Telemedicine use as a learning resource for monitoring and discussing surgeries: the perception of Brazilian medical students

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Introduction

Telemedicine is receiving more attention as it can facilitate access to health services, whilst at the same time greater discussion is required as to how Telemedicine solutions can be integrated in with traditional medicine.

Telemedicine solutions have been used for many years since the 1960s and from that time, there have been cycles of greater or lesser interest in the subject [3]. A possible application of Telemedicine is Telesurgery, which involves the real-time transmission of a surgical procedure to an audience that is physically located away from the operating theatre [1].

Telesurgery can be an important academic tool used in the classroom with the aim of complementing theoretical and practical educational activities. According to Dekastle [4], meeting the needs of students and giving them a beneficial experience is a challenge when that teaching involves the surgery theatre. For him, Telesurgery allows the students to observe the surgical procedure without causing scheduling, supervision, or patient care problems.

In this context, the aim of this paper was to analyse the perception of students from a Brazilian medical school in regards to the use of Telemedicine, specifically in relation to the transmission of surgical procedures from an operating theatre to the classroom as a learning resource tool.

The motivation for this study is to understand the possibilities regarding the use of Telemedicine as a teaching resource, including an evaluation of the positive and negative aspects. It is well known that health services are very specialised, usually expensive, and concentrated in certain regions of a country. As a result, it is difficult and costly to provide high quality face-to-face health services [2]. Similarly, providing high quality lectures for medical students is complicated and embodies a series of potential impacts, such
as: a) the need for a surgical procedure to be underway and performed with high quality (for the achievement of the educational goal of the lecture); b) the need for surgery to occur at the same time as the lecture; c) the consideration of possible negative impacts on the comfort, safety and privacy of the patient. Therefore, the use of Telemedicine as a complementary teaching resource becomes very important.

Methods

The research was conducted using a structured questionnaire with open and closed responses. Students evaluated technical and educational aspects of the use of Telemedicine using a scale from 0 to 5 for the objective responses. The respondents were all students from the School of Medicine of the Pontifical Catholic University of Rio Grande do Sul (PUCRS), Porto Alegre, Brazil, enrolled in two disciplines (Approach to Medical Practice and Practice of Adult and Elderly Health from the 3rd and 7th semesters, respectively). The data collected represented the perception of these students regarding the applicability of Telemedicine as a complementary teaching resource.

Students received the questionnaire upon completion of the teletransmission of the surgical procedure. A total of 59 surgeries were carried out between 2009 and 2013 involving 37 different procedure types from 14 specialties. These were teletransmitted from the surgical block of the Hospital São Lucas/PUCRS to the classroom. Students completed 798 questionnaires, with 257 being from the Approach to Medical Practice unit and 440 from the Practice of Adult and Elderly Health unit.

Students participating in the data collection were all Brazilian, however, students and professors from other countries were invited on many occasions to remotely watch and discuss the surgeries.

The data was analysed with the use of descriptive statistics for the objective responses and the grouping of similar responses for the open questions.

Results

The mean (±SD) for the technical aspects evaluated were 4.4(± 0.7) for the quality of image and 4.0 (± 0.9) for the sound. In relation to educational data, the mean (± SD) was 4.8 (± 0.5) for its relevance, 4.8 (± 0.4) for its teaching method, and 4.7 (± 0.5) for its content.

These findings show the importance given by the students to the use of Telemedicine as a teaching resource. In order to better understand these result, a series of statistical analyses were performed with the intention of identifying the relationship between the variables studied. Table 1 features the technical and educational aspects in relation to the level of medical
education of the students, considering the 3rd and 7th semesters of the course. It is possible to see from this table the mean for each topic evaluated by the questionnaire, respecting the scale from 1 to 5.

Table 1. Evaluation of technical and educational aspects of the use of telemedicine as a didactic tool, considering the level of medical education of the students.

<table>
<thead>
<tr>
<th>Discipline (semester - respondents)</th>
<th>Mean for the aspects evaluated</th>
<th>Technical</th>
<th>Educational</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Image quality</td>
<td>Sound quality</td>
</tr>
<tr>
<td>Approach to Medical Practice (3º - 357)</td>
<td>4.43*</td>
<td>3.92</td>
<td>4.61</td>
</tr>
<tr>
<td>Practice of Adult and Elderly Health (7º - 440)</td>
<td>4.41*</td>
<td>4.05</td>
<td>4.80**</td>
</tr>
<tr>
<td>Total (797)</td>
<td>4.42</td>
<td>3.99</td>
<td>4.71</td>
</tr>
</tbody>
</table>

Significant difference ($p \leq 0.05$) between technical aspects (*) and educational ones when the two groups of students where compared (**).

These findings corroborate the idea that a better evaluation was given by students from the course in the 7th semester in relation to the educational aspects of the surgery teletransmissions. The current stage of the research still does not allow the identification of other possible variables that can be affecting these findings, other than these students being 4 semesters ahead in their medical education. In terms of the evaluation of technical aspects (image and sound quality), no significant difference was found between the two groups of students, although for both groups the image quality received a better evaluation than that of the sound. It is reasonable to consider that a student from a more advanced semester of the course can provide a better understanding of the surgery being transmitted. This aspect can be impacting on the results of the study since it is expected that these students would be more prepared than those from an earlier stage of the course. This may indicate that students towards the end of their medical school education could be better candidates for the use of Telemedicine as a teaching resource.

In terms of the qualitative opinion regarding the Telemedicine experience, analysis of the open questions (total of 764) allows them to be grouped into six categories:
a) a better visualisation of the procedure in comparison to actual participation in the operating theatre, since viewing is more limited in the theatre;

b) a better understanding of the surgical plan, the anatomical structures involved and the clinical history and prognosis of the patient, with detail provided by a professor situated in the classroom alongside the students;

c) the possibility of exchanging experiences with students and professors from different countries, providing even greater understanding of the surgical procedure and the patient clinical case;

d) increasing the possibility of seeing a larger variety of surgical procedures;

e) better conditions for the surgeons performing the operation and for the patient due to there being fewer people in the surgery theatre;

f) a better understanding of the possibilities of the use of Telemedicine.

An expected response was not expressed by the students, which relates to the potential reduction in risk to the surgery itself due to not having students in the theatre, thus reducing disturbances that could affect the concentration of the surgeon during the procedure.

Conclusion

This study clearly shows the importance given by students to the use of Telesurgery as a teaching resource. It contributes to a better understanding of Telemedicine as a complementary teaching tool, something that is still little used in Brazil. Telemedicine can be used as a way to substitute with quality the participation of students in an operating theatre during surgical procedures, while at the same time enhancing the student experience and potentially reducing risks during the procedure.

References


