Application of e-health programs in physical activity and health promotion

Guest editorial

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Sedentary behavior has been identified as one of the major causes of many chronic diseases, such as cardiovascular diseases, stroke, cancer, osteoporosis, and type 2 diabetes. Modern technology plays a complex role in sedentary behavior—much like a double-edged sword. Specifically, some modern technologies, such as sedentary video games and computer games, have contributed to the epidemic of sedentary behavior and physical inactivity, whereas other novel technologies such as e-health have been increasingly used to promote physical activity (PA) and health. Indeed, e-health encompasses more than just Internet and medicine. It can include many sophisticated applications that deal with disease prevention and wellness, mobile decision making, emergency interventions, monitoring health, and remote care via mobile devices. Given the ubiquitous nature of modern technology, researchers are seeking to leverage multiple e-health technologies (e.g., social media, active video games, health wearables, smartphone apps, and virtual reality) to improve health in people through increased PA and reduced sedentary behavior. As technology becomes a more prevalent part of everyday life, and e-health programs seek new ways to increase lifelong engagement with PA, the 2 means have become increasingly linked. Although the application of e-health programs has been widely used, the effectiveness of such intervention programs in various populations on PA and health promotion remains largely unexplored.

In response, this special topic of the Journal of Sport and Health Science is aimed at investigating the effects of e-health programs in promoting PA and health-related outcomes as well as determining the feasibility of applying e-health programs in various populations through experimental and observational research designs. New data-based findings are presented from 5 studies that took place in Australia, France, and the USA. These studies attempted to (1) explore the feasibility and acceptability of applying e-health programs in PA and health promotion; (2) investigate the effectiveness of e-health intervention programs on individuals’ PA and health-related outcomes; (3) illustrate the current status of e-health applications in PA and health promotion across various countries; and (4) provide directions for future research and practice to promote PA and health through e-health programs.

1. Web- or social media-based PA interventions

Available web- and social media-based intervention programs have rendered mixed findings, with some suggesting positive findings on PA and health and others indicating no significant differences between the intervention and control conditions. The 2 e-health interventions in this special topic are no exception. In the first trial, Schoeppe et al. examined the acceptability, usability, perceived usefulness, and satisfaction of a web-based video-tailored PA intervention (TailorActive) in Australian adults. They found that personally tailored PA advice provided through web-based video or text seemed insufficient to ensure good retention, usage, perceived usefulness, and satisfaction. Yet McDonough and colleagues investigated the effects of a YouTube-based PA intervention on college students’ PA and psychological well-being during the coronavirus disease 2019 pandemic. They suggested that the 12-week YouTube-based PA intervention promoted greater moderate-to-vigorous PA (MVPA), sleep efficiency, and exercise motivation while reducing perceived barriers to PA.

2. Virtual reality-based PA interventions

Virtual reality refers to a digital technology that replicates a real or imagined environment and simulates a user’s physical presence in this environment, allowing for user interaction. Generally, there are 2 types of virtual reality: (1) immersive virtual reality, which frequently uses head-mounted displays, body-motion sensors, real-time graphics, and advanced interface devices simulating an environment; and (2) nonimmersive virtual reality, which uses interfaces such as flat-screen televisions or computer screens with associated keyboards, game pads, controllers, and human body—not simulating an environment to as deep a degree as the immersive virtual reality. Exergaming, a type of video game that is also a form of exercise, is usually deemed a nonimmersive virtual reality. Promoting PA and health through exergaming has been increasingly applied in the past decade because of its enjoyable and interactive features.

In the third study of this special topic, Baysden et al. explored the reactions of adolescents when navigating an exergame with an avatar created from multiple scans of players. Findings from interviews indicated that participants identified with their representative avatars and tended to protect the avatars, which influenced their...
actions in the exergaming and led to greater game enjoyment. In testing the effects of exergaming on sedentary college students’ PA and cognitive performance, Sousa et al. found that participants in the exergaming sessions had greater MVPA compared to those playing sedentary video game and sitting quietly doing nothing. Moreover, exergaming induced greater game experience and immersion, challenge, and positive affect than sedentary video games. In the last study, Pasco and Roure examined the relationships between college students’ situational interest and PA when playing the design-based bike exergame Greedy Rabbit (Vescape). They suggested that a design-based exergaming intervention may be a good option in promoting PA and health-related outcomes.

3. Knowledge gaps and directions for future research

Technology has played an important role in shaping individuals’ lifestyle and health. Further, modern technologies allow for exciting opportunities for the promotion of PA and health. The rapid growth of technology, coupled with the emerging field of PA and health, has created both challenges and opportunities that require further attention from professionals and researchers.

Online social media and web-based programs are promising tools for the promotion of PA and health, given that the technology allows professionals to reach large populations while removing obstacles encountered by in-person interventions (e.g., transportation needs, time off from work), elements that are particularly useful during the current pandemic. Yet this inquiry area has knowledge gaps that need filling. To begin, non-true-experimental study designs prevent the discernment of causal effects of e-health interventions on health outcomes. Second, social media-based intervention is still in its infancy, and small sample sizes and low study power make it difficult to establish between-group differences. Moreover, some studies lacked objective measures of PA, which limited the validity of the assessed PA outcomes. Hence, future research should implement true experimental designs that objectively assess PA. Future studies should also examine the long-term health effects of e-health interventions with large sample sizes.

The challenges and opportunities for exergaming research, as well as recommendations for future research, are discussed in Gao et al. and are not reiterated here. Population-level e-health programs might be possible with certain types of virtual reality technology. Despite the positive findings of some virtual reality studies, no large scale, methodologically rigorous studies have been completed so far. Because of its infancy, virtual reality requires more research to determine its efficacy/effectiveness in promoting PA and health.

Competing interests

Both authors declare that they have no competing interests.

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