

## Patients' attitudes toward doctor-patient relationship after use of computerized technology during medical service

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### Abstract:

Patients' attitudes toward doctor-patient relationship after use of computerized technology during medical service

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*Miscommunication between doctor and patient can affect the outcome of treatment and even lead to malpractice suits. The use of a computer by the doctor during medical service might affect communication or the doctor-patient relationship. The objectives of this study were to describe patient attitudes, to define the consequences of such attitudes on the doctor-patient relationship, and to describe patient expectations of doctors using computerized technology during outpatient medical service.*

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This study was conducted during February 1-7, 2004. We used questionnaires to study the degree of disagreement and general ideas of 214 patients. Seven participants who disagreed were selected for a semi-structured interview. According to the questionnaire, about 20% of the patients disagreed with the use of a computer by the doctor during medical service. Three independent factors were related to this disagreement: sex, age group and type of service. Females were 2.3 times (95% CI = 1.2-4.4) more likely to be dissatisfied with the doctor's conversation, and 2.1 times (95% CI = 1.1-4.0) were likely to feel that the doctor listened to them less than when not using a computer. Older patients were more likely to be dissatisfied with their doctor's conversation than younger patients (OR = 2.8 (95% CI = 1.1-6.7)). Participants from the outpatient department felt that doctors let them ask fewer questions than before compared to patients who had been admitted (OR = 2.5 (95% CI = 1.0-6.1)). The semi-structured interviews revealed that patients felt that nonverbal communications, such as attentiveness and eye contact from the doctor, were noticeably reduced when computers were used. It was also felt that the doctors talked less to the patient when using a computer compared to before the computerized system was adopted. Most of the participants were more concerned with the doctor's personality than with their competency, and none was concerned with confidentiality or legal issues. Even with these criticisms, however, all participants still agreed that in general the advantages of using a computer outweighed the disadvantages. It is concluded that, despite having a number of benefits for outpatient medical service, use of a computer can also lead to deteriorated communications and a poorer relationship between doctor and patient, and steps should be taken to address this problem.

**Key words:** attitude, doctor-patient relationship, computerized technology

### บทคัดย่อ:

การใช้คอมพิวเตอร์ระหว่างการตรวจผู้ป่วยของแพทย์อาจส่งผลกระทบต่อความสัมพันธ์ระหว่างผู้ป่วยและแพทย์ จุดประสงค์ของการศึกษาเพื่อศึกษาทัศนคติ ความคาดหวังและคำแนะนำของผู้ป่วยต่อการใช้คอมพิวเตอร์ของแพทย์ระหว่างการตรวจผู้ป่วย การศึกษานี้เป็นการศึกษาทั้งเชิงปริมาณและคุณภาพโดยการใช้แบบสอบถามสำรวจความคิดเห็นในผู้ป่วย 214 ราย ที่ใช้บริการระหว่างวันที่ 1-7 กุมภาพันธ์ พ.ศ. 2547 และสัมภาษณ์เพิ่มเติมผู้ป่วย 7 ราย ซึ่งได้รับคัดเลือกแบบเจาะจงในกลุ่มที่ไม่เห็นด้วยต่อการใช้คอมพิวเตอร์ ผลการศึกษาพบว่าผู้ป่วยร้อยละ 20 ไม่เห็นด้วยต่อการใช้คอมพิวเตอร์ระหว่างการตรวจของแพทย์ ปัจจัยที่เกี่ยวข้องกับการไม่เห็นด้วย ได้แก่ เพศ กลุ่มอายุ และประเภทของผู้ป่วย พบว่าผู้ป่วยหญิงมีโอกาส 2.3 เท่า (95% CI = 1.2-4.4) เมื่อเทียบกับเพศชายที่จะไม่พอใจต่อการสนทนาของแพทย์ เมื่อแพทย์ใช้คอมพิวเตอร์ และมีโอกาส 2.1 เท่า (95% CI = 1.1-4.0) ที่เห็นว่าแพทย์รับฟังผู้ป่วยลดลง ผู้ป่วยกลุ่มที่มีอายุมากกว่า 50 ปี มีโอกาสสูงขึ้นที่จะไม่พอใจต่อการสนทนากับแพทย์ เมื่อแพทย์ใช้คอมพิวเตอร์เป็น 2.8 เท่า (95% CI = 1.1-6.7) เมื่อเทียบกับผู้ป่วยกลุ่มอายุที่น้อยกว่า 30 ปี ผู้ป่วยนอกมีความเห็นว่าแพทย์สนทนากับผู้ป่วยน้อยลง 2.5 เท่า (95% CI = 1.0-6.1) เมื่อเทียบกับความเห็นของผู้ป่วยที่รักษาตัวอยู่ในโรงพยาบาลที่เคยได้รับการตรวจที่หอผู้ป่วยนอก ผลการสัมภาษณ์เพิ่มเติมในผู้ป่วย 7 ราย ที่ไม่เห็นด้วยกับการที่แพทย์ใช้คอมพิวเตอร์ พบว่า ผู้ป่วยกลุ่มนี้เห็นว่าแพทย์สนใจผู้ป่วยน้อยลง โดยเฉพาะการสื่อสารด้วยภาษากาย (nonverbal communication) เช่น การสบตา ขณะเดียวกันการพูดสนทนาจึงลดลงเช่นกัน ผู้ป่วยส่วนใหญ่มุ่งประเด็นบุคลิกภาพ (personality) มากกว่าเรื่องความสามารถของแพทย์ ไม่มีผู้ป่วยรายใดกังวลเรื่องประเด็นการเปิดเผยข้อมูลของผู้ป่วยหรือประเด็นเรื่องกฎหมาย อย่างไรก็ตามผู้ให้สัมภาษณ์กลุ่มนี้ทุกรายยังเห็นว่าการใช้คอมพิวเตอร์มีข้อดีมากกว่าข้อเสีย โดยสรุปแม้ว่าการใช้คอมพิวเตอร์ระหว่างการตรวจผู้ป่วยมีข้อดีมากกว่าข้อเสีย แพทย์ควรให้การตระหนักมากขึ้น โดยเฉพาะเรื่องการสื่อสารและการสร้างความสัมพันธ์ที่ดีระหว่างแพทย์และผู้ป่วยเมื่อใช้คอมพิวเตอร์ระหว่างการตรวจ

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## Introduction

Good communication is a crucial step in creating a strong doctor-patient relationship. Failure in communication with patients or their relatives can lead to poor health outcomes or even malpractice lawsuits against doctors. Beckman, et al.<sup>1</sup> found that as many as 70-80% of patient-doctor litigations were related to poor doctor-patient communication, and other studies have reported that the doctor's communication style and attitude are the major risk factors in nearly 75% of malpractice suits.<sup>2</sup> In addition, good communication can obviate the occurrence of negative events that lead to malpractice litigation.<sup>3,4</sup> Moreover, Levinson, et al.<sup>5</sup> identified specific communication behaviors associated with malpractice history in primary care physicians and surgeons, and showed significant differences in communication behaviors of "no-claims" and "claims" physicians. No-claims physicians used more humor and encouraged their patients to talk more.<sup>5</sup> Of communication problems, the most frequently complained of were inadequate explanations of diagnosis or treatment, and communicating in such a way that patients felt their concerns were being ignored.<sup>5</sup>

Nowadays, computer-based technology such as telemedicine is widely used in modern health care systems. Advantages of this technology include improvement of clinical care through faster and more accurate diagnosis,<sup>6</sup> increased checks on medical procedures,<sup>7</sup> and reduction of adverse drug events through improved monitoring.<sup>8</sup>

Songklanagarind Hospital is a university hospital and the major tertiary care center in the southern part of Thailand. In the year 2002, a computerized system was instituted in the outpatient service department for various reasons, including to minimize errors from doctors' hand-written orders, an improved database system, reduced document materials and improved follow-up system. Some disadvantages were also considered, such as the cost of the hardware, a possible perceived threat to individual privacy,<sup>9</sup> and possible disruptions to the doctor-patient relationship. Our pre-introduction discussions also revealed concern that the doctor-patient relationship could be affected in various ways such as loss of eye contact, decreased attention towards the patient's complaints, or decreased quality of care. Given these uncertainties

about the effect of using computers on the doctor-patient relationship, it was felt that this was an area that should be studied. To the best of our knowledge, there have been no previous studies exploring the effect of modern computer technology on communications and the doctor-patient relationship. The objectives of this study were to explore patient attitudes towards the doctor using a computer and the consequences of this on the doctor-patient relationship, and to describe the patient's expectations concerning service while the doctor used computerized technology during outpatient service.

## Materials and methods

One hundred and sixty four patients attending Songklanagarind Hospital during February 1-7, 2004 were purposively sampling from the outpatient clinics including general practice, obstetric and gynecology, surgery, medicine, pediatric, ear-nose-throat, ophthalmology and orthopedics. Fifty participants drawn from patients admitted to the orthopedics, surgery, ear-nose-throat and ophthalmology wards. Seven participants who were dissatisfied with using computerized technology were selected for a semi-structured qualitative interview. The questionnaire for the quantitative part had previously been constructed and tested for reliability by interviewing 20 subjects in a pilot study and using the results from those interviews to construct a guideline for the semi-structured interview in the actual study. The overall reliability of the questionnaire was acceptable (Cronbach's alpha greater than 0.90 in each category). Data collected from the questionnaire included general, age, sex, race, occupational status, religion, occupation, educational level, and marital status), and some preliminary questions concerning the interviewee's attitudes toward doctors using a computer, such as whether they agreed with this usage, the quality of communications and the quality of service compared to before computers were used. The semi-structured interviews were conducted by one interviewer for each participant. Conversations and emotional or non-verbal expressions were recorded in the interview notes. Patients were informed about the purposes of the study and promised confidentiality before the

interview was begun. Each interview lasted for 30–45 minutes, and the notes and the tape recording were transcribed as soon as possible thereafter. The interviewer summarized his/her impressions of the important aspects of the patient's attitudes from the semi-structured interview to construct sub-themes. Each theme was explored and integrated to develop the main categories, which became the final conceptual model to reflect the initial objectives.

The research was approved by the Ethics Committee of the Faculty of Medicine, Prince of Songkla University.

### Statistical analysis

The "R" program was used for quantitative data analysis. Descriptive analysis used means and standard deviation. Associations between demographic variables and patients' attitudes were analyzed using both univariate and multivariate analysis. A p-value less than 0.05 was considered to be statistically significant.

## Results

### Part I: Quantitative result

Of 214 participants (164 outpatients and 50 inpatients) who completed the questionnaire, 65% were female and 45% were 30–49 years old. All were Thai, 89.7% were Buddhist, and 26% of participants were government officers. About 50% had an education level of high school or higher (Table 1).

**Table 1 Demographic data of study participants**

Characteristics	Number	Percentage
<b>Sex</b>		
Female	138	64.48
Male	76	35.52
<b>Age (years)</b>		
10–29	49	22.89
30–49	95	44.39
50–85	70	32.72
<b>Nationality</b>		
Thai	214	100.00
Other	-	-

**Table 1 (continued)**

Characteristics	Number	Percentage
<b>Religion</b>		
Buddhist	192	89.72
Islam	21	9.81
Other	1	0.47
<b>Occupation</b>		
Government officer	54	25.23
Employee	26	12.20
Government employee	3	1.40
Housewife	27	12.61
Business owner	32	14.95
Other	72	33.64
<b>Education level</b>		
Illiterate	66	30.84
Primary school	22	10.28
Secondary school	108	50.47
Bachelor degree	10	4.67
Master's degree or higher	8	3.73
<b>Type of service</b>		
Inpatient department	50	23.83
Outpatient department	164	76.17

About 20% of those interviewed were dissatisfied with the doctor using a computer during outpatient service (Table 2). The mean duration each patient spent with the doctor was 17.8 minutes. There were no statistical significant differences in duration of service time between those who satisfied and those who were dissatisfied with using a computer (Table 3).

Univariate analysis indicated that factors associated with disagreement in using the computer included age, occupation, sex, type of service and education level, but multivariate analysis found only 3 independent factors correlated with disagreement; sex, age and type of service use. Females were 2.3 times (95% CI = 1.2–4.4) more likely to disagree with the doctor's conversation while using a computer, and 2.1 times (95% CI = 1.1–4.0) more likely to feel that the doctor listened to them less if using a computer during service. Older patients were more likely to disagree than younger patients (OR = 2.8 (95% CI = 1.1–6.7)). Partici-

pants from the outpatient department felt that the doctors allowed them to ask their questions less frequently while using a computer than before computers were used compared to patients who had been admitted to the hospital (OR=2.5 (95% CI = 1.0-6.1) (Table 4).

**Table 2 Patient attitudes towards using a computer during medical service**

Item	Agree (%)	Disagree (%)
1. Agree with using a computer during outpatient medical service	80.75	19.25
2. Agree that using a computer improves the doctor's communication capacity in		
- Verbal communications	39.14	60.86
- Nonverbal (e.g. eye contact)	15.94	86.06
3. Agree that using a computer improves the active listening of the doctor	41.52	58.48
4. Agree that use of a computer improves the process of the service	75.94	24.06
5. Agree that computers improve the follow-up system	80.12	19.88
6. Agree that computers improve the overall quality of service	81.30	18.70

**Table 3 Comparison of mean duration (minutes) of doctor's service between patients who agreed and disagreed with using a computer**

Aspects of consideration	Mean (SD)	P-value
<b>Attitude*</b>		
Agree	17.8 (13.49)	0.33
Disagree	17.65 (15.59)	
<b>Conversation*</b>		
Agree	15.66 (9.38)	0.55
Disagree	19.00 (15.79)	
<b>Listening*</b>		
Agree	15.75 (9.59)	0.44
Disagree	19.09 (15.92)	
<b>Asking*</b>		
Agree	15.67 (10.4)	0.37
Disagree	18.54 (14.87)	
<b>Explanation*</b>		
Agree	17.39 (12.27)	0.39
Disagree	18.18 (15.44)	

\* Attitude: agreement with using computer during outpatient service  
\* Conversation: doctor's verbal communication  
\* Listening: doctor's attentive listening  
\* Asking: opportunity to ask the doctor questions  
\* Explanation: doctor's explanation to the patient of the problem, treatment, etc

**Table 4 Relationship between demographic variables and disagreement of patients, using multivariate analysis**

Opinion	Variables	Odds Ratio	95% CI	P-value*
<b>Dissatisfaction with conversation</b>	Sex: Male	1		
	Female	2.32	1.22-4.43	0.010
<b>Doctor listened less</b>	Sex: Male	1		
	Female	2.10	1.12-3.96	0.021
<b>Less opportunity to ask</b>	Age (years): 10-29	1		
	30-49	2.22	1.02-4.83	0.044
	50-85	2.76	1.13-6.71	0.025
	Type of service: Inpatient	1		
	Outpatient	2.47	1.01-6.09	0.048

\*P-value from likelihood ratio test

## Part II: Qualitative result

Seven participants (all outpatients) aged between 28 and 72 years were selected for a semi-structured interview. Everyone had had previous services at Songklanakarind Hospital before the computerized system was begun. Six were female. Their educational level varied from primary school to master's degree. Their attitudes toward the use of a computer by the doctor during their consultation could be divided into four categories: patient expectations, causes of miscommunication, advantages and disadvantages, and suggestions.

Concerning patient expectations, all participants said that they wanted to visit a doctor who paid attention to them and was concerned with the patient's problem and feelings. A 45-year-old male summed up this sentiment well by saying, *"The doctor should treat the patient as their relative, like his or her parent. He should ask questions about the patient's feeling and other problems"*. A 72-year-old man said, *"I expect to see a doctor who is more concerned with me than the computer"*. Friendliness was also mentioned often. One female participant said, *"The doctor should be warm, respectful, and accept the patient's opinion"*. Openness was also important, *"I want the doctor to explain to me more about the processes of treatment and self-care, and more details of my illness"*.

The causes of miscommunication could be divided into verbal and nonverbal aspects. All participants were concerned more with nonverbal than verbal communication, and felt that the most striking change after the computer system implemented was that the doctor's attention level became worse than before. A 37-year-old woman said, *"The first time that I went to the doctor's room, he was still typing with the computer and did not look at me or talk to me. I know he had not finished recording the previous patient's data, but it was still like the doctor didn't recognize me or address my feelings"*. Most participants felt that doctors were less attentive to patient problems with the new computer system than before. A frustrated 28-year-old woman said, *"I don't think that the doctor could listen to me properly while trying to find some keys on the computer"*. Some participants noticed that eye contact from the doctor had decreased. A 40-year-old woman complained, *"He just typed in the computer without looking at me while I was telling my story"*. For verbal communication,

all participants said that their doctors talked to them less than before. Some participants mentioned that the doctor did not encourage them to talk as they had previously. He said, *"The doctor didn't let me say what I would like to say, he just only asked me some questions about things that he wants to know"*.

Barriers to communication were also a concern and three participants said that time available is a barrier to effective communication. A 37-year-old participant commented that the computer skills of the doctor could also be a barrier to communication and said, *"In my experience, while I was telling my complaints, the doctor asked me to stop for a while while he was recording the information I was telling him"*.

Nevertheless, all of the participants agreed that a computer could be useful for service in such aspects as improving the database records, decreasing errors arising from a doctor's poor handwriting, and improving the overall quality of services. The advantages of using a computer outweighed the disadvantages. Most importantly, they suggested that the doctor should be concerned more about the problem of communication failure and the doctor-patient relationship. One 50-year-old woman summed up, *"It seemed to me that there was a big space between doctor and patient after using this computer"*. Two interviewees even went so far as to say that, *"I would sue the doctor, if any mistakes happened because of error from using the computer"*. It was also mentioned that having an assistant to help with recording the data in the computer could increase time available for actual service and someone could explain to the patient the role of the computer, which might ease some of the patients' concerns.

## Discussion

About 20% of the patients in our study disagreed with applying computer technology to medical service. They said that computers distract the doctor's attention. They felt that the most noticeable changes after computers were introduced were a reduction in nonverbal communications such as decreased eye contact, listening to the patient less and showing less empathy than before. In verbal communications, it was noted that the doctors concentrated more on recording data, talked to the patients less than before, and gave less explana-

tion or encouragement to the patients. Most participants felt that the computer was a barrier to doctor-patient communication, which could be even worse if the doctor had poor typing skills. Despite noting such disadvantages, however, all of the interviewees agreed that the advantages of using a computer, such as a more complete data base that could be accessed more quickly and a decrease in some errors, especially those resulting from a doctor's poor handwriting, outweighed the disadvantages. Some good suggestions were also offered, e.g. doctors should show more concern for the patients, or have assistance for entering data in the computer. It was felt that miscommunications arising from computer use could result in mistrust of the doctor and the service, decrease their satisfaction or even lead to malpractice suits. Two participants said that they would sue their doctor if any mistakes resulted from their doctor paying more attention to the computer than to themselves.

Communication is a fundamental skill for human beings. Communication in health care is very important to both physicians and patients. Miscommunication during medical service can arise from the doctor, other medical personnel or from the patients themselves.<sup>10,11</sup> Miscommunications can come from poor communicative skills, a bad attitude, poor knowledge,<sup>12-14</sup> or using medical terms that are difficult to understand.<sup>15</sup> The patient's attitude is also important; in our study, most participants were more concerned with their feelings than their disease.

Medical technology has been developing quickly during the past ten years,<sup>16</sup> as part of the revolution our world is in the midst of, from the industrial era to the information and genomic era. Progress in modern medicine is a part of this revolution. Nowadays, medicine can improve our life expectancy and quality of life even more than in the past. Computer technology has been introduced to the hospital to improve the quality of service, a central part of which is better documentation. Songklanagarind Hospital has been implementing a computer system for medical service since 2002. Computers are a new thing to both medical personnel and patients. It requires time to adjust and learn. The results we report herein are reflective of this early time of using computers, and the

number of patients who disagree with the new technology may well decrease as time goes by and doctors become more familiar with using the computers and the computer system itself becomes further developed.

The doctor-patient relationship is the interaction between the physician and the person who receives the care. Good communication plays a major role in creating this relationship, so physicians should listen and understand the patient as much as possible in a "holistic" way. In addition, doctors should encourage the patient to tell them what kind of information they want or do not want to know. Good communication skills means that the physician is capable of explaining whatever the patient wants or needs to know in easy to understand yet comprehensive language.<sup>18</sup> This improves trust, which is the central element of all ethical obligations.<sup>17,19</sup> When patients trust their doctor, they will provide important information, cooperate more fully with the treatment plan, and will be much less likely to sue. The doctor-patient relationship is influenced by the personal and professional characteristics of both parties,<sup>20,21</sup> such as age, sex, ethnic background and personality.<sup>14,17,21,22</sup> A poor doctor-patient relationship will decrease trust and acceptability of the treatment and may even create conflict.<sup>1,23-26</sup>

The results of our study indicate that the patients felt that the computer could increase the likelihood of a poor doctor-patient relationship, even leading to malpractice suits, which have been increasing in Thailand during recent years.<sup>15</sup> The decision to take action in such suits is often determined not only by the original injury but also by the handling after the original incident<sup>1,24,25,27,28</sup> Levinson, et al.<sup>5</sup> found that the most significant differences between sued and never-sued physicians are not their quality of care or their documentation, but are in fact the effective communication skills and the personality of the doctor. Doctors who are more orientated towards their patients, have more humor and spend a longer time talking with and taking care of them, are less sued. Hickson and colleagues<sup>29</sup> found that patients of physicians with prior malpractice claims reported feeling rushed and ignored, receiving inadequate explanation or advice, and spending less time during service than patients of physicians with no prior

claims. Beckman, et al.<sup>1</sup> identified communication problems between physicians and patients in 70% of litigation cases. The current study indicates that the participants' inclination to sue would mainly depend on the severity of the mistakes. How to improve the doctor-patient relationship is a challenging question for the modern medical profession. As is well known, this relationship is a key element of success in our career. Barrier, et al.<sup>10</sup> suggested doctors should use two words to improve the doctor-patient relationship "what else?" Physicians should use these words during the medical interview to gather information, build relationships and educate their patients. Ling, et al.<sup>21</sup> suggested that trust between doctors and patients should be fostered to improve the relationship, as patients who trust in the integrity of the doctor will accept mistakes more than patients who do not have such trust.<sup>19</sup> However, developing such a relationship usually takes time. Using computers during the service by the doctor not only can disrupt this relationship, but also can create the impression of a new culture that is more materialistic, wherein the doctor treats the patient simply like an object, with no concern for his/her feelings.<sup>18, 30</sup>

This study had some limitations in that the data were collected from only the patient's perspective, and did not include other stakeholders such as paramedical personnel, doctors, or the medical director, who might have had different perspectives. Further studies are needed to explore these and other aspects of how modern information technology is affecting the doctor-patient relationship.

## Conclusions

**In conclusion, use of computerized technology during medical service can affect doctor-patient relationship especially in females, the elderly age group and those using the out patient service.**

## References

1. Beckman HB, Markakis KM, Suchman AL, Frankel RM. The doctor-plaintiff relationships: lesson from plaintiff reposition. Arch Intern Med 1994;154:1365-70.

2. Medical Liability Insurance Crisis, Metropolitan Medical Society. 2004 January [cited 2004 Feb 1]. Available from: [http://www.slmms.org/text/EVP/executive\\_vice\\_president.html](http://www.slmms.org/text/EVP/executive_vice_president.html)
3. Hickson GB, Clayton EW, Githens PB, Sloan A. Factors that prompted families to file medical malpractice claims following perinatal injuries. JAMA 1992; 267:1359-63.
4. Feilich B. The death of a baby: neither forgiven nor forgotten. JAMA 1992;268:1413-4.
5. Levinson W, Roter DL, Mullooly JP, Dull VT, Frankel RM. Physician-patient communication, the relationship with malpractice claims among primary care physicians and surgeons. JAMA 1997;277:553-9.
6. Hunt DL, Haynes RB, Hanna SE, Smith K. Effects of computer-based clinical decision support systems on physician performance and patient outcomes: a systematic review. JAMA 1998;280:1339-46.
7. Bates DW, Leape LL, Cullen DJ. Effect of computerized physician order entry and a team intervention on prevention of serious medical errors. JAMA 1998;280: 1311-6.
8. Raschke RA, Gollihare B, Wunderlich TA, Guidry JR, Leibowitz AI, Peirce JC, et al. A computer alert system to prevent injury from adverse drug events: development and evaluation in a community teaching hospital. JAMA 1998;280:1317-20.
9. Gostin LO, Hodge JG. The "names debate": the case for national HIV reporting in the United States. Albany Law Rev 1998;61:679-743.
10. Barrier CA, Li J, Jensen NM. Two words to improve physician-patient communication: what else? Mayo Clinic Proceedings 2003;78:211-4.
11. Drossman DA, Swantkowschi DD. Improving the doctor-patient relationship. [cited 2004 Feb 3]. Available from: [http://www.med.unc.edu/medicine/fgidc/improving\\_relationships.html](http://www.med.unc.edu/medicine/fgidc/improving_relationships.html)
12. Liphin M Jr, Levinson W. Generalist's approach to the medical interview. In: Nobel J, editor. Primary Care Medicine. 2<sup>nd</sup> ed. St. Louis: Mosby; 1996;2-8.



13. Northouse PG, Northouse LL. Health communication: strategies for health professionals. 2<sup>nd</sup> ed. Norwalk: Appleton & Lange; 1992.
14. Wartzkin H. Doctor-patient communication, clinical implication of social scientific research. *JAMA* 1984; 252:2441-6.
15. Buranapanitkit B, Pumnoy K, Kawlaeid N, Lim A, Geater A. Problems and factors of information misperception in orthopedic patients. *J ASEAN Orthop Ass* 2001;14:36-40.
16. Norris AC. Essentials of telemedicine and telecare. Chi Chester: John Wiley & Sons; 2002.
17. Emanuel EJ, Ubler NN. Preserving the physician-patient relationship in the era of managed care. *JAMA* 1995; 273:323-9.
18. Zeldow PB. Clinical interview. In: Wedding D, editor. Behavior and medicine. 2<sup>nd</sup> ed. St. Louis: Mosby; 1995: 185-99.
19. Sharma BK. Trust is the basis of doctor-patient relationship. [cited 2004 Feb 5]. Available from: <http://www.tribuneindia.com/2001/200111007/spectrum/fitness.htm>
20. Chan DI, Goh LG. The doctor-patient relationship: survey of attitudes and practices of doctors in Singapore. *Bioethics* 2000;14:58-78.
21. Lings P, Evans P, Seamark S, Seamark C, Sweeney K, Dixon M, et al. The doctor-patient relationship in US primary care. *Soc Sci Med* 2003;96:180-4.
22. Matthew LH. Physician-patient relationship. In: Susie B, editor. Legal medicine. 4<sup>th</sup> ed. St. Louis, Missouri: Mosby; 1998:247-56.
23. Lammers JC, Duggan S. Bringing the physician back in: communication predictors of physicians' satisfaction with managed care. *Health Commun* 2002;14:493-513.
24. Gallagher TH, Waterman AD, Ebers AG, et al. Patients' and physicians' attitudes regarding the disclosure of medical errors. *JAMA* 2003;289:1001-7.
25. Bechmar H. Communication and malpractice: why patients sue their physicians. *Cleveland Clin J Med* 1995; 6:84-5.
26. Hodge JG, Jr, Gostin LO, Jacobson PD. Legal issues concerning electronic health information. *JAMA* 1999; 282:1466-71.
27. Vincent C, Young M, Phillips A. Why do people sue doctors? A study of patients and relatives taking legal action. *Lancet* 1994;343:1609-13.
28. Martin BF. Medical malpractice and the physician dependent. In: Susie B, editor. Legal medicine. 4<sup>th</sup> ed. St. Louis, Missouri: Mosby; 1998:123-31.
29. Hickson GB, Clayton EW, Entman SS. Obstetricians' prior malpractice experience and patient's satisfaction with care. *JAMA* 1994;272:1583-7.
30. Eger MJ, Goodkin RL, Valentine SR. Physicians' adoption of information technology: a consumer behavior approach. *Health Marh* 2001;19:3-21.