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Feasibility and Effect of Telerehabilitation Program during Bone Marrow Transplant

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Introduction

The aim of this study was to identify the feasibility and effects of the telerehabilitation program for hematologic cancer patients who underwent bone marrow transplant.

Methods

Subjects

: Fifteen hematologic cancer patients under the age of 65 and scheduled for bone marrow transplant were enrolled.

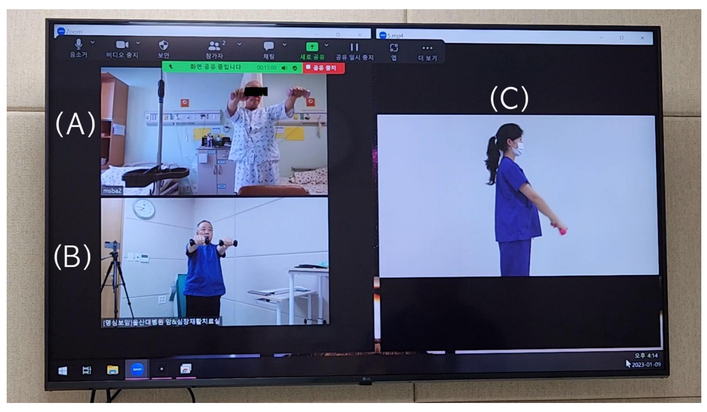

Figure 1. Telerehabilitation settings : real-time video window for the participant (A), real-time video window for the physiotherapist (B), and window for the pre-recorded exercise guide video (C).

Intervention

: For about 3 weeks in the isolation room, the telerehabilitation program was provided for 30 minutes a day using the camera and video conferencing program Zoom (Zoom Video Communications Inc, San Jose, CA). The exercise program consists of stretching, strengthening, and aerobic exercises, and a physical therapist selected the type and intensity of exercise according to daily patient's condition. Baseline, immediate follow-up, and 3-month follow-up exams were performed and analyzed.

Results

Table 1. General characteristics of subjects

	N=15
Age	52.2±6.88
Sex (Male:Female)	9:6
Height(cm)	163.71±7.63
Weight(kg)	67.09±9.01
Cancer type AML DLBCL ALL Others	 5 3 2 5
Transplant Autologous Allogenic	 8 7
Admission period (days)	19.53±1.77
Numbers of remote rehabilitation treatment	8.67±1.91
Values are mean±standard deviation.	

Table 2. Comparison of physical status and function between baseline and follow-ups

	Baseline	Follow-up after transplant	Follow-up after 3 months	P-value
Weight (Kg)	67.09±9.01	65.16±8.30	65.15±9.29	0.604
BMI (Kg/m^2)	25.1±3.27	24.44±3.26	24.31±3.01	0.982
Skeletal muscle mass (Kg)	25.79±4.83	24.87±4.64	24.31± 3.01	0.982
Percent body fat (%)	29.2±8.92	29.13±9.43	30.51±10.56	0.742
Hand grip strength				
Right hand (kg)	33.37±9.30	30.77±9.77	30.2±9.71	0.925
Left hand (kg)	29.17±8.86	27.01±8.32	29.11±9.17	0.815
6-minute walk (m)	468.2±84.14	-	410.00±34.41	0.249
Values are mean±standard deviation. * p<0.05 is statistically significant.				

Table 3. Comparison of QOL, depression, and fatigue between baseline and follow-ups

	Baseline	Follow-up after transplant	Follow-up after 3 months	P-value
EORTC QLQ-C30				
Global health status/QoL	69.27±22.82	62.20±17.05	68.33±18.70	0.212
Function scales				
Physical functioning	85.33±16.75	78.13±11.93	76.00±17.01	0.052
Role functioning	82.27±22.23	80.00±22.88	75.73±24.17	0.749
Emotional functioning	85.53±16.55	85.60±15.57	85.60±15.57	0.911
Cognitive functioning	92.20±12.34	88.87±13.53	90.00±13.72	0.641
Social functioning	71.13±21.35	72.40±17.41	71.20±17.17	0.629
Symptom scales/items				
Fatigue	22.07±18.30	31.67±16.29	33.13±15.25	0.130
Nausea and vomiting	9.93±15.04	23.27±5.02	13.40±21.92	0.061
Pain	16.67±19.90	14.53±18.79	17.93±17.23	0.739
Dyspnea	15.40±17.04	17.67±21.28	28.67±17.20	0.038 *
Insomnia	17.67±21.28	28.80±30.55	22.13±24.15	0.239
Appetite loss	17.73±24.81	28.80±24.85	24.33±23.48	0.535
Constipation	13.20±16.73	24.27±19.74	11.00±16.10	0.199
Diarrhea	13.27±21.05	31.00±23.55	13.20±16.73	0.075
Financial difficulties	26.60±25.90	26.60±31.41	31.00±34.44	0.829
BDI-II	10.13±7.13	11.47±7.63	11.33±9.12	0.882
Fatigue severity scale	23.67±13.31	25.27±12.51	25.07±12.41	0.819
EORTC, European Organization for the Research and Treatment of Cancer Quality of Life Questionnaire; BDI-II, Beck's depression inventory II Values are mean±**standard deviation.** * p<0.05 is statistically significant.				

Table 4. Results of the satisfaction survey

	N=15 (Mean±SD)
1. Was the exercise program you participated in physically and mentally beneficial?	4.20±1.15
2. Was the overall exercise intensity of the provided exercise program appropriate for you?	2.87±0.35
3. Was the exercise duration (20-30 minutes) of the provided exercise program appropriate?	2.73±0.46
4. Was participating in the exercise program interesting?	3.47±0.99
5. Did you communicate well with the physical therapist?	4.00±0.85
6. Which type of exercise was most beneficial to you?	Aerobic 1 Stretching 10 Strengthening 4
7. Which type of the exercise do you want to strengthen a little more?	Aerobic 4 Stretching 3 Strengthening 8
8. Would you recommend this program to other transplant patients?	4.07±0.80
9. After participating in this study, did you feel motivated to continue exercising in the future?	3.87±0.99
10. How would you describe your satisfaction with the remote exercise program on a scale of 0 to 10?	8.2±2.34

Conclusions

The results of this study showed that telerehabilitation program might be the useful exercise program for the patients who underwent bone marrow transplant. And it seemed that direct communicating with a physical therapist helped patients maintain their physical and mental health during the isolation period.