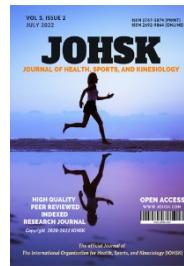


## ORIGINAL RESEARCH

# Promoting Physical Activity for College and University Students with Disabilities

Dal-Hyun Moon & Erick Kong  
California State University East Bay, CA, USA

Received 17 February 2022 | Revised 14 May 2022 | Accepted 8 June 2022  
Open Access Available online at [www.johsk.com](http://www.johsk.com)



## ABSTRACT

The benefits of physical activity (PA) participation are well documented, and yet many students with disabilities remain inactive. Approximately 19 % of U.S. undergraduate students have a disability and this is an 8 % increase since a decade ago. As the number of college/university students with disabilities (CUSD) is consistently increasing, it is important to provide equal opportunities for this population to be physically active. While inactivity raises health concerns for all college students, literature reveals that CUSD are less physically active than those without disabilities and/or CUSD may not know much about college PA opportunities on campus. This suggests that there might not be enough college PA programs available for CUSD. The purpose of this paper is to provide the importance of PA programs/courses for CUSD, college/university students without disabilities, and faculty. In addition, we will identify possible challenges to designing and implementing college PA programs for CUSD and strategies to better manage those challenges based on a review of the existing literature.

**Keywords:** physical activity; college and university students with disabilities

## INTRODUCTION

### Benefits of Physical Activity

Evidence regarding the health benefits of physical activity (PA) has been well documented. For example, regular participation in PA can lower the risk for early death, and prevent several chronic diseases, such as cardiovascular disease, type 2 diabetes, cancer and obesity (Warburton et al., 2006). Despite recognition of the numerous benefits of PA, many people remain sedentary including college and university students. PA levels have decreased from high school to college and typically college and university students are less physically active compared to their childhood (Calestine et al., 2017; López-Valenciano et al., 2021). Due to inactivity, obesity is one of the growing concerns in this population. The American College Health Association (2019) reported that approximately 38% of college students reported being overweight (Body mass index at least 25 or higher). In addition, PA levels among university students were significantly reduced during the COVID-19 (López-Valenciano et al., 2021).

### College and University Students with Disabilities (CUSD)

The number of students with disabilities pursuing higher education has been increasing over the years (Yoh et al., 2008). According to the National Center for Education Statistics [NCES] (2021), 19 percent of all undergraduates enrolled in the U.S. reported having a disability in 2015-2016, and this is an 8 percent increase since 2011-2012. Literature has shown that College and university students with disabilities (CUSD) are not meeting the recommended amount of PA and are less physically active than students without disabilities. For example, Übeda-Colomer et al. (2019b) surveyed 1,103 university students with disabilities to examine whether they are achieving the World Health Organization (WHO) PA recommendation of at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity each week for adults. The study found that 72.2% of the study participants did not meet the recommendation of 75-minute activity, 80.3% of them did not meet the recommendation of 150-minute activity, and 63.1% did not meet any of these recommendations (Übeda-Colomer et al., 2019b). In addition, another study done by Yoh et al. (2008) reported that the usage of and satisfaction with campus recreation facilities

among CUSD were significantly low. Yoh's study found that 68% of college students with physical disabilities used less than 5 times per semester and approximately 37% of them have never used campus recreation facilities.

### **Lack of Effort for PA Promotion Among CUSD**

While PA promotion for adults with disabilities is emphasized in the literature, CUSD are often overlooked and there is less attempt to promote PA opportunities for college students (Milroy et al., 2012). Low levels of PA of CUSD raise serious concern because the level of PA in higher education has significantly decreased post-graduation (Wilson et al., 2020). As mentioned previously, WHO recommends PA at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity each week for adults ("World Health Organization: Physical Activity." 2020). In order to make CUSD meet the recommended amount of PA, providing more PA opportunities for CUSD on campuses are needed. Therefore, this paper is intended to address several areas in terms of the importance of PA programs/courses for CUSD. Furthermore, discuss how college/university students without disabilities are also impacted and the benefits for faculty members. In addition, we will identify possible challenges and strategies to designing and implementing college PA programs for CUSD and further point out the lack of awareness of the programs available. Lastly, discuss the opportunities and accessibility along with the lack of motivation for participation in these PA programs.

## **IMPORTANCE OF COLLEGE/UNIVERSITY PA PROGRAMS**

This systematic review protocol was prepared in accordance with the Preferred Items for Systematic Reviews and Meta-Analysis Protocols (PRISMA-P) 2015 statement and was reported using the PRISMA statement as guidance (Moher, et al., 2015).

### **Regulatory Compliance**

College PA programs for CUSD benefit the health of the campus community members and must adhere to certain laws and regulations. There are colleges that offer programs/classes for students with chronic conditions, disabilities, or limitations, such as Citrus College and West Valley College ("Citrus College DSPS EAC 090 flyer," 2022; "West Valley College," 2022). Based on federal law of Americans with Disabilities, colleges must provide individuals with and without disabilities equal opportunity to participate in physical education and PA (National Association for Sport and Physical Education [NASPE], 2007). According to a position statement from the NASPE (2007), "all colleges and universities uphold a PA instructional program for students as a strong and integral part of the academic curriculum" (p. 1). Similar to the United States, the United Kingdom has disability rights in regards to physical activity, such as the Special Education Needs and Disability Act (Haegel et al., 2017). Thus, providing college PA programs for students with disabilities is regulatory compliance.

### **Benefits for CUSD**

Literature found that PA provides positive health effects for individuals with disabilities. For example, a systematic review done by Plotnikoff and colleagues (2015) found that PA interventions affect the improvement of health outcomes, such as PA and weight reduction for university students. In addition, Jo et al. (2018) found that muscle endurance in adults with intellectual disabilities (ID) significantly improved with a 12-week exercise program. PA also has positive effects on the psychological health of individuals with disabilities, such as improving self-efficacy in adults with ID, reducing depression in patients with a chronic illness, and improving problem-focused coping to reduce stress in university students (Herring et al., 2012; Jo et al., 2018; Kim & McKenzie, 2014). Besides several health benefits, there is evidence that PA participation contributes to improving brain function. A review done by Casebolt et al. (2017) reported that college/university PA programs could increase students' PA and positively influence the academic success of college students. In their review (Casebolt et al., 2017), participation in PA contributes to improved brain function, such as learning, memory, concentration, attention, and information processing. As a result, these cognitive attributes are associated with improvement in academic success.

### **Benefits for College/University Students without Disabilities**

University's PA programs are courses or programs that are offered across the campus to promote physical activity for those who participate. This includes those with and without physical disabilities (Valis & Gonzalez, 2016). These programs offered for students with or without disabilities can also be used as service learning opportunities. Service learning is a pedagogical approach that connects discipline specific knowledge to practice through out-of-classroom activities (Bishop & Driver, 2007; Roper & Santiago, 2014, & Watson et al., 2002). Through service learning, students can connect with class curriculum, and they can develop leadership skills (Bishop & Driver, 2007, & Wurr & Hamilton, 2012). Research found that service learning has positively affected students' attitudes toward people with disabilities. Lawson et al. (2016) found that college students who participated in community service involving direct contact with people with disabilities had positive attitudes toward them after the service learning experience.

### **Benefits of PA Programs for Faculty**

Offering and developing adapted PA classes and programs for CUSD also provide benefits for faculty. One of the benefits for faculty is that it helps to promote learning for students (Bishop & Driver, 2007). Typically, faculty work alongside the students to run the PA programs by helping them to increase the level of understanding in the subject knowledge through hands-on experience for CUSD and increase student engagement in the classroom (Bishop & Driver, 2007; Chabot & Holben, 2003). Integrating PA as a component in a class can be beneficial for both faculty and students because it enhances subject knowledge and problem-solving abilities (Bishop & Driver, 2007). Another faculty benefit from PA programs is providing research opportunities by testing the effectiveness of the programs (Bishop & Driver,

2007). Consequently, working with students for these programs can contribute to improving student-faculty relationships (Bishop & Driver, 2007; Eyler et al., 2001). For instance, frequent interactions with students can provide opportunities for faculty to learn more about students and be able to guide and meet the needs of students with disabilities (Bishop & Driver, 2007).

## STRATEGIES TO OVERCOME CHALLENGES

### **Constraint**

There are several challenges when it comes to participation in PA programs. For example, recruiting people with disabilities to participate in PA programs can be a real difficult task. Recruiting individuals is not only a challenge for disability related studies but also one of the major difficulties for PA programs (Richard et al., 2015). Leisure constraints play a role in having difficulty in recruitment. There are three types of leisure constraints; it includes intrapersonal, interpersonal, and structural constraints (Allar & Taliaferro, 2014). These constraints have kept students from being able to participate in campus recreation activities. Intrapersonal constraints are defined as affecting an individual's ability to participate in leisure activities and it can vary from person to person, especially those who rely on other people's support. This may include personal trainers, friends, companions, or family members (Leung, Siebert, & Yun, 2017). On the other hand, structural constraints are inhibitors that keep one from being able to participate in leisure activities because of lack of access to transportation, facility's access due to American Disabilities Act (ADA) compliance, and the cost of the program in itself (Piercey et al., 2018). Furthermore, Jehue et al. (1999) pointed out the factors that influence leisure participation by including their individual interest, the area where the facility is located, the proximity and accessibility of the facility, and those around the individual that encourage them to participate. In the case of university students, these leisure constraints prevent them from being able to actively participate in campus' leisure recreation (Bult et al., 2011).

### **Lack of Awareness by CUSD**

Based on the findings from previous literature, university student participants often were unaware of PA programs or facilities on campus. Hsu et al. (2021) found that nearly 70% of college students with disabilities reported that they used campus recreation facilities less than five times per semester and also nearly 40% of them have never used the facilities. This suggests a potential gap between awareness of opportunities and the existing programs on campus. A study done by Jaarsma et al. (2019) reported that students may not receive information about PA opportunities even if the school is advertising or distributing them. These findings suggest that practitioners should focus efforts to improve communication between the PA centers, the school, and CUSD. Jaarsma et al. (2019) suggests that improving communication about PA opportunities for people with disabilities can be achieved by providing more specific communication about PA programs, expanding communication networks, and using multiple methods to promote PA opportunities.

### **Lack of Opportunities & Accessibility**

Although facility accessibility is legally mandated, the lack of opportunities and accessibility remains a major barrier to PA for people with disabilities (Mulligan & Nichols-Dunsmuir, 2017). Budget issues and time may limit opportunities to rebuild facilities (Rimmer et al., 2016). If this is the case, equipment modification and curriculum adjustments should be made so that the programs are inclusive and accessible for college students with disabilities (Úbeda-Colomer et al., 2019a). To make the adjustments, it is important to understand the unique characteristics of various disabilities to identify the needs of students in college PA programs (Úbeda-Colomer et al., 2019a). Activities should be modified, and curriculum should be adjusted to match students' ability level (Úbeda-Colomer et al., 2019a; Choi, 2020). According to Choi et al. (2020), additional factors, such as positive attitude toward people with disabilities, collaborative support with instructors, peer-tutoring, and additional in-service learning training is essential for successful inclusion.

Moreover, financial constraints put all students including those with disabilities the opportunity to participate in sport and physical activity (Lee, & So, 2019). Lastly, a disadvantage for people with disabilities is to be able to access or participate in conventional sports activities due to the structure of team sport programs (Taub, Blinde, & Greer, 1999).

### **Lack of Motivation for Participants**

Lack of motivation appears to be a consistent barrier to PA for people with disabilities (McDermott et al., 2022). In order to address this issue, PA preferences should be considered when planning, developing, and implementing college PA programs for students with disabilities. In addition to preferred types of PA, other factors related to PA participation should be considered, including the setting (facilities on campus vs somewhere else) and format (group vs. individual). Boman et al. (2013) reported that enjoyment in school-based PA programs is associated with high levels of PA participation. These results suggest program participation of college PA programs for students with disabilities depends on the perception of the PA as enjoyable. Other ways to increase enjoyment of the college PA programs for students with disabilities include reducing competitive activities and value participation rather than performance. Practitioners should emphasize the importance of PA with CUSD with PA-related workshops or other campus events.

Furthermore, college students are faced with social challenges going from high school to college. This is evident in academic performance especially those who are adjusting to college life. This ultimately creates a lack of motivation to participate in campus activities, let alone physical activities. Casebolt et al. (2017) research indicated that college students find it most difficult in their first semester and those who are failing tend to lack the motivation to participate in campus activities. This can lead to stress and prohibit from being able to participate in leisure activities and campus recreation activities (Devine, 2016). In addition, Pans et al. (2021) pointed out that first year college students drop out within the first semester because they are faced with many challenges and difficulty in adapting to the university environment. Therefore, stress is considered a major constraint to campus recreation participation among students with disabilities.

## IMPLICATIONS AND RECOMMENDATIONS

The importance of PA for people with disabilities and promoting PA for CUSD cannot be understated. There is also limited research on PA for CUSD that includes the lack of accessibility to the PA facilities and lack of effort to develop such programs/courses. As a result, CUSD are less active and often do not engage in their schools' PA and recreational facilities. Based on the literature, there is much need for providing PA programs for students at colleges and universities. Campuses should address this issue by looking at what the needs area for students with disabilities beyond PA programs but other supportive programs to meet their needs. For example, Liu and Jung (2016) found that Physical Education programs offered by the university have influenced students' motivation to participate in exercises outside of the classroom. Moreover, Ntoumanis (2001) found that having supportive programs has resulted in benefiting the student body including those with disabilities. Furthermore, this would provide an opportunity to elicit future research to be done due to lack of current literature. There is a lack of PA courses and programs for CUSD, little effort has been made to develop programs/courses. Not only lack of opportunities due to barriers and accessibility, but also other issues, such as motivation, lack of communication could be possible factors for this concern. Moreover, very little effort has been made to develop the effectiveness of the current program in PA on campus. As a result, awareness brings inclusive programs availability and lack of PA courses for people with disabilities. For example, recreation center currently does not have a PA program and campus administrators fails to offer PA programs in their universities. Based on the literature, there is much need in offering PA programs for people with disabilities. Campuses should address this issue by looking at what the needs are for students with disabilities beyond PA programs along with providing other supportive programs to meet their needs.

## SUMMARY

The number of CUSD is increasing and the PA participation of this population is well below recommended PA levels. Inactivity habits remain or increase for this population with age. Under the federal mandate of Americans with Disabilities Act, CUSD should be given more PA opportunities. Literature suggests that promoting PA in colleges and universities are important for students since it leads to positive outcomes. PA programs/courses are not only beneficial for their health, but also can have a positive contribution to their academic performance. College and university students without disabilities can gain benefits such as deeper understanding of adapted PA related course materials, building leadership skills, and improving attitudes towards people with disabilities. Furthermore, leisure constraints such as intrapersonal, interpersonal, and structural have limited students' participation in campus recreation. In addition, communication in regard to PA opportunities for people with disabilities on campus has been lacking. The need to expand communication networks and promote PA opportunities must be in place. Moreover, accessibility must be made available with equipment modification and curriculum adjustments so that programs are inclusive and accessible for all college students including those with disabilities. Lastly, creating a motivation environment that reduces competitive activities and value participation rather than performance should be addressed.

## REFERENCES

- Allar, I., Baek, J.-H., & Taliaferro, A. Addressing inclusion in higher education physical activity programs. *J Phys Educ Recreation Dance* [Internet]. 2014;85(9):36–41. Available from: <http://dx.doi.org/10.1080/07303084.2014.958254>
- Allar, I., Baek, J.-H., & Taliaferro, A. (2014). Addressing inclusion in higher education physical activity programs. *Journal of Physical Education, Recreation and Dance*, 85(9), 36-41. doi:10.1080/07303084.2014.958254
- American College Health Association (ACHA). American college health association-national college health assessment III: Undergraduate student, Fall 2019. Silver Spring, MD: ACHA; 2019. Available from: [https://www.acha.org/documents/ncha/NCHA-III\\_FALL\\_2019\\_UNDERGRADUATE\\_REFERENCE\\_GROUP\\_DATA\\_REPORT.pdf](https://www.acha.org/documents/ncha/NCHA-III_FALL_2019_UNDERGRADUATE_REFERENCE_GROUP_DATA_REPORT.pdf)
- Barfield, J., Bennett, J., Folio, M., & Killman, C. (2007). Disability rights in higher education: Ensuring kinesiology program and accreditation standards do not discriminate. *Quest*, 59, 384-397.
- Bishop, J., & Driver, S. (2007). Implementing service-learning in undergraduate adapted physical education. *Journal of Physical Education, Recreation & Dance*, 78(8), 15-19.
- Boman, K. K., Hörnquist, L., de Graaff, L., Rickardsson, J., Lannering, B., & Gustafsson, G. (2013). Disability, body image and sports/physical activity in adult survivors of childhood CNS tumors: population-based outcomes from a cohort study. *Journal of Neuro-Oncology*, 112(1), 99–106. <https://doi.org/10.1007/s11060-012-1039-5>
- Booth, M.L., Bauman, A., Owen, N., & Gore, C.J. (1997). Physical activity preferences, preferred sources of assistance, and perceived barriers to increased activity among physically inactive Australians. *Preventive Medicine: An International Journal Devoted to Practice and Theory*, 26(1), 131-137.
- Buckworth, J. (2001). Exercise adherence in college students: Issues and preliminary results. *Quest*, 53, 335-345.
- Bult, M. K., Verschuren, O., Jongmans, M., Lindeman, E., & Ketelaar, M. (2011). What influences participation in leisure activities of children and youth with physical disabilities? A systematic review. *Research in Developmental Disabilities*, 32(5), 1521–1529. <https://doi.org/10.1016/j.ridd.2011.01.045>
- Calestine, J., Bopp, B., & Bopp, C.M. (2017). College student work habits are related to physical activity and fitness. *International Journal of Exercise Science*, 10(7), 1009-1017.
- Casebolt, K., Chiang, L.M., Melton, B., & Russell, J. (2017). College/university instructional physical activity programs and academic success in higher education. *International Journal of Kinesiology in Higher Education*, 1(3), 100-106.
- Chabot, J.M., & Holben, D.H. (2003). Integrating service-learning into dietetics and nutrition education. *Topics in Clinical Nutrition*, 18(3), 177-184.

- Choi, P., Motl, R. W., & Agiovlasitis, S. (2020). Validity of physical activity measured by proxy-response questionnaire in adults with intellectual disability: 1541 Board #135 May 28 10:30 AM - 12:00 PM. *Medicine and Science in Sports and Exercise*, 52(7 Suppl), 407–408. <https://doi.org/10.1249/01.mss.0000678276.01407.1f>
- Citrus College DSPS EAC 090 flyer. (2022, January). Retrieved from <https://www.citruscollege.edu/stdntsrv/dsp/Documentation/Flyers/090.pdf>
- Devine. (2016). Leisure-time physical activity: Experiences of college students with disabilities. *Adapted Physical Activity Quarterly*, 33(2), 176–194. <https://doi.org/10.1123/APAQ.2014-0241>
- Eyler, J., Giles, D. E., Stenson, C. M., & Gray, C. J. (2001). At-a-glance: What we know about the effects of service-learning on students, faculty, institutions, and communities, 1993-2001. Retrieved from <https://digitalcommons.unomaha.edu/cgi/viewcontent.cgi?article=1137&context=slchighered>
- Haegeler, J., Zhu, X., & Davis, J. (2017). Barriers and Facilitators of physical education participation for students with disabilities: an explorative study. *International Journal of Inclusive Education*, 22(2), 130-141.
- Herring, M. P., Puetz, T. W., O'Connor, P. J., & Dishman, R. K. (2012). Effect of exercise training on depressive symptoms among patients with a chronic illness: A system review and meta-analysis of randomized controlled trials. *Archives of Internal Medicine*, 172(2), 101-111. doi:10.1001/archinternmed.2011.696
- Hsu, P., Chou, H.-S., Pan, Y.-H., Ju, Y.-Y., Tsai, C.-L., & Pan, C.-Y. (2021). Sedentary time, physical activity levels and physical fitness in adults with intellectual disabilities. *International Journal of Environmental Research and Public Health*, 18(9), 5033-. <https://doi.org/10.3390/ijerph18095033>
- Jaarsma, E. V., Haslett, D., & Smith, B. (2019). Improving communication of information about physical activity opportunities for people with disabilities. *Adapted Physical Activity Quarterly*, 36, 185-201.
- Jehue, D. M., Barnd, S. M., & Schultz, J. C. (1999). Physical activity level and stages of change in college students with disabilities. *Medicine and Science in Sports and Exercise*, 31(Supplement), S365-. <https://doi.org/10.1097/00005768-199905001-01851>
- Jin, J., Yun, J., & Agiovlastitis, S. (2018). Impact of enjoyment on physical activity and health among children with disabilities in schools. *Disability and Health Journal*, 11, 14-19.
- Jo, G., Rossow-Kimball, B., & Lee, Y. (2018). Effects of 12-week combined exercise program on self-efficacy, physical activity level, and health related physical fitness of adults with intellectual disability. *Journal of Exercise Rehabilitation*, 14(2), 175-182.
- Kapsal, N. J., Dicke, T., Morin, A. J. S., Vasconcellos, D., Maiano, C., Lee, J., & Lonsdale, C. (2019). Effects of physical activity on the physical and psychosocial health of youth with intellectual disabilities: A systematic review and meta-analysis. *Journal of Physical Activity and Health*, 16, 1187-1195.
- Kim, J.H., & McKenzie, L.A. (2014). The impacts of physical exercise on stress coping and well-being in university students in the context of leisure. *Health*, 6, 2570-2580.
- Lawson, J. E., Cruz, R. A., & Knollman, G. A. (2017). Increasing positive attitudes toward individuals with disabilities through community service learning. *Research in Developmental Disabilities*, 69, 1-7.
- Lee, K., & So, W. (2019). Differences in the levels of physical activity, mental health, and quality of life of elderly Koreans with activity-limiting disabilities. *International Journal of Environmental Research and Public Health*, 16(15), 2736. <https://doi.org/10.3390/ijerph16152736>
- Leung, Siebert, E.A., & Yun, J. (2017). Measuring physical activity with accelerometers for individuals with intellectual disability: A systematic review. *Research in Developmental Disabilities*, 67, 60-70. <https://doi.org/10.1016/j.ridd.2017.06.001>
- Liu, J., & P. Jung. (2016). Students' perceived autonomy support and psychological needs satisfaction in physical education and exercise intrinsic motivation." *Journal of Sport Behavior*, 39(4), 409–425.
- Lopez-Valenciano, A., Suarez-Iglesias, D., Sanchez-Lastra, M.A., & Alyan, C. (2021). Impact of COVID-19 pandemic on university students' physical activity levels: an early systematic review. *Frontiers in Psychology*. doi. org/10.3389/fpsyg.2020.624567.
- McDermott, B. N., Shannon, S., Fitzpatrick, B., & Taggart, L. (2022). Barriers and facilitators of physical activity in adolescents with intellectual disabilities: An analysis informed by the COM-B model. *Journal of Applied Research in Intellectual Disabilities*, 35(3), 800–825. <https://doi.org/10.1111/jar.12985>
- Milroy, J.J., Wyrrick D.L., Bibreau, D.L., Strack, R.W., & Davis, P.G. (2012). A university system-side qualitative investigation into student physical activity promotion conducted on college campuses. *American Journal of Health Promotion*, 26(5), 305-312.
- Mulligan, M. M., & Nichols-Dunsmuir, A. (2017). Multiple perspectives on accessibility to physical activity for people with long-term mobility impairment. *Scandinavian Journal of Disability Research: SJDR*, 19(4), 295–306. <https://doi.org/10.1080/15017419.2016.1167772>
- National Association for Sport and Physical Education (2007). *College/university physical activity programs: A critical piece in the education of young adults* [Position Paper]. Reston, VA: Author.
- Nosek, M. A., Hughes, R. B., Robinson-Wheelen, S., Taylor, H. B., & Howland, C. A. (2006). Physical activity and nutritional behaviors of women with physical disabilities: Physical, psychological, social, and environmental influences. *Women's Health Issues*, 16(6), 323–333. <https://doi.org/10.1016/j.whi.2006.08.002>
- Ntoumanis, N. (2001). A self-determination approach to the understanding of motivation in physical education. *British Journal of Educational Psychology*, 71(2), 225–242.
- Pans, M., Úbeda-Colomer, J., Monforte, J., & Devís-Devís, J. (2021). Physical activity and accomplishment of recommendations in university students with disabilities: A longitudinal study. *International Journal of Environmental Research and Public Health*, 18(11), 5540-. <https://doi.org/10.3390/ijerph18115540>
- Park, S.S., Koh, Y., & Block, M. (2014). Contributing factors for successful inclusive physical education. *Palaestra*, 28(1), 42-49.
- Piercy, K. L., Troiano, R. P., Ballard, R. M., Carlson, S. A., Fulton, J. E., Galuska, D. A., George, S. M., & Olson, R. D. (2018). The Physical Activity Guidelines for Americans. *JAMA: The Journal of the American Medical Association*, 320(19), 2020–2028. <https://doi.org/10.1001/jama.2018.14854>
- Plotnikoff, R.C., Costigan, S.A., Williams, R.L., Hutchesson, M.J., Kennedy, S.G., Robards, S.L., Allen, J., Collins, C.E., Callister, R., & Germov, J. (2015). Effectiveness of interventions targeting physical activity, nutrition, and healthy weight for university and college students: A systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity*, 12(45). Doi 10.1186/s12966-015-0203-7

- Richards, K., Andrew, R., Eberline, A. D., Padaruth, S., & Templin, T. J. (2015). Experiential learning through a physical activity program for children with disabilities. *Journal of Teaching in Physical Education*, 34(2), 165–188.  
<https://doi.org/10.1123/jtpe.2014-0015>
- Rimmer, P. S., Malone, L. A., & Mehta, T. (2016). Fitness facilities still lack accessibility for people with disabilities. *Disability and Health Journal*, 10(2), 214–221. <https://doi.org/10.1016/j.dhjo.2016.12.011>.
- Rimmer, J. H., Riley, B., Wang, E., Rauwirth, A., & Jurkowski, J. (2004). Physical activity participation among persons with disabilities: Barriers and facilitators. *American Journal of Preventive Medicine*, 26(5), 419-425.
- Roberts, D. A., Herring, M., Plotner, A., & Roach, A. (2018). Physical activity in inclusive postsecondary education for students with intellectual disability. *Journal of Postsecondary Education and Disability*, 31(3), 239-252.
- Roper, E. A., & Santiago, J. A. (2014). Influence of service-learning on kinesiology students' attitudes toward P-12 students with disabilities. *Adapted Physical Activity Quarterly*, 31, 162-180.
- Sparling, P. B., & Snow, T. K. (2002). Physical activity patterns in recent college alumni. *Research Quarterly for Exercise and Sport*, 73(2), 200-205.
- Stroud, N., Minahan, C., & Sabapathy, S. (2009). The perceived benefits and barriers to exercise participation in persons with multiple sclerosis. *Disability and Rehabilitation*, 31(26), 2216-2222.
- Taub, D. E., Blinde, E. M., & Greer, K. R. (1999). Stigma management through participation in sport and physical activity: Experiences of male college students with physical disabilities. *Human Relations* (New York), 52(11), 1469–1484.  
<https://doi.org/10.1177/001872679905201106>
- United States Department of Education, National Center for Education Statistics. (2021). *Digest of Education Statistics*, 2019 (NCES 2021-0009).
- United States Department of Health and Human Services. (2008). Physical Activity guidelines for Americans (2<sup>nd</sup> ed.). Retrieved from [https://health.gov/sites/default/files/2019-09/Physical\\_Activity\\_Guidelines\\_2nd\\_edition.pdf](https://health.gov/sites/default/files/2019-09/Physical_Activity_Guidelines_2nd_edition.pdf)
- Úbeda-Colomer, J., Devís-Deví, J., & Sit, C.H.P. (2019a). Barriers to physical activity in university students with disabilities: Differences by sociodemographic variables. *Disability and Health Journal*, 12(2), 278–286. <https://doi.org/10.1016/j.dhjo.2018.11.005>
- Úbeda-Colomer, J., Monforte, J., & Devís-Deví, J. (2019b). Physical activity of university students with disabilities: accomplishment of recommendations and differences by age, sex disability and weight status. *Public Health*, 166, 69-78.  
doi: 10.1016/j.puhe.2018.10.006
- Valis & Gonzalez, M. (2016). Physical activity differences for college students with disabilities. *Disability and Health Journal*, 10(1), 87–92. <https://doi.org/10.1016/j.dhjo.2016.09.003>
- Vanner, E.A., Block, P., Christodoulou, C.C., Horowitz, B.P., & Krupp, L.B. (2008). Pilot study exploring quality of life and barriers to leisure-time physical activity in persons with moderate to severe multiple sclerosis. *Disability and Health Journal*, 1, 58-65.
- Warburton, D.E.R., Nicol, C.W., & Bredin, S.S.D. (2006). *Health benefits of physical activity: The evidence*. CMAJ [Internet]. 174(6):801–9. Available from: <http://dx.doi.org/10.1503/cmaj.051351>
- Watson, D.L., Hueglin, S., Crandall, J., & Eisenman, P. (2002). Incorporating service-learning into physical education teacher education programs. *Journal of Physical Education, Recreation & Dance*, 73(5), 50-54. doi: 10.1080/07303084.2002.10607810
- West Valley College: Disability and Educational Support. (2022). Retrieved from <https://www.westvalley.edu/academics/disability-educational-support/>
- Williams, T.L., Smith, B., & Papathomas, A. (2014). The barriers, benefits and facilitators of leisure time physical activity among people with spinal cord injury: A meta-synthesis of qualitative findings. *Health Psychology Review*, 8(4), 404-425.  
doi:10.1080/17437199.2014.898406
- Wilson, O.W.A., Matthews, P.J., Duffey, M., Papalia Z., & Bopp, M. (2020). Changes in health behaviors and outcomes following graduation from higher education. *Internal Journal of Exercise Science*, 13(5), 131-139.
- World Health Organization: Physical Activity. (2020, November). Retrieved from <https://www.who.int/news-room/fact-sheets/detail/physical-activity#:~:text=living%20with%20disability%3A-,should%20do%20at%20least%20150%20minutes%20of%20moderate%2Dintensity,intensity%20activity%20throughout%20the%20week>
- Wurr, A.J., & Hamilton, C.H. (2012). Leadership development in service-learning: An exploratory investigation. *Journal of Higher Education Outreach and Engagement*, 16(2), 213-239.
- Yoh, T., Mohr, M., & Gordon, B. (2008). Assessing satisfaction with campus recreation facilities among college students with physical disabilities. *Recreation Sports Journal*, 32, 106-113.

**Correspondence** concerning this article should be address to Dr. Dal-Hyun Moon at California State University East Bay. Email: [dalhyun.moon@csuebay.edu](mailto:dalhyun.moon@csuebay.edu).

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationship that could be construed as a potential conflict of interest.

**Publisher's Note:** All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors, and reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.



Copyright © 2020-2022. This work is licensed under a CC BY-NC-SA 4.0 International license. This is an open access article distributed under the Creative Commons Attribution License which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.