ABSTRAK

PENGARUH PROGRAM KOMBINASI TELEREHABILITASI KARDIOVASKULAR TERHADAP KEMAMPUAN LATIHAN MAKSIMAL PADA PASIEN SINDROM KORONER AKUT PASCA INTERVENSI KORONER PERKUTAN

Pradana, A.D., Hartopo, A.B., Gharini, P.P.R

Latar Belakang: Program rehabilitasi kardiovaskular berbasis latihan fisik pada pasien sindrom koroner akut (SKA) pasca intervensi koroner perkutan (IKP) terbukti aman dan efektif meningkatkan kemampuan latihan. *Home-Based Cardiac Rehabilitation* (HBCR) dan kombinasi rumah sakit sama amannya dengan *Center-Based Cardiac Rehabilitation* (CBCR). *Home-Based Cardiac Telerehabilitation* (HBCTR) merupakan suatu langkah inovasi terbaru program rehabilitasi kardiovaskular berbasis rumah yang memanfaatkan kemajuan teknologi. Penelitian menggunakan kombinasi telerehabilitasi berbasis *smartwatch* pada pasien SKA pasca IKP belum pernah dilakukan di Indonesia.

Tujuan: Penelitian ini merupakan uji *pre-experimental-posttest with control* dengan kelompok kontrol untuk mengetahui efek pengaruh program kombinasi telerehabilitasi kardiovaskular terhadap kemampuan latihan pasien SKA pasca IKP yang dinilai dengan uji latih jantung (ULJ) maksimal berbasis treadmill (TMT).

Metode: Total 45 subjek pasien SKA pasca IKP, stratifikasi risiko rendah-sedang, jarak tempuh *entry test* >100 m, secara berurutan dibagi menjadi kelompok berbasis CBCR (kontrol) (n = 23) dan kelompok kombinasi telerehabilitasi (perlakuan) (n = 22). Kedua kelompok mendapatkan program latihan berbasis rumah sakit 2x/minggu selama 4 minggu, intensitas sedang, durasi 30 menit setiap sesi. Kelompok perlakuan mendapat latihan aerobik 3-5x/minggu di rumah dengan supervisi telemonitor berbasis *smartwatch*. Luaran yang dinilai adalah hasil ULJ TMT pada akhir minggu ke-4 sebagai penanda kemampuan latihan maksimal.

Hasil: Karakteristik dasar kedua kelompok secara umum tidak berbeda signifikan. Tidak terdapat perbedaan bermakna kemampuan latihan maksimal pasca rehabilitasi kardiovaskular pada kelompok perlakuan 10.2 (4.6-13.4) METs dan kontrol 8.5 (6.4-13.5) METs, p = 0.06 dan juga VO_2 *peak* 35.7 (16.1-46.9) mL/kg/min vs. 29.7 (22.3-47.2) mL/kg/min, p = 0.06. Parameter lain seperti denyut jantung puncak latihan/HR *peak*) (p = 0.41) dan *rate-pressure product*/RPP (p=0.72) tidak didapatkan perbedaan secara signfikan. Tidak didapatkan potensi variabel lain yang berpengaruh secara signfikan (p>0.05) terhadap nilai kemampuan latihan maksimal.

Simpulan: Telerehabilitasi kardiovaskular dengan *smartwatch* terbukti memiliki efektivitas yang sama dengan CBCR dalam meningkatkan kemampuan latihan pasien SKA pasca IKP.

Kata Kunci: *sindrom koroner akut; program latihan fisik; telerehabilitasi, smartwatch, kemampuan latihan; uji treadmill*

ABSTRACT

THE EFFECT OF A COMBINED CARDIOVASCULAR TELEREHABILITATION PROGRAM ON MAXIMAL EXERCISE CAPACITY OUTCOMES IN PATIENTS WITH ACUTE CORONARY SYNDROME FOLLOWING PERCUTANEOUS CORONARY INTERVENTION

Pradana, A.D., Hartopo, A.B., Gharini, P.P.R

Background: Exercise-based cardiac rehabilitation programs in patients with acute coronary syndrome (ACS) after percutaneous coronary intervention (PCI) have been proven safe and effective in improving functional capacity. Home-Based Cardiac Rehabilitation (HBCR) and hybrid programs combining home and hospital components have demonstrated safety comparable to Center-Based Cardiac Rehabilitation (CBCR). Home-Based Cardiac Telerehabilitation (HBCTR) represents an innovative approach utilizing technological advancements to facilitate remote rehabilitation. To date, no studies in Indonesia have investigated the use of a smartwatch-based telerehabilitation program for ACS patients following PCI.

Objective: This pre-experimental–posttest study aimed to evaluate the effect of a combined home-based cardiovascular telerehabilitation program (HBCTR) on the exercise capacity of post-PCI ACS patients, assessed using treadmill-based maximal exercise testing (TMT).

Methods A total of 45 post-PCI ACS patients with low-to-moderate risk and baseline entry test distance >100 meters were consecutively allocated into a CBCR (control) group (n = 23) and a HBCTR (intervention) group (n = 22). Both groups underwent supervised, moderate-intensity, hospital-based exercise sessions twice weekly for four weeks, with each session lasting 30 minutes. The intervention group additionally performed home-based aerobic exercise 3–5 times per week under smartwatch-based telemonitoring supervision. Outcomes were evaluated as TMT performance after four weeks of rehabilitation.

Results: Baseline characteristics were generally comparable between groups. There was no statistically significant difference in maximal exercise capacity after cardiovascular rehabilitation between the intervention group (10.2 [4.6–13.4] METs) and the control group (8.5 [6.4–13.5] METs), $p = 0.06$, nor in peak oxygen consumption (VO_2 peak) (35.7 [16.1–46.9] mL/kg/min vs. 29.7 [22.3–47.2] mL/kg/min, $p = 0.06$). Other parameters, such as peak exercise heart rate (HR peak) (p = 0.41) and rate-pressure product (RPP) (p = 0.72), did not show significant differences. No other variables were found to have a significant influence (p > 0.05) on maximal exercise capacity.

Conclusion: A smartwatch-assisted, home-based cardiovascular telerehabilitation demonstrated comparable effectiveness to conventional center-based cardiac rehabilitation in improving maximal exercise capacity among ACS patients after PCI.

Keywords: *acute coronary syndrome; exercise-based cardiac rehabilitation; telerehabilitation; smartwatch; exercise capacity; treadmill test*