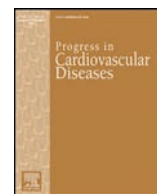




Contents lists available at ScienceDirect

## Progress in Cardiovascular Diseases

journal homepage: [www.onlinepcd.com](http://www.onlinepcd.com)

## Cardiometabolic adaptations and benefits of recreational group sports

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Recreational sport provides a fun, engaging and multifaceted form of exercise to help reduce both primary and secondary cardiovascular (CV) disease (CVD) risk. This issue of *Progress in CVD* (PCVD) provides a review and new evidence supporting the feasibility and health value of implementing recreational sport interventions in various clinical and hard to reach populations; from children to adults, for purposes of primordial, primary, secondary and tertiary prevention of cardiometabolic outcomes.<sup>1</sup>

While most of the papers in this special issue study the effects of recreational soccer, many other recreational team sports have shown to improve cardiometabolic outcomes.<sup>2</sup> Castagna et al.<sup>3</sup> summarize the literature on the importance and benefits of other recreational team sports, not including soccer, to CV health. Reviewing basketball, handball, floorball, futsal, volleyball, recreational rugby, and the numerous studies linking these team sports to improvements in CVD risk factors like blood pressure (BP), cardiorespiratory fitness (CRF) and body composition with relatively low perceived exertion rates. Dr. Kirkendall provides a review and history lesson on the all-time research in soccer and the emergence of recreational soccer in the late 1970s and health-related research of recreational soccer in this millennium.<sup>4</sup>

Letnes et al.<sup>5</sup> investigated  $VO_{2peak}$  change with aging and adherence to leisure-time physical activity (PA). They concluded that despite the decline in  $VO_{2peak}$  with aging, engaging in leisure-time PA, especially at higher intensities, mitigates this decline. Hagman et al.<sup>6</sup> conducted a study examining telomere length in soccer players of various age groups. They showed that soccer played regularly over a lifetime can shorten telomere length and reduce signs of aging and therefore contribute to reducing CVD risk in comparison to untrained controls.

Wundersitz et al.<sup>7</sup> showed heart structure was significantly larger in cyclists relative to non-athletic controls and end-diastolic left ventricular internal diameter was larger compared to other types of athletes. Further, Mehta et al.<sup>8</sup> reviewed the literature on regular aerobic exercise and CRF with CVD outcomes. Emerging evidence shows that a lifetime of prolonged high intensity aerobic exercise may accelerate subclinical

coronary atherosclerosis whereas the relationship between aerobic exercise risk of heart failure appears to be more linear. These data may help guide optimal exercise doses to favorably modify distinct CVD outcomes.

Several of the original data presented in this issue test the impact of recreational soccer interventions in various populations. The first is an example from Frediani et al.<sup>9</sup> on how recreational soccer can engage hard to reach populations at risk of type 2 diabetes (T2DM) and CVD. Hispanic men were recruited for a 24-week program that also included education from the National Diabetes Prevention Program. All aspects of physical fitness improved by the first three months and the approach showed high retention rates. Another feasibility study by Barbosa et al.<sup>10</sup> in middle-aged and older men with T2DM was conducted using walking soccer. This soccer modality requires participants to walk instead of run during a game, aiming at fewer injuries and adverse events. Participants were engaged and increased their light-to-vigorous exercise intensity. Uth et al.<sup>11</sup> designed a 12-month soccer program for women treated for breast cancer, showing that soccer training is feasible for this group of cancer patients. Other than cancer, these women were relatively healthy at baseline and therefore showed modest fitness improvements after 12-months; however, quality of life improved in the recreational soccer group at 6 months. Team handball has several similarities to soccer when it comes to elements of endurance training, high-intensity interval training (HIIT) and strength training, and may have similar effects on fitness and health metrics as recreational soccer. Pereira et al.<sup>12</sup> studied the effect of regular team handball practice for 16 weeks in a group of post-menopausal women. When compared to usual care control, the team handball group improved aerobic performance and CRF.

Recreational soccer and other ball games can also play a significant role against childhood obesity. Seabra et al.<sup>13</sup> designed a school-based soccer program. They found their six-month soccer program improved several metabolic biomarkers, such as cholesterol and BP in overweight children when compared to control children. In another study among healthy children, soccer and other ball games like handball were compared to both interval running and control. Larsen and colleagues<sup>14</sup> examined echocardiograms, resting heart rate and BP and found after 10 months of 60-minute sessions per week, both running and ball games resulted in positive cardiac changes along with improvements in BP in

Abbreviations: BP, Blood pressure; CRF, Cardiorespiratory fitness; CV, Cardiovascular; CVD, Cardiovascular disease; PA, Physical activity; T2DM, Type 2 diabetes.

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the running group. These two studies corroborate evidence that PA is crucial for children and that fun and engaging ball games like soccer and handball show comparable fitness and cardiometabolic improvement to HIIT activities like interval running.

As this issue of PCVD guest editors, we are delighted to present this collection. We are grateful for the superb contributions of the coauthors and for the editorial oversight of Dr. Carl “Chip” Lavie, Editor-in-Chief of *PCVD and his staff*. We hope that you find this issue to be an excellent review of many exciting new avenues for the prevention and treatment of CVD and T2DM. Let's get the ball rolling!

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