Patients Satisfaction with an in-Home Telerehabilitation Exercise Program and Physiotherapists’ Satisfaction toward Technology for an Acute Stroke Population: A Pilot Study

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Abstract. The purpose of this study was to investigate the satisfaction of patients and physiotherapists toward technology used during in-home teletreatment following discharge from an acute care hospital after a stroke. The teletreatment that was delivered to the patients consisted of 45-minute sessions of exercises inspired from Tai Chi movements, twice a week, over a period of 8 weeks. The health care services satisfaction questionnaire was completed by the patients at the end of the intervention. The subjective appreciation of the technical quality of the physiotherapist using the technology during the telerehabilitation treatment was noted at the end of each treatment session. The analyses for this pilot study have thus been completed on a total of 6 patients and over 96 sessions by a physiotherapist. Satisfaction towards health care services provided was high for both patients (86%) and physiotherapists (90%). While patient satisfaction is very important in maintaining treatment compliance, the satisfaction of health care professionals must be high in order for new treatments to become mainstream in clinics. Our results show that in-home telerehabilitation seems to be a promising alternative to traditional face-to-face treatments.

Keywords. Telerehabilitation, Satisfaction, Ageing, Professionnal.

Introduction

In-home telerehabilitation, defined as the provision of remote rehabilitation services to individuals with disabilities using information technologies and telecommunications in their home\textsuperscript{[1]}, is growing as a complementary intervention to traditional face-to-face therapy for stroke patients\textsuperscript{[2-4]}. Satisfaction is an important indicator of the degree of efficacy of an intervention. Telerehabilitation have demonstrated good levels of satisfaction with a chronic post-stroke population but not with acute stroke.\textsuperscript{[5]}

1 Purpose

In this context, the purpose of this study was to investigate the satisfaction of patients and health professionals with in-home teletreatment as an alternative to face-to-face therapy for individuals following discharge from an acute care after a stroke.
Methodology

2.1 Design and Data Collection Procedure

This study was embedded in a pilot study on the feasibility of in-home teletreatment following a stroke. The design used a pre/post-intervention measurement (T1, T2) with a 2-month follow-up (T3) without a control group. The patients’ satisfaction with health care services was collected at the end of the intervention (T2). Health care professionals’ satisfaction was measured at the end of each treatment session during the intervention period.

2.2 Participants (Patients and Physiotherapists)

Inclusion criteria for stroke patients were: 1) returning home after discharge from the acute hospital and not having received intensive rehabilitation; 2) presenting mild to moderate balance problems; 3) having someone available during telerehabilitation session and 4) having an access to a high speed internet connection at home. Patients with severe hemineglect and visual impairment were excluded. Physiotherapists had to be specialized in neurology.

2.3 Technological Platform

Treatments were provided over a high-speed Internet connection at home. On the patient’s side, a screen, speakers and a commercial videoconferencing system (Tandberg 550MXP) with a pan-tilt-zoom camera was installed to provide the required audio and video communication. Data was bandwidth limited to 512 kbps to stay under the upload limit of residential Internet connection. On the clinician’s side, a similar system was installed. However, on the therapist’s side, a computer running custom software (TeRA) replaces the screen that is used at home. This software allows the clinician to easily establish a session and control the local and remote camera.

2.4 Teletreatment Intervention

The intervention consisted of an exercise program based on Tai Chi dispensed by in-home telerehabilitation as used in a previous study[6]. Recent studies have demonstrated that a re-education balance program based on Tai Chi movements improve balance in people at risk of falls[7]. Each session was planned to last 45 minutes twice a week for 8 weeks.

2.5 Patients’ Satisfaction with Health Care Services Received

Patients’ satisfaction with health care services was assessed with the French version of the “Health Care Satisfaction Questionnaire”[8]. This questionnaire showed a good internal consistency (Cronbach’s alpha coefficient of the overall scale = 0.92)[8]. The multidimensional nature of the concept of satisfaction is analyzed by the presence of three factors: satisfaction with regards to the relationship with the health care professional, satisfaction with the services delivered and satisfaction with the general health care organization. The questionnaire contains 26 questions, which are separated
into two sections. The first section aims to verify the satisfaction level related to the received health services in different situations and the second section evaluates the importance given to these situations when consulting within the general health organization. Patients were asked to answer on a four-point Likert scale where (1) represents “not at all satisfied” or “not at all important” and (4) represent “highly satisfied” or “highly important”.

**Health Professionals’ Satisfaction with the Technology**

Satisfaction with the quality and performance of the technological platform was assessed with the “Technical quality subjective appreciation questionnaire”, which was created by our research team. This questionnaire was built using the quality attributes for telemedicine success determined by Lerouge’s team\[^9\]. Physiotherapists completed this questionnaire at the end of each treatment session. The questionnaire is divided in two sections: 1) the first section consists of five items focusing on the technical quality of telreatment sessions (audio, video), and 2) the second section includes three questions on the clinical objectives, relationship with the patient and overall satisfaction. In the first section, the score varied from 0 to 3, with 3 being the highest level of satisfaction (“Good”), while 0 was the lowest (“Bad”). The score is computed as the sum of all the answers and then adjusted to a percentage. The last three questions of the questionnaire are answered on a scale of 0 to 10, with 10 being the highest level of satisfaction.

### 2.6 Results

For this pilot study, six post-stroke participants (3 women and 3 men) aged between 67 and 92 who suffered a mild to moderate stroke (MRS= 2 or 3) with balance impairment were recruited. Two women physiotherapists gave the telerehabilitation: one had 20 years of experience while the other had one year. Patients showed improvements for all fall-related variables: balance and gait, motor function, and lower limb strength\[^6\] (see Table 1).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measured instrument</th>
<th>Pre-Treatment</th>
<th>Post-treatment</th>
<th>2-month follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance</td>
<td>Berg scale (/56)</td>
<td>49.3</td>
<td>53.3</td>
<td>52.4</td>
</tr>
<tr>
<td>Functional Gait</td>
<td>Timed Up and Go (s)</td>
<td>15.9</td>
<td>12.5</td>
<td>12.1</td>
</tr>
<tr>
<td>Motor function</td>
<td>Chedoke McMaster (leg) (s)</td>
<td>5.2</td>
<td>6.0</td>
<td>6.4</td>
</tr>
<tr>
<td>Motor function</td>
<td>Chedoke McMaster (postural control) (s)</td>
<td>5.2</td>
<td>6.2</td>
<td>6.4</td>
</tr>
<tr>
<td>Lower Limb Strength</td>
<td>Sit to Stand (s)</td>
<td>26.5</td>
<td>18.7</td>
<td>18.4</td>
</tr>
</tbody>
</table>

### 2.7 Patients’ Health Care Satisfaction

Patient’s health care questionnaire results showed a high level of satisfaction for the global score (86 ± 5%). Mean score of the three factors measured (i.e. relationship with the health care professional, satisfaction with the services delivered, satisfaction with
the general health care organization) were between 79% and 95% (see table 2). Furthermore, comments from the patients confirmed their satisfaction regarding their experience with the telerehabilitation: “It was easy [to use the technology]. Actually, it was fun!” “There weren’t a lot of problems [with the Internet connection]. A few times we lost it for a few minutes, but it really gave us the advantage of not having to leave the home and to have a personalized intervention.”

<table>
<thead>
<tr>
<th>Part. 1</th>
<th>Part. 2</th>
<th>Part. 3</th>
<th>Part. 4</th>
<th>Part. 5</th>
<th>Part. 6</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global score (%)</td>
<td>82</td>
<td>80</td>
<td>84</td>
<td>91</td>
<td>85</td>
<td>93</td>
</tr>
<tr>
<td>Factor 1 score: Satisfaction with regards to the relationship with the health care professional (%)</td>
<td>82</td>
<td>79</td>
<td>85</td>
<td>95</td>
<td>90</td>
<td>92</td>
</tr>
<tr>
<td>Factor 2 score: Satisfaction with the services delivered (%)</td>
<td>75</td>
<td>76</td>
<td>74</td>
<td>85</td>
<td>67</td>
<td>94</td>
</tr>
<tr>
<td>Factor 3 score: Satisfaction with the general health care organization (%)</td>
<td>91</td>
<td>96</td>
<td>97</td>
<td>97</td>
<td>91</td>
<td>99</td>
</tr>
</tbody>
</table>

2.8 Physiotherapists’ Satisfaction with the Technology

The quality and performance of the technological platform perceived by the professionals was calculated using the average of the ratings obtained for all the telerehabilitation sessions (see table 3). Moreover, the therapist found that the clinical assessment of the session according to treatment goal was achieved at 92 % and 95 % of the relationship quality was reached. Finally, the overall satisfaction with the treatment sessions was 90 %.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Bad (0)</th>
<th>Insufficient (1)</th>
<th>Satisfactory (2)</th>
<th>Good (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability of the technological environment</td>
<td>0%</td>
<td>5%</td>
<td>27%</td>
<td>68%</td>
</tr>
<tr>
<td>Voice/image synchronization</td>
<td>0%</td>
<td>4%</td>
<td>28%</td>
<td>68%</td>
</tr>
<tr>
<td>Refresh rate of the images</td>
<td>0%</td>
<td>2%</td>
<td>13%</td>
<td>84%</td>
</tr>
<tr>
<td>Sound quality</td>
<td>1%</td>
<td>5%</td>
<td>32%</td>
<td>62%</td>
</tr>
<tr>
<td>Operability of the peripherals</td>
<td>1%</td>
<td>6%</td>
<td>26%</td>
<td>65%</td>
</tr>
</tbody>
</table>

3 The Impact to the Field

After minimal training, all participants were able to function independently with the technology. The high scores on the satisfaction questionnaire showed that these elderly patients with impairment appeared to have accepted this new service delivery method. Furthermore, all therapists were satisfied with the treatment session. These results agreed with the ones obtained in a previous study that aimed to measure the satisfaction of patients and health care professionnals with the technology and services provided during in-home rehabilitation after discharge from total knee arthroplasty surgery.

This novel intervention method has the advantage of providing intervention to patients in their living environment without having to travel. However, this pilot study
has some limitations. The participants were not randomly recruited and it is possible that the participants included in the study were more enthusiastic and positive about modern technology. Thus, a randomized study will be required to be able to generalize these results.

4 Conclusions and Planned Activities

Both participants and therapists showed a high satisfaction with telerehabilitation. As a patient satisfaction is associated to treatment compliance and professional satisfaction to treatments usage in clinics, these preliminary results demonstrated that in-home telerehabilitation seems to be a promising alternative to face-to-face intervention.

References