Supplementary Material 2. Data collection and interventions

The researcher first received permission from the hospital and intensive care unit (ICU) management to conduct the research. After obtaining the informed written consent of the patients, she referred to the ICUs and completed the demographic and background information of the patients who met the inclusion criteria before the intervention. Using the MRC scale and a hand-held dynamometer, a single rater evaluated the muscle strengths of the upper and lower extremities on the first (before intervention) and 7th days (after intervention) of admission to the ICU at 8 pm. The intervention was performed in the range of motion (ROM) and massage groups once a day for 7 consecutive days. In all three groups (control, massage, and ROM), patients, who were transferred to the ward within the first 7 days of their hospitalization, were excluded from the study.

ROM exercise group: The intervention started on the first day of admission. In addition to routine care, passive, active, active-assistive ROM exercises were performed once a day for 7 consecutive days. The patient was first placed in a supine position and the researcher adjusted her position to fit the body mechanics. The ROM exercise area was uncovered and other parts of the body were covered. Passive, active, and active-assistive ROM exercises were done according to the patient's condition. ROM exercises of the upper extremity included shoulder flexion, shoulder extension, shoulder abduction, elbow flexion and extension, wrist flexion and extension, joints of the thumb and fingers (metacarpophalangeal, interphalangeal joints). ROM exercises of the lower extremity included hip and knee flexions, hip extension, hip abduction, ankle dorsiflexion, plantar flexion, and all movements were performed rhythmically in 10 repetitions [1]. ROM exercises lasted 30–60 minutes. ROM exercises were done at 3–7 pm when the workload of the ICU was less. Parameters indicating intolerance to ROM exercises include mean arterial pressure ≤65 mm Hg, systolic blood pressure ≥200 mm Hg, heart rate ≤40 or ≥130, oxygen saturation ≤88%, respiration rate ≤5 or ≥30 per minute, and arrhythmia [2]. In case of intolerance, ROM exercises were postponed until the patient's condition became stable. It should be noted that no patient in the present study developed complications during ROM exercises.

The physiotherapist trained the second researcher and her colleague (two nurses) how to do ROM exercises within three sessions (6 hours) and they started the intervention after their approval. The second researcher did ROM exercises for female samples while her colleague did ROM exercises for male samples.

Massage group: The intervention started on the first day of admission. In addition to routine care, the upper/lower extremities, back, and chest were massaged with Swedish massage once a day for 7 consecutive days. First, an absorbent pad was placed to protect the patient's mattress from leaking oil. The patient was in a supine position, with the head at an angle of 30°–45°. The massage area was uncovered while other parts of the body were covered. The researcher examined the areas in question for the presence of barriers to massage, including vascular disorders such as DVT, fractures in the lower and upper extremities, skin disease, wounds, infections, sensitivity to olive oil. Then, the researcher applied Swedish massage, including stroking, effleurage, vibration, and kneading movements [3]. Olive oil (about 20 ml) was used to make the area slippery and easy to massage. The upper/lower extremities, back, chest were massaged continuously during 30–60 minutes. The massage was performed at 3–7 pm when the workload of the ICU was less. After the massage, the remaining oil on the patient's body was cleaned with a napkin. A physiotherapist trained the second researcher and her colleague (two nurses) how to massage within three sessions (6 hours) and they started the intervention after their approval. The second researcher massaged the female samples while her colleague massaged the male samples.

Control group: The patients in the control group have the same condition as patients in the intervention groups. The control group only received routine care. A physiotherapist performed routine care in the ICU once a day in the morning shift, which included respiratory and limb physiotherapy (Supplemental Digital Content). Breathing exercises include use of motivational spirometry, bud lip breathing, diaphragmatic breathing, breath focus technique (This deep breathing technique uses imagery or focus words and phrases), alternate nostril breathing, coherent breathing, resonant breathing (breathe at a rate of 5 full breaths per minute), deep breathing (helps to relieve shortness of breath by preventing air from getting trapped in your lungs), effective cough training, which were performed in sitting and semi-sitting positions. Unfortunately, patients with coronavirus disease 2019 (COVID-19) are

Table 1. Comparison of range of motion exercises as an intervention with routine care

		Intervention group[a]		Routine care[b]	
			Passive, active, active-assistive		Passive, active, active-assistive
Range of motion exercises	Upper extremity	10 Repetitions	Shoulder:	10 Repetitions	Shoulder flexion
			flexion/extension/abduction (2–4: active, 3–4: passive, 1–2: active-assistive)		
			Elbow:		Elbow
			flexion/extension (2–5: active, 2–3: passive, 1–2: active-assistive)		flexion/extension
			Wrist:		No
			flexion/extension (2–3: active, 2–5: passive, 1–2: active-assistive)		
			Joints of the Thumb and Fingers (metacarpophalangeal		No
			and interphalangeal joints (		
			Flexion/extension/abduction /adduction (passive)		
	Lower extremity		Hip:		Hip flexion
			flexion/abduction/adduction (2–4: active, 2–6: passive)		
			Knee flexion (2–4: active, 2–6: passive)		Knee flexion
			Ankle dorsiflexion/plantar flexion (passive)		plantar flexion
	Total time		30–60 min		15 min

a) In the first day of intervention all of the range of motion exercises has performed passively; b) Breathing exercises include: use of motivational spirometry, deep breathing, bud lip breathing, effective cough training and these exercises were performed in a sitting and semi-sitting position. In addition, unfortunately in our center, due to staff shortage, the early mobilization of patients including aerobic, resistive, functional exercises is not routinely preforming particularly in patients with coronavirus disease 2019 (COVID-19) infection, as they are oxygen dependent and need complete support for being out of bed.

not routinely doing aerobics, resistive, functional exercises in our center due to staff shortage because they are oxygen-dependent and need complete support for being out of bed (Table 1).

REFERENCES

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