timely manner. Not only do HSIs have to handle large sets of healthcare data, they must do so while respecting patients' confidentiality, and keeping their trust (Bayer et al., 2015). The emergence of Hospital Information Systems (HIS) may assist in accomplishing this task. HIS can be understood simply as the methods with which a hospital manages the information within their organization; it has been defined as a comprehensive and integrated Information System engineered to handle an HSI's administrative, financial, and clinical aspects of a hospital (Ahmadi et al., 2017). HIS is intended to make sense of the large amounts of information that HSIs collect every day and present them in a way that can be utilized easily by HSI administrators and stakeholders. However, HSI investments in HIS have focused mainly on improving performance from the perspective of administrators rather than from the perspective of patients (Sheikh et al., 2015; Wang et al., 2018).

The purpose of this systematic review of the literature is to determine how prevalent the use of HIS is for the goal of motivating patient loyalty, as opposed to focusing on administrative concerns. An additional purpose is to reveal how effective HIS has been in motivating patient loyalty in the studies that use it for that goal. To reveal the prevalence and

effectiveness of HIS use with respect to motivating patient loyalty, the following research questions were formulated:

RQ1. How prevalent is the use of Hospital Information Systems to motivate patient loyalty?

RQ2. How effective is Hospital Information Systems in motivating patient loyalty?

By reviewing the current state of the literature regarding both the prevalence and efficacy of HIS with respect to motivating patient loyalty, this review aims to reveal how commonly HSIs use HIS to increase patient loyalty and how effective such use has been.

The review will be organized into four sections. The first section will discuss the methods utilized for the systematic review, the second will outline the results of the review, the third will expand upon the obtained results, and the fourth and final section will include the conclusion of the study, and also possible directions for future research.

Litrecher review

A search of five online research databases was made to compile relevant articles for the review: ACM Digital Library, Emerald Insight, IEEE Xplore, ScienceDirect, and Scopus. The search was conducted from late February to early May 2020. The search results were reconfirmed on June 2020. To generate the articles, the following search string was used: "hospital information system AND ("patient loyalty" OR "patient satisfaction")".

Initially, the search string used was simply "hospital information system" AND "patient loyalty". However, there were too few results using this string. Due to the robust evidence linking patient satisfaction and patient loyalty, "patient satisfaction" was added to the search string in order to generate more results.

Inclusion and Exclusion Criteria

As the review is focused on the actual use of HIS by HSIs with the express purpose of motivating or improving patient loyalty, only articles with the following characteristics were included: (1) the article must be published in English, and available in full text version, (2) the article must be published in a peer-reviewed academic journal within the last five years, or (3) the article is set to be published in a peer-reviewed academic journal this year, or (4) the article is a peer-reviewed article from an inter-national computer science conference. Only empirical studies that focus on the use or effect of HIS on patient loyalty or satisfaction were included in the review, as the primary concern is the actual practice of HSIs with respect to HIS and patient loyalty.

The inclusion criteria were intended to generate results pertinent to the current state of HIS use with respect to motivating patient loyalty in HSIs. Due to the rapid advancements in IT, extending the inclusion range beyond five years prior to the review may introduce obsolete data. Because the research questions of the review pertain to actual use of HIS by HSI staff, only empirical studies were included.

Articles were excluded if they were published prior to 2015, not peer-reviewed, used HIS in a manner other than for motivating patient loyalty, or did not conduct an empirical study. Previous systematic literature reviews were also not included in the review as their findings may already be obsolete.

Methodology

Data Extraction

By applying the inclusion and exclusion criteria outlined above, a list of articles to be included in the review was identified and gathered for further refinement to build the final list. It was necessary to eliminate articles that emerged from more than one database to eliminate redundancies.

To determine whether an article was to be included in the review, the titles of the results from the aforementioned search string were scanned; if they did not mention HIS, patient loyalty, or patient satisfaction, they were excluded. Next, the remaining results' abstracts were examined to determine their relevance to the review. If the abstract did not contain reveal an empirical study on HIS, patient loyalty, or patient satisfaction, they were excluded. Finally, the remaining results' full texts were read by to determine their relevance to the review. The first three authors of the review handled the initial search and abstract reviews. All four authors contributed to the full text readings and final selection of the articles. The full process is outlined below in figure 1.

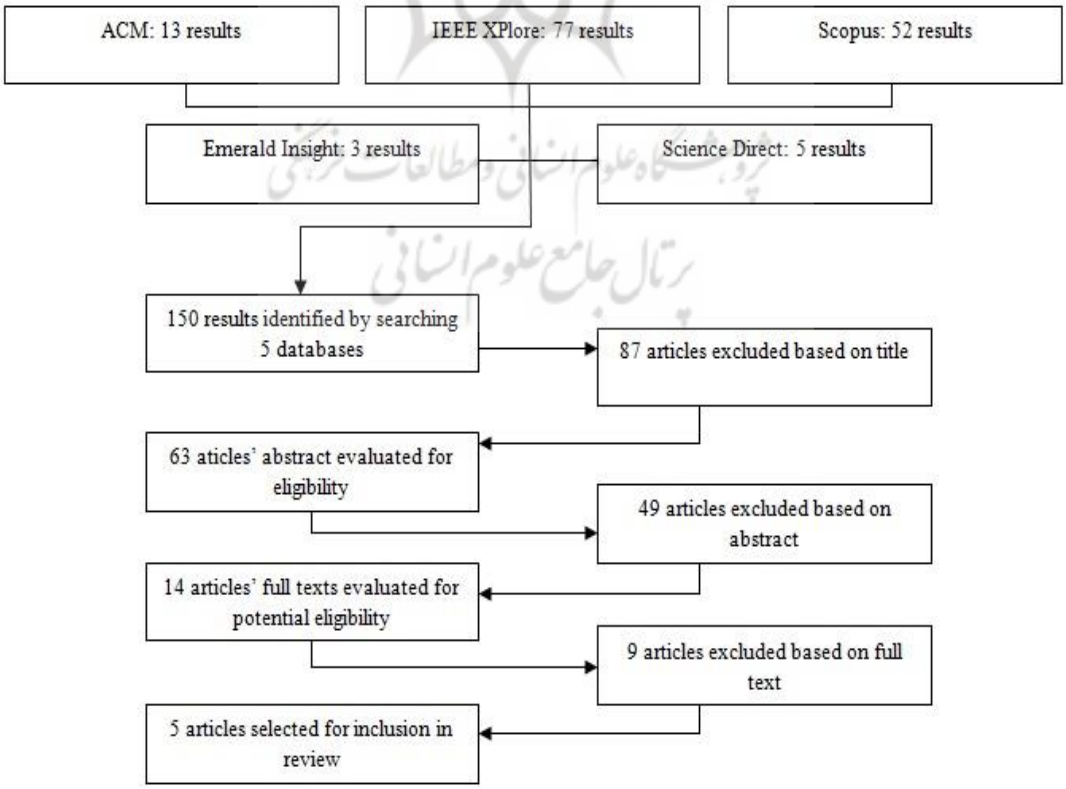

Figure 1. Data Extraction Process

Findings

This section presents a summary of the reviewed articles.

Search Results

Table 1. Data Extraction Results.

Authors	Year	Study Location	Purpose of the Study	Relevant Results	Limitations	Implications
Liang, Gu, Tao, Jain, Zhao, & Ding (2017)	2017	Large hospital in East China	To examine the influence of HIS on doctor-patient relationships and patient satisfaction through the lens of service fairness.	Patient-accessible HIS increases the patients' perception of service fairness, which in turn improves both doctor-patient relationships, as well as patient satisfaction.	Data from a large hospital was utilized; data from smaller HSIs may lead to different results. Furthermore, because this is a Chinese hospital, Liang et al. (2017) noted that there may be cultural factors specific to the Chinese that may differ from other cultures with respect to perceptions of service fairness.	There is a power imbalance between physicians and patients in health care, leading to potential tension when patients feel that their concerns are unappreciated or ignored. The use of HIS, which allows patients more access to pertinent medical and administrative information regarding themselves, may help remedy this imbalance and increase patient satisfaction and loyalty.
Yoo, Jung, Kim, Kim, Lee, Ching, & Hwang (2016)	2016	A public tertiary general hospital in South Korea	To evaluate an HIS that addresses the difficulties of outpatients regarding the search for HSIs, keeping up with treatment regimens, and accessing tailored medical and administrative information.	The authors conducted a survey on their satisfaction regarding the HIS, n=43 (23 outpatients and 20 of their guardians). Participants exhibited a satisfaction level of roughly 4.0 on a 5-point Likert scale.	An Android-based mobile app was used by the outpatients. The study did not discuss the HIS used by the hospital. The results may therefore apply only to HIS initiatives solely focused on patients, and not on HSI-wide efforts to utilize HIS.	Outpatients value the easy access to pertinent medical and administrative information at a glance. Visiting an HSI can often be a stressful experience, particularly for older patients. If they can access information readily without having to ask a staff member, they may feel more empowered and thus more satisfied—the increased satisfaction may motivate them toward loyalty for the HSI.
Khalifa (2017)	2017	Four hospitals in Saudi Arabia (2 private, 2 public)	To reveal the perceived benefits of HIS and electronic medical records (EMR) from the point of view of patients	After 153 valid survey responses, the patients perceived the following benefits for HIS and EMR: 1) Improved information access, 2) Increased healthcare professionals productivity, 3) Improved	HIS was examined solely from the point of view of patients. Considerations from the HSI's point of view were left out, which means there is limited data on whether the HIS would be financially viable on their end.	Patients are more satisfied when they can feel empowered and exercise their informed autonomy in HSI interactions. HIS that increases information availability and convenience will likely lead to greater patient satisfaction, as well as greater patient loyalty.

				efficiency and accuracy of coding and billing, 4) Improved quality of healthcare, 5) Improved clinical management (diagnosis and treatment), 6) Reduced expenses associated with paper medical records, 7) Reduced medical errors, 8) Improved patient safety, 9) Improved patient outcomes and 10) Improved patient satisfaction.		
Meyerhoefer, Sherer, Deily, Chou, Chen, Sheinberg, & Levick (2018)	2018	An obstetrics and gynecology practice in eastern Pennsylvania.	To examine the impact of installing an EHR system at OB/GYN practices.	HSI staff were dissatisfied with the EHR system; physicians most especially. Patient satisfaction decreased after the installation of the EHR system.	Only OB/GYN practices were considered; results may not apply to other branches of healthcare.	The negative impact of EHR on patient satisfaction may be due to the dissatisfaction of HSI staff with the system, which may have impacted staff compliance. HIS tasked with motivating patient loyalty must have support from HSI staff to be viable.
Asagbra, Burke, & Liang (2019)	2019	Acute care hospitals in the United States	To examine the relationship between HIS functionalities and the quality of care by the HSI.	The more comprehensive the coverage of the different HIS functionalities, the higher the satisfaction of patients. The number of functionalities also correlated negatively with readmission rates for myocardial infarction, hearth failure, and pneumonia.	Secondary data was utilized by Asagbra et al. (2019), all of which were surveys.	HIS that meets patient needs leads to greater patient satisfaction, which may, in turn, lead to more robust patient loyalty.

Discussion

This section presents the answers to the research questions posed in the study.

Prevalence of HIS Tasked with Motivating Patient Loyalty

In contrast to the thousands of results one obtains by searching for “hospital information system” in online research databases, limiting the search terms to mentions of “hospital information system” in combination with “patient loyalty” drastically decreased the search

results. To remedy this, the search term "patient satisfaction" was added in order to expand the results. The final data extraction resulted in just five studies; this indicates that there is a clear lack of studies focused on HIS with the specific intention of patient loyalty.

Efficacy of HIS Tasked with Motivating Patient Loyalty

The reviewed studies revealed that HIS has significant positive effects on patient satisfaction, which in turn, motivates patient loyalty, which supports the findings of previous literature. Four out of five studies revealed that the increased information availability of HIS led to greater satisfaction rates from patients.

In Asagbra et al. (2019), secondary data from acute care hospitals was analyzed to reveal whether the HSIs' HIS functionalities predicted the satisfaction rates of patients. It was found that the more HIS functionalities are present in an HSI, the more likely it is for patients to report satisfaction. A potential contributor to higher patient satisfaction rates is the lower readmission rates among HSIs with more HIS functionalities. Because an HIS can present pertinent medical data tailored to the patients' own needs, patients are better able to follow their treatment regimens, which lead to better patient outcomes. In fact, the improved outcomes may be attributed by patients to better information availability. Similar results were also found in (Khalifa, 2017; Liang et al., 2017; Yoo et al., 2016).

A common thread among the four studies that revealed the relationship between information availability and patient satisfaction is the subjects' apparent priority of information availability (Asagbra et al., 2019; Khalifa, 2017; Liang et al., 2017; Yoo et al., 2016). A potential reason for this was illuminated by Liang et al. (2017), who noted that, in China, there is a wide gulf between patients and medical staff, especially physicians, in terms of power. Patients often feel powerless in the face of illness; if medical staff is unable to empower patients by providing them with pertinent information quickly, they feel less powerful. This may contribute to their lack of satisfaction, as patients can feel confused and uncertain if they feel uninformed about the specifics of their treatment or care.

The outlier was the result obtained by the Meyerhoefer et al. (2018), who examined the effect of HIS on an OB/GYN practice. They found that patients were less satisfied before the implementation of HIS on the practice than during, as well as after, the implementation. However, the result may have been influenced by the dissatisfaction exhibited by the medical staff with the HIS employed, particularly among physicians. Their dissatisfaction could have negatively impacted their performance, which in turn could have led to the loss of satisfaction reported by patients.

Overall, it appears that the use of HIS leads to positive effects with respect to increasing patient loyalty. However, the effect revealed in the reviewed studies is indirect; that is, HIS positively impacts patient satisfaction, which can then be inferred to lead to improved patient loyalty.

Gaps in the Literature

There appears to be a need to examine the use of HIS toward the specific use of motivating patient loyalty. Based on the short list of results for HIS and patient loyalty, it appears that much of the scholarly focus regarding the overall aim of HIS is centered on other issues. Some of the more common search results for HIS concerns technology adoption or conceptual frameworks.

Traditionally, the healthcare industry has utilized HIS to tend to administrative concerns, such as the streamlining of billing procedures and the storage of medical records or patient data (Sheikh et al., 2015). It is mostly assumed that the administrative benefits will result in greater patient satisfaction and loyalty, due to the efficiencies brought about by HIS. Despite the surge in patient-centered HIS in recent years, there is still a gap in empirical studies on the effect of such HIS on patient loyalty. Instead, much of the focus is on the conceptual development, implementation, and adoption of patient-centered HIS. One potential explanation for this focus is that most researchers believe that motivating patient loyalty is a byproduct of the improvements brought about by HIS, rather than the primary goal.

The short list of empirical studies on HIS and patient loyalty indicate that, when the impact of HIS on patient loyalty is examined, the results are significantly positive. It is noteworthy, however, that the reviewed articles examined patient loyalty indirectly. That is, they did not investigate the impact of HIS on patient loyalty specifically; instead, this connection could only be inferred by the positive impact of HIS on patient satisfaction. There appears to be a literature gap in the empirical testing of an HIS that treats patient loyalty as its primary goal, rather than an incidental effect of improving HSI services.

Limitations

This review is limited by the short list of articles generated by the search terms utilized. The articles were also limited by publication date, specifically, within the last five years; it is possible that much of the empirical testing of the effects of HIS on patient loyalty was enacted prior to this period. The search results may also have been constrained by the selection of research databases, which was limited by the available resources of the school library.

Conclusion

Scholarly research on HIS yields a large number of results; however, when the research is limited to HIS in relation to generating patient loyalty, the number shrinks significantly. The review revealed that the prevalence of HIS for the express purpose of motivating patient loyalty is low. However, in the few studies where the impact of HIS was investigated, a majority found that HIS had a significant positive impact for patient satisfaction. Due to the robust literature on the relationship between patient satisfaction and patient loyalty, it would be reasonable to infer that HIS is likely effective in motivating patient loyalty. However, a direct examination of an HIS geared toward increasing patient loyalty was not found. Future

research may be directed toward the development of HIS designed to motivate patient loyalty, as well as the empirical testing of this HIS in a real-world HSI setting.

Conflict of interest

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

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