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Negative Effect of Electronic Health Records System on Patients' Perception of Physician's Empathy

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ABSTRACT

Aims The use of electronic health record systems has been developed in the health system, but it is still not clear whether empathy is created in patient visits with this system. The present study aimed to compare patients' perceptions of physicians' empathy after the patient viewed standardized and scripted video vignettes of two physicians, which one used the electronic health record system during his visit, and the other one visited the patient without electronic health record system.

Materials & Methods This study is a cross-sectional, double-blind, quasi-experimental study with only a post-test, which was conducted in Isfahan Omid Hospital, Isfahan, Iran. 120 eligible patients were selected using convenience sampling method and randomly divided into two groups (each 60 patients) in a cross-over study plan. In group 1, the first arm viewed the electronic health record video, and the second arm viewed video of visit without electronic health record, and in group 2 vice versa. The data were gathered by Jefferson Scale of Patient Perceptions of Physician Empathy, after each intervention.

Findings The video of the visit without the electronic health record system compared to the visit with the electronic health record system had a significantly better empathy score in each arm of the participants ($p<0.05$).

Conclusion Cancer patients perceive more empathy in physicians who do not use the electronic health record system during visits and consider this strategy more empathetic.

Keywords Empathy; Patients; Physicians; Electronic Health Records; Communication; Hematology; Neoplasms

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Introduction

Hematologic Malignancies (HMs) are a miscellaneous group of malignant disorders that contribute significantly to the global burden of cancer [1]. They are commonly distributed by their four main subtypes: Leukemia, Hodgkin Lymphoma (HL), Non-Hodgkin Lymphoma (NHL), and Multiple Myeloma (MM) [2]. In a study, leukemia accounted for 407,000 incident cases and 309,000 deaths [3]. This growing trend requires more attention to these patients.

For patients to get through all stages of cancer well, it requires proper routine follow-up visits based on three hypotheses, the first and most important of which is early detection of deterioration as a prognostic point of view. The second belief is that patients earn an insight of psychological guarantee and satisfaction from being observed in this way, and the third that routine check-ups are necessary for organizing data for the quality assurance [4].

Several clinical models have been introduced to integrate the electronic health record (EHR) systems into patient care [5-8]. The electronic health record systems are becoming more widespread in face-to-face health encounters and is using in clinical settings for managing and keeping patient data and billing processes [9, 10]. Iran's health ministry has announced that the implementation of the EHRs officially started in February, 2017 and applied through 235 cities in November 2018. In addition, the spread of Covid-19 has accelerated it more. In January, 2021, the progress of electronic health records was about 75%, which reached over 90% due to the legal requirement. According to some studies, the EHRs have reduced care costs, prescription mistakes, and medication errors and ultimately improve drug therapy and patient health [11-13]. The rapid growth of using EHR systems has affected our understanding of the EHRs, while still providing compassionate health care and optimizing patient-physician communication plays a principal role in each phase of every team work. However, maintaining eye contact, facilitation-utterance, empathy-utterance, and praise-utterance as the key aspects of face-to-face consultations are not sufficiently regarded [14].

Empathy as a core component of patient-physician communication has been connected to other interpersonal interaction indicators such as patient trust and satisfaction [15]. Aestheticians introduced the concept of empathy in the mid-19th century using the German word "Einfühlung". Theodore Lipps, in 1903, defined this concept as "feeling one's way into the experience of another". Later, Martin Buber promoted this concept by describing empathic communication as "I and Thou" instead of unemphatic "I and It" [16], a struggle of words. Unfortunately, all of these definitions imply that empathic behavior is almost a revery etiquette. In the medical setting, it has covered a wide range of definitions and measures of empathy. However, there is no entirely accepted definition for empathy. Eye contact as the fundamental nature of non-verbal social interaction has been studied in detail in several past studies [14, 17-19]. They also perceive physicians who visit the patient without Examine Room Computer as more compassionate and having better communication skills [20]. Patients prefer physicians who do not interact with the EHR system [5], and practicing with EHRs has been reported to be intrusive and distracting [21, 22].

Empathy can be explained as a multidimensional construct, including ethical, affective, behavioral, and predominantly cognitive dimensions involving a patient's understanding of experiences and concerns with an ability to communicate this understanding (rather than emotional feelings) [23]. Several studies defend the positive health outcomes of empathy for clients, which improve patients' knowledge about the disease, motivation to get better, adherence to treatment advices, and outcomes [24-26].

In the present study, the primary purpose was to compare patients' perceptions of physician empathy after watching standardized and scripted videos of two physicians, one of whom used the EHR system in his visit and the other who visited the patient without the EHR system. Our second goal was to compare patients' preferences after watching each video and to determine demographic and clinical predictors of patients' preferences.

Materials and Methods

Design

This study is a cross-sectional, double-blind, quasi-experimental study with only a post-test, which was conducted in February and March 2023 in Isfahan Omid Hospital (Isfahan Cancer Research Center).

Participants and sampling

The statistical population of this study included patients admitted to the hematology and oncology department and clinic of Omid Hospital in Isfahan, Iran. The sample size was estimated to be 120 patients based on the standard error of 5% and the confidence interval of 95%, using Raosoft's sample size calculation. 120 eligible patients were selected using convenience sampling method and randomly divided into two arms of video EHR or No-EHR (each arm includes 60 patients). In group 1, the first arm viewed the EHR video, and the second arm viewed video of visit without EHR (No-EHR), and in group 2 vice versa. Inclusion criteria were age over 18 years and diagnosis of early or advanced hematological cancer (local, recurrent or metastatic). Patients with scores ≥7 on the Memorial Delirium Assessment Scale (MDAS) and patients with severe physical/emotional impairment who were unable to participate were excluded [21].

Blinding

To minimize biases, all patients were kept blind because the type of intervention for both groups was

watching two videos. All coordinators and cast members were also blinded.

Interventions

Two groups of patients were investigated with two crossover interventions. Group 1 received standard scripted video vignettes of physicians depicting use of the EHR system (EHR video), followed by standard scripted video vignettes of physicians consulting with a standard patient without using the EHR system (No-EHR video). Group 2 received the No-EHR video in the first arm of the study and then participated in the EHR video intervention in the second arm. Two standardized clinical videotapes depicted patient encounters at the Omid Hospital palliative care clinic. The physician role was played by a man aged 40 to 50 years. A 40 to 50-year-old woman with a poor prognosis of cancer played the patient role. The selection of the cast's ethnicity and accent was determined by the familiarity of the Majority of patients referred to the Omid Hospital. The script represented routine discussions done in daily physician-patient encounters, which included evaluating the patient's signs and symptoms, laboratory findings, medication prescriptions, and counseling. Each script heading had specific communication skills that evaluated empathetic statements with neutral emotions. The eye contact duration between the EHR video intervention and the No-EHR was equivalent. The full script was available in the Supporting Materials. The recordings were observed and independently proved by six faculty members of the medical school of Isfahan University of medical sciences, who were blinded to the main study's hypothesis.

A biostatistician used the random assignment for determining sequence of allocation of the intervention to each arm. In the next step, participants watched two video vignettes that were approximately 4 minutes long with a time interval of 30 minutes. In one video, the physician portrayed the use of the EHR system during clinic visits; in the other video, the physician visited the patient without the EHR system. After watching each video by the participants, they completed the same post-test questionnaire.

Outcome measures

The primary outcome was patients' perceptions about physicians' empathy, and the secondary outcome was determining of relationship between demographic and clinical characteristics of the patients with perception of them about physicians' empathy.

Instruments and data gathering

The data were gathered by Jefferson Scale of Patient Perceptions of Physician Empathy (JSPPPE) after each intervention [27, 28]. The Persian translation of the Jefferson Scale of Patient Perceptions of Physician Empathy developed for measuring patient perceptions of their physician's empathy by Managheb and Bagheri [29]. The questionnaire consists of two parts; the first part includes personal and demographic characteristics, and the second part is a five-point Likert-type scale (Strongly agree: 5, agree: 4, have no opinion: 3, disagree: 2, strongly disagree: 1). the patients were asked to state the level of their agreement or disagreement with each of the statements. For illiterate patients, the questions were read by the research staff, and their answers were recorded. The scale consists of 24 items. Total score ranges from 24 to 120, by adding the points from the 24 statements together. The minimum possible score is 60, and the maximum is 120, that the higher score indicates stronger empathy [30]. A score between 24 and 40 indicated low empathy, a score between 40 and 80 showed moderate empathy, and a score more than 80 stated strong empathy. In Iran, the reliability of this questionnaire has been measured, and Cronbach's alpha coefficient was estimated to be above 0.7. This scale has high internal consistency (α=0.79) [29, 30].

Statistical analysis plan

Data were summarized using descriptive statistics, such as mean, standard deviation, and median. The categorical variables were compared between the two groups using Chi-square and Fisher exact tests. Mann-Whitney U test was used for continuous variables and also for assessing the video effect on the median scores of empathy between two groups. Eventually Kruskal-Wallis and Mann-Whitney U-test was used for evaluating the relationship between empathy score and demographic and clinical characteristics of participants. All tests were 2-sided, and $p \leq 0.05$ was assumed statistically significant. For computation, all data were entered into the SAS Institute Inc., version 9.4.

Findings

Most of the patients were women, married, with an academic degree and leukemia, in first year of illness, and poor condition. The median of participants' age was 58 (27-74) years. However, there was no statistically significant difference in these variables between the two groups ($p>0.05$; Table 1).

Main outcome

The score distribution of the patients' perception about doctor-patient empathy in No-EHR video intervention was significantly higher than EHR video intervention after watching the first and second video between groups (p=0.011 in first video and p=0.0009 in second video; Table 2).

Secondary outcomes

Eventually, women showed more empathy than men (p=0.044). A higher education level had a significant relationship with a higher perceived empathy (p=0.017). Also, there was a significant relationship between the condition of malignancy-prognosis and the score of empathy perceived (p=0.033).

Moreover, the patients with advanced academic degrees were likely to favor the physician whom used the EHR system.

Table 1) Demographic and clinical characteristics of patients (n=120)

Variable	No. of Patients (%)		p-value
	First EHR arm (n=60)	First No-EHR arm (n=60)	
Age (years), Median (IQR)	58 (27-74)	56 (20-83)	0.055
Gender			
Women	33 (55.0)	35 (58.3)	0.982
Men	27 (45.0)	25 (41.7)	
Marital status			
Married	52 (86.7)	46 (76.7)	0.129
Unmarried	8 (13.3)	14 (23.3)	
Education level			
Completed college	30 (50.0)	28 (46.7)	0.698
< College	30 (50.0)	32 (53.3)	
Primary cancer diagnosis			
Leukemia	28 (46.7)	28 (46.7)	0.833
Hodjkin lymphoma	11 (18.3)	12 (20.0)	
Non-Hodjkin lymphoma	11 (18.3)	9 (15.0)	
Multiple myeloma	6 (10.0)	8 (13.3)	
Others	4 (6.7)	3 (5.0)	
Illness duration			
First year	36 (60.0)	38 (63.3)	0.734
Over 1 year	24 (40.0)	22 (36.7)	
Recurrent	18 (30.0)	17 (28.3)	
Metastatic	4 (6.7)	13 (21.7)	
Current condition			
Out-patient/Poor	44 (73.3)	40 (66.7)	0.639
In-patient/Fair	16 (26.7)	20 (33.3)	

The majority of patients (92 of 120, 76.7%) preferred the physician who didn't use the computer for their care as a more empathetic medical practitioner.

There was no statistically significant difference in empathy scores of the patients based on age and marital status (Table 3).

Table 2) Primary outcome measures of physician empathy

Group	Median (IQR)		p-value
	No-EHR	EHR	
After first video	80 (74-95)	56 (49-64)	0.0115
After second video	86 (67-105)	59 (50-70)	0.0009

Table3) Relationship between perceived empathy and demographic and clinical characteristics

Variable	Median IQR)	p-value
Gender		
Women	75 (66-82)	0.044
Men	50 (41-62)	
Age		
18-40 years	50 (43-54)	0.563
41-70 years	45 (43-51)	
≥71 years	48 (43-51)	
Marital status		
Married	55 (49-61)	0.154
Unmarried	60 (52-64)	
Education level		
Completed college	86 (71-91)	0.017
<College	51 (45-66)	
Current condition		
Inpatient/Poor	73 (67-86)	0.033
Out patient/Fair	54 (43-60)	
Primary cancer diagnosis		
Leukemia	60 (54-66)	0.258
Hodjkin lymphoma	56 (50-58)	
Non-Hodjkin lymphoma	53 (45–67)	
Multiple myeloma	58 (50-68)	
Other	63 (58-69)	

Discussion

The present study aimed to compare patients' perceptions of physicians' empathy after the patient viewed standardized and scripted video vignettes of two physicians, which one used the EHR system during his visit, and the other one visited the patient without EHR system. To our knowledge, this is the first study to evaluate the effectiveness of EHR integration in any clinical setting in Iran.

In this study, we comprehend that physician who communicated without EHR were not only sensed positively but were also found more empathetic by the patients. Our findings are unique because they underline patients' experiences and beliefs regarding the improvised use of technology, which can assist in future implementation methods and policymaking.

There are theoretical reasons to suspect both positive and negative effects of the computer on doctor-patient interaction and relationships. The attention provided to patients with hematologic cancer in one-on-one encounters in the clinic is a fundamental part of their care [31]. Ultimately, it can help doctors support and guide each patient through their cancer journey, build a pathway of trust between patients and doctors, and greatly influence the success of long-term care through patients' willingness to adhere to prescribed treatments and monitoring [32]. These patients also see their clinicians as more empathetic [33]. In the present study, the perception of empathy in patients with cancer was higher in the video with No-EHR. Therefore, physicians who communicated face to face without using the EHR were not only perceived as affirmative but were preferred by the patients.

In the current study, the patients with cancer rated their physician's empathy by answering 24 questions. Their scores were highly at five major areas, including my physician understands my emotions, feelings, and concerns, my physician is an

understanding doctor, my physician seems concerned about me and my family, my physician asks about what is happening in my daily life, and my physician can view things from my point of view.

Our findings suggest that with a No-EHR approach, patients' perception of their physician's empathy is significantly enhanced, and it elucidates that physicians should choose the best approach for their clinical scenarios. Certain No-EHR visit aspects, such as proper introduction and better eye contact as the nature of communication skills besides digital modalities of EHR as an additional device (i.e., images and laboratory tests to review, etc.) may have an affirmative impact on patients' empathetic perceptions [34-36]. In line with the current study, Zahedi *et al*.'s study showed that the electronic health record can reduce the intimacy between the patient and the doctor by affecting the emotional action and prioritizing the recorded data [37]. Some studies show that the use of EHR can prevent doctors from focusing on patients and disrupt their communication [38, 39]. With the emergence of technologies such as electronic health records, the personal aspects of communication between doctor and patient are over shadow [40]. In the study by Lee *et al*., despite concerns about the negative impact of electronic health records on physician-patient communication, patients reported high levels of satisfaction, although few patients reported poor eye contact with physicians [41]. However, in the review study, the results indicated that the use of a recording system may interfere with the acquisition of emotional and psychosocial information and, as a result, may interfere with the development of supportive and therapeutic relationships. Moreover, in this system, patients often have difficulty explaining their problems, and the doctor's look pattern seems to be very important in influencing patients to fully explain their conditions [42]. Unlike the present study, Alkureishi *et al*. showed that the patient's and doctor's satisfaction or relationship by the electronic health record has not changed [43]. It is possible that the results differ among patients due to their different levels of computer literacy. Compared to other skills, the skill of empathy will never be a simple one-size-fits-all recipe and depends to some extent on the personality of people. Moreover, these differences may be due to the study population, the type of disease, different culture, subjective norms, environment, and social factors. Also, the training of doctors in different cities or countries was different regarding how to communicate or properly manage the time of communication and interaction with the patient and the use of electronic health records.

Proponents suggest that the use of EHR improves medical record completeness [44], patient safety, decision making, and medication management [45, 46] and facilitates patient access to medical records [47]. Despite these potential positive effects, EHR during the visit may negatively affect essential elements of doctor-patient communication [7, 47, 48], such as building rapport with patients and emotional dialogue [49]. Processes in the electronic health record must be improved without interfering with the ability of physicians and patients to communicate effectively. The correct time to use the electronic file and timely communication with the patient is important.

In the present study, women showed more empathy than men. Nash found that the cognitive dimension of empathy can be changed over time, and the factors of age, gender and marriage can be investigated as an effective factor [50]. Khademalhosseini *et al*. reported that female medical students had a higher empathy score than male medical students [51]. Some significant factors related to the patient, such as age, gender, and race, can also influence the doctor's empathetic responses to the patient's negative emotions [32].

One of the major practical limitations of this research was the concern of the patients about not receiving proper services from the doctor if they refused to fill out the form correctly, which was explained with sufficient explanation and assurance that all the information in the questionnaire is protected. Also, their participation in this study was voluntary.

As digital methods are progressing in different stages of cancer care (diagnosis and detection), there is a concern about not paying attention to doctor-patient empathy in the digital care system. Therefore, in medical education, teaching empathic relationship in visiting with EHR as a skill should be considered. Moreover, empathy with the patient can be considered in the design of future EHR.

It is suggested that barriers to expressing empathy in EHR visits be investigated in future research. In addition, it seems necessary to evaluate these results in other clinical settings and population groups. It is also suggested to conduct similar research in the real environment.

Conclusion

Patients with cancer perceive more empathy in physicians who do not use the electronic health record system during visits and consider this strategy more empathetic.

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