Doctor-Patient Communication: A Comparison between Telemedicine Consultation and Face-to-Face Consultation

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Abstract

Objective The objective of this study was to compare doctor-patient communications in clinical consultations via telemedicine technology to doctor-patient communications in face-to-face clinical consultations.

Method Five doctors who had been practicing internal medicine for 8 to 18 years, and twenty patients were enrolled in this study; neither doctors nor patients had previous experience of telemedicine. The patients received both a telemedicine consultation and a face-to-face consultation. Three measures - video observation, medical record volume, and participants’ satisfaction - were used for the assessment.

Results It was found that the time spent on the telemedicine consultation was substantially longer than the time spent on the face-to-face consultation. No statistically significant differences were found in the number of either closed or open-ended questions asked by doctors between both types of consultation. Empathy-utterances, praise-utterances, and facilitation-utterances were, however, seen less in the telemedicine consultations than in the face-to-face consultations. The volume of the medical records was statistically smaller in the telemedicine consultations than in the face-to-face consultations. Patients were satisfied with the telemedicine consultation, but doctors were dissatisfied with it and felt hampered by the communication barriers.

Conclusions This study suggests that new training programs are needed for doctors to develop improved communication skills and the ability to express empathy in telemedicine consultations.

Key words: telemedicine, face-to-face consultation, doctor-patient relationship, communication

(Introduction)

Advances in telemedicine technology have made it possible to provide health services even when there is a geographical separation between a health-care provider and a patient, or between one provider and another provider. One researcher predicted that telemedicine technology would be likely to become widely available in physicians’ offices and patients’ homes in the near future (1). On the other hand, Hassol et al (2) reported that in America, in spite of government support and a continued reduction in equipment and transmission costs, relatively few rural facilities use telemedicine, and even among them, the frequency of teleconsultation is low. The lack of data for the evaluation of the effect of telemedicine on cost and quality of treatment and access to treatment is one of the factors that have contributed to the slow adoption of telemedicine (3, 4). Some researchers have investigated equipment and transmission costs, and have also suggested the importance of comparison of costs and benefits, or costs and effects (5-8). However, there have only been a limited number of investigations on the quality of doctor-patient communication in telemedicine consultations.

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Previous studies (9, 10) showed that there is no consensus as to whether telemedicine enhances or erodes the nature and content of doctor-patient communication. Ball et al (9) compared the process and outcome using four different communication modes: face-to-face, telephone, hands-free telephone, and a video conferencing system. Four assessment measures were used: observational studies; non-verbal behavior; verbal content analysis; and doctors’ and patients’ self-report measures. No differences were found in the verbal content of the four consultation modes. Both patients and doctors had a positive response to the video conferencing system. Dongier et al (10), however, reported that there were no significant differences between the telemedicine group and the control group with respect to patient evaluations. Since these studies used different measures and populations, it is difficult to differentiate the reasons for the inconsistent pattern of results.

It goes without saying that a new relationship between doctors and patients will be needed in the use of telemedicine. Doctors will have to pay much more attention to communication skills because good communication with a patient is important in developing a good doctor-patient relationship, and the patient’s trust in a physician is an extremely important factor in achieving good outcomes of care. In view of the association between communicative behaviors and the outcomes of medical encounters, it is important to understand whether and how doctor-patient communication is affected by the use of telemedicine technology. In this study, therefore, we investigated: 1) whether the consultation time, utterances, utterance speed, and especially the doctors’ verbal behaviors (e.g. the number and type of questions, and patient-centered utterances) through the intervention of telemedicine technology would be different from those through the intervention of a face-to-face consultation; 2) whether the extent and the details of the patient’s medical record would be influenced through the use of telemedicine technology; and 3) whether the participants’ satisfaction with the telemedicine consultation would be superior to the satisfaction with the face-to-face consultation.

**Patients and Methods**

**Study population**

We recruited five physicians (two males and three females) who had been practicing internal medicine for 8 to 18 years (mean=13±5 years) with no previous experience of telemedicine consultation. They had sufficient ability for the face-to-face medical interview and consultation in their daily activity in Gunma University Hospital. Physicians were told that the study was focused on doctor-patient communication.

Twenty patients, who had not previously been acquainted with the doctors in this study, consisted of 8 men and 12 women, with ages ranging from 50 to 89 years old (mean age 69±10 years). Thirteen had good controlled diabetes, three had histories of cerebral infarction or cerebral thrombosis but were recovered in good condition, one was suffering from heart failure with no limitation in daily activity, and three had recent histories of pneumonia, head banging or depression. Patients had sufficient abilities for utterance, understanding, and hearing. These patients also had no previous experience of telemedicine consultation. The patients were asked to act as if they had just moved to a new location with their particular medical problem and that this was their first visit to the doctor. And the doctors were also asked to interview their medical problems. Informed consent was obtained from each participant before admission to the study, and the Ethics Committee of the Gunma University Hospital approved the protocol.

**Study design**

The two telemedicine consulting rooms at the Gunma University Hospital had a homecare system (MC-H8903 ADP, Sanyo, Japan) to communicate each other at 380 kilobits per second. The doctor and patient were each seated one meter in front of a monitor in separate rooms, and a miniature camera was mounted on the top of each monitor to show a head-and-shoulders view of each subject on the other’s monitor. The face-to-face consulting room was arranged in the same way as consulting rooms at the hospital.

Each patient had both a face-to-face and telemedicine consultation with a different doctor on the same day. To avoid a biased impression, patients were divided into two groups: one group had the face-to-face consultation first (n=10); and the other group had the telemedicine consultation first (n=10). The doctors were told to perform the same number of telemedicine consultations and face-to-face consultations, and all of the sessions were videotaped. After each consultation, both the doctor and the patient independently completed a questionnaire.

**Study variables**

A total of 40 sets of questionnaires were completed by the doctors and patients. Three sets of data were thus obtained from each experiment: a video recording, medical records, and a satisfaction questionnaire (doctor and patient).

The videotapes of all of the consultations were transcribed to obtain the text for assessment measures. Fourteen video observation items were selected for use in this study: nine items for understanding the consultation characteristics; and five items for examining a doctor’s verbal behavior according to the method of Brink-Muiinen et al (11). The observation items were as follows: 1) total consultation time (minutes); 2) the number of total utterances; 3) the number of utterances per minute; 4) the number of doctor utterances; 5) the number of patient utterances; 6) the number of conversational turns; 7) the number of conversational turns per minute; 8) the number of simultaneous utterances; 9) the number of requests for repetition; 10) the number of open-ended questions (doctor); 11) the number of closed ques-
Table 1. Comparison of Time Spent and the Number of Utterances and Conversational Turns between Telemedicine and Face-to-Face Consultations

<table>
<thead>
<tr>
<th></th>
<th>Telemedicine</th>
<th>Face-to-face</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time spent in consultation (min)</td>
<td>13.6±4.0</td>
<td>20.6±5.2</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Number of total utterances (words)</td>
<td>3,442±1,266</td>
<td>5,685±1,825</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Number of doctor's utterances (words)</td>
<td>1,484±287</td>
<td>2,527±836</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Number of patient's utterances (words)</td>
<td>1,958±1,151</td>
<td>3,158±506</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Number of utterances per min (words/min)</td>
<td>144±88</td>
<td>153±30</td>
<td>ns</td>
</tr>
<tr>
<td>Number of conversational turns (times)</td>
<td>161±63</td>
<td>225±83</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Number of conversational turns per min (words/min)</td>
<td>11.8±4.2</td>
<td>10.9±4.8</td>
<td>ns</td>
</tr>
<tr>
<td>Number of requests for repetition utterances (words)</td>
<td>4.1±4.5</td>
<td>0.8±1.4</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Number of simultaneous utterances (words)</td>
<td>4.2±3.9</td>
<td>5.6±3.2</td>
<td>ns</td>
</tr>
</tbody>
</table>

Data are shown as mean ± SD. ns: statistically not significant.

Results

Video observation items

The time spent in consultation was significantly shorter for the telemedicine consultation than for the face-to-face consultation (13.6±4.0 minutes versus 20.6±5.2 minutes; p<0.01). Similarly, the number of total utterances (3,442±1,266 words versus 5,685±1,825 words, p<0.01), doctors' utterances (1,484±287 words versus 2,527±836 words; p<0.01), patients' utterances (1,958±1,151 words versus 3,158±506 words; p<0.01), and conversational turns (161±63 times versus 225±83 times; p<0.01) were significantly less in the telemedicine consultations than in the face-to-face consultations. However, there were no significant differences in the number of utterances per minute and the number of conversational turns per minute between the two types of consultation. The number of requests for repetition utterances was significantly higher in the telemedicine consultations than in the face-to-face consultations (4.1±4.5 words versus 0.8±1.4 words; p<0.01). There was no significant difference between the two types of consultation in the number of simultaneous utterances (Table 1).

Comparisons of the doctors’ verbal behavior patterns in the video observation items for the face-to-face and the telemedicine consultations are shown in Fig. 1. No significant differences were found between both types of consultation in the number of closed questions and the number of open-ended questions. However, the number of empathy-utterances (7.6±3.4 times versus 17.4±6.4 times; p<0.01), the number of praise-utterances (1.7±1.9 times versus 5.2±3.9 times; p<0.05), and the number of facilitation-utterances (1.7±1.2 times versus 2.6±1.5 times; p<0.05) were significantly smaller in the telemedicine consultation than in the face-to-face consultation.
Figure 1. Comparison of the doctors’ verbal behavior patterns between telemedicine and face-to-face consultations. Data are shown as mean±SD. *p<0.05, †p<0.01 vs. the face-to-face group.

Figure 2. Comparison of the amount of information in the medical records between telemedicine and face-to-face consultations. Data are shown as mean±SD. *p<0.05, †p<0.01 vs. the face-to-face group.

Medical record items

Fig. 2 shows the comparison between the face-to-face and the telemedicine consultation in the amount of information words in the medical records. The chief complaint (19.8±13.0 words versus 31.6±19.9 words; p<0.05), and history of present illness (87±60 words versus 1701±118 words; p<0.01) were described in significantly less detail in the telemedicine consultation than in the face-to-face consultation, and the total number of words used (130.7±68.4 words versus 240±122 words; p<0.01) was also significantly less in the telemedicine consultation. There were no significant differences in the number of words used to describe past history and family history between the types of consultation.

Table 2. Satisfaction Rate of Patient and Doctor in the Face-to-Face and Telemedicine Consultations

<table>
<thead>
<tr>
<th>Medical record items</th>
<th>Telemmedicine</th>
<th>Face-to-face</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief complaint</td>
<td>30 (6)</td>
<td>80 (16)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>History of present illness</td>
<td>40 (8)</td>
<td>85 (17)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Past history and family history</td>
<td>60 (12)</td>
<td>75 (15)</td>
<td>ns</td>
</tr>
<tr>
<td>Total</td>
<td>45 (9)</td>
<td>80 (16)</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

The data show the percentages (and the number in 20 experiments) of patients and doctors who scored “agree completely” or “agree” in communication experiences, and “disagree completely” or “disagree” in communication barriers in the respective questionnaire. ns: statistically not significant.

Patient and doctor satisfaction items

The satisfaction rates of patients and doctors are listed in Table 2. In the patient group, when comparing communication experiences and communication barriers, no significant differences in satisfaction were observed. Most of the patients reported being able to communicate adequately with the doctor in the telemedicine consultation (satisfaction rates were between 70% to 90%) and in the face-to-face consultation (between 75% to 95%); there were no significant differences between two consultations.

On the other hand, for doctors, the differences were quite significant in the communication experiences and communication barriers categories. Doctors said that they had good communication with patients in the only 40% telemedicine consultation (p<0.01), and also answered that they understood what was on the patient’s mind in the only 45% telemedicine consultation and the respective response rates for communication experiences were 90% and 85%. The doctor satisfaction rate in the telemedicine consultation for communication barriers was 30% (time spent on small talk), 40% (a bit difficult to ask questions), and 45% (a bit difficult to connect with the patient), all of which were statistically lower than the values reported in face-to-face consultations (p<0.01, p<0.01, and p<0.05, respectively).
Discussion

This cross-over study showed that: 1) the time spent in a telemedicine consultation was shorter than in a face-to-face consultation; 2) patient-centered behavior patterns (facilitation-utterance, empathy-utterance and praise-utterance) were fewer in a telemedicine consultation than in a face-to-face consultation; 3) the amount of data taken for the medical records was less in a telemedicine consultation, compared with a face-to-face consultation; and 4) patients were satisfied with the doctor-patient communication in the telemedicine consultation, but doctors were dissatisfied with it.

The time spent in medical consultation is an important measure for examining the quality of doctor-patient communication (13, 14). In this study, the doctors’ satisfaction with communication, or rather lack of it, in a telemedicine consultation provided some reliable evidence as to why time spent in a telemedicine consultation was shorter. Most of the doctors, in the process of the telemedicine consultation, felt dissatisfaction in the communication experiences; only 40% doctors had a good talk and 45% doctors understood what was on the patients’ mind. Then doctors provided such comments as, “Too much time was spent on small talk”, “It was a bit difficult to ask questions”, and “It was a bit difficult to connect with the patient” in communication barriers. In other words, the telemedicine consultation was ended when the doctors felt that they could not get any more information from their patients in spite of having spent much time for talking with them. Although the data is not shown here, we observed that there was a trend for patients to give a much shorter answer to the doctors’ questions in the telemedicine consultation, compared with the simultaneous question and answer situation in the face-to-face consultation. We think that this may explain the exchange of minimum information and the poor interaction between doctors and patients in the telemedicine consultations. If during the telemedicine consultation doctors had provided more facilitation-utterance, empathy-utterance and praise-utterance for patients, the time spent on the telemedicine consultation might not have been shorter than the face-to-face consultation.

With respect to the doctor’s verbal behavior patterns, our findings revealed no differences in instrumental behavior (open-ended questions and closed questions) in both types of consultation. But affective behavior patterns such as empathy-utterances and praise-utterances which are strongly associated with good doctor-patient interactions were less evident in the telemedicine consultations. These findings were consistent with previous reports. Street et al (15) reported that a specialist was the more dominant communicator in comparison to patients, in terms of asking questions, controlling behavior and talking, and patient-centered responses rarely occurred in these telemedicine consultations. Speaking generally, patients bring not only an intimate knowledge of their physical state, but also knowledge of their psychosocial situation, including their personality, culture, living arrangements and relationships. Doctors’ affective behaviors play an important role in developing a trusting doctor-patient relationship, and having the patient’s trust is one of the leading correlates of important outcomes of care. In this study, however, these skills were used less frequently by doctors in the telemedicine consultations. These findings seem to indicate that the lack of affective behavior was associated with the intervention of the telemedicine system. In other words, doctors must be encouraged to make special efforts to improve their skills in communication in the telemedicine situation.

The present findings showed that the average amount of patient-related medical information obtained in a telemedicine consultation was less than that obtained in a face-to-face consultation. To our knowledge, there have only been a few previous studies that have compared the amount of information in medical records obtained in telemedicine and face-to-face consultations. In a questionnaire-based study, Dongier et al (10) measured the degree of physician satisfaction on the basis of medical records obtained in telemedicine consultations compared with those obtained in face-to-face encounters, and showed that those records obtained in the telemedicine situation were significantly inferior to those obtained in face-to-face encounters. However, the authors did not describe their interpretation in detail.

Usually, in a face-to-face consultation, doctors position a medical record sheet at the corner of a desk to orient their bodies towards a patient. This was also the case in this study. Doctors were often silent and did not look at a patient as they recorded information on the chart. On the other hand, in the telemedicine consultations in this study, doctors were seated one meter in front of the camera and facing a screen where they could see a patient image well. We observed in the video recordings that doctors tended to look at the screen incessantly while they were filling in on the chart the information that they received from patients. It seemed that doctors were afraid of missing some patient information if they took their eyes off the screen, because if they took their eyes off the screen while they were taking notes, they would miss receiving important information from the patient. As a matter of course, most people focus on only one task at a time even when two tasks are performed in parallel (16). We think that it is necessary to minimize the distraction by developing a telemedicine screen that will project the medical record chart together with a patient image and make it easier to fill out the medical record.

Our findings showed that patients were satisfied with the doctor-patient communication in telemedicine consultations, and this finding is consistent with other studies (9, 10). In respect of the patient satisfaction level, Hall and Doran (17) showed that patients routinely reported high levels of satisfaction with the care received. Puskin and Sanders (18) reported that while patients tend to accept telemedicine after their some experience of it, providers exhibit considerable...
resistance. If a patient has been able to adequately convey his or her health problem and trouble to a doctor, in either a telemedicine or face-to-face environment, then he or she would feel satisfaction at the time. On the other hand, a doctor has to take various actions in order to control the flow of a medical consultation to obtain information from a patient. This may be more easily achieved in the face-to-face situation than in the consultation via the intervention of a telemedicine set-up, particularly in the case of doctors who are novices in the telemedicine consultation situation, and so these doctors may feel dissatisfied with the telemedicine approach.

It is clear that some special communication skills are required for doctors in the environment of the telemedicine consultation. It has previously been shown that intensive training is effective in face-to-face communication. A doctor can encourage patient participation by following up patient-initiated topics, by responding to emotions, and by not dominating the consultation (19). The present study suggests that new training programs are needed that aim to develop doctor communication skills in the telemedicine situation. The present study, moreover, can be useful for developing these new training programs by providing meaningful new knowledge about the length of time of the consultation and the amount of medical record-taking in a telemedicine consultation. In those programs doctors may know that exaggerated nods, large body actions, and clear speakings with sympathy increase conversational turns and good responses of patients in telemedicine. Further research is necessary to develop productive training methods to optimize the potential benefit of telemedicine for both patients and doctors.

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References