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EXAMINING PHYSICAL ACTIVITY IN USERS OF CAMPUS RECREATION DURING CAMPUS CLOSURE DUE TO COVID-19

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Burcal K., et. al. Campus recreation facilities are a critical resource to encourage physical activity at universities. COVID-19 closures in 2020 led to the shutdown of many campuses, which included campus recreation facilities. Little is known about how the closures impacted the physical activity levels of students, faculty, and staff who relied on campus recreation for physical activity opportunities. Therefore, the purpose of this study was to determine if individuals who were users of campus recreation prior to campus closure continued to be physically active when campus closed. The survey was completed by 282 previous users (students, faculty, and staff) of campus recreation. Results indicated that 85.8% of participants were meeting physical activity recommendations following campus closure. To support physical activity off campus, survey respondents suggested online exercise classes via social media and allowing equipment rentals. Future efforts should continue identifying ways campus recreation can support physical activity both on and off campus.

Key Words: campus recreation, physical activity, college students, COVID-19, university

INTRODUCTION

Universities are an ideal setting to help students establish healthy habits that can be carried into their future after graduation (Milroy et al., 2015; Plotnikoff et al., 2015). Unfortunately, as students enter college, they find themselves with increased stress and less hours of sleep (Lund et al., 2010; Saleh et al., 2017), which has been found to lead to depression and weight gain (Hasler et al., 2004; Kahlhöfer et al., 2016; Pelletier et al., 2016; Watson et al., 2015). Faculty and staff experience many of the same health issues (Haines et al., 2007).

One health behavior that can positively impact these health behaviors is physical activity. Increasing physical activity can help with reducing stress (Pengpid & Peltzer, 2018, Van der Zwan et al., 2015), improving sleep (Wu et al. 2015), and controlling weight (Lowry et al., 2000). However, many individuals do not meet the aerobic physical activity recommendations of 150 minutes of moderate-to-vigorous or 75 minutes of vigorous intensity physical activity weekly (Department of Health and Human Services [DHHS], 2019). Studies suggest that only 30-50% of students on a standard college campus report meeting the recommendations (Fuller et al., 2015; Keating et al., 2005).

Historically, universities have designed campus recreation facilities as a convenient way to help increase physical activity by providing programs and facilities for individuals to use (Cooper & Theriault, 2008; Dalgarn, 2001; Kraus, 1971; Powers et al., 2019). Campus recreation has been found to be an especially convenient venue to get physical activity without leaving campus (Dalgarn, 2001; Feldman et al., 2019). However, few studies report how campus recreation usage specifically impacts meeting aerobic physical activity recommendations (Castle et al., 2015; Zizzi et al., 2004).

While campuses could not have foreseen the impact of COVID-19 and eventual closure of campus recreation facilities, their role in supporting physical

activity through the provision of knowledge and opportunities for physical activity did not stop. Furthermore, there is limited data to show how the closure of campus recreation impacted the aerobic physical activity levels of previous users of campus recreation. Thus, the purpose of this study was to determine if individuals who were users of campus recreation prior to campus closure continued to be physically active if campus closed. This information could indicate the success of campus recreation's efforts to support the maintenance of physical activity for individuals after leaving the university (e.g., graduating students). The secondary purpose of this study was to understand how a public university campus recreation facility can help to support students, faculty, and staff to be physically active when they are not on campus. This information could be used to develop programs and resources to support current students, faculty, and staff during an ongoing pandemic as well as alumni.

METHODS

Participants

Participants in this study were undergraduate students, graduate students, faculty, and staff at a midwestern public university who either attended a group exercise class or took part in the Commit to Fit program prior to campus closure. Commit to Fit was a program offered at this specific university that allowed individuals to set structured goals for the year. In 2019, the university consisted of 17,298 individuals (12,244 undergraduate students, 2,909 graduate students, and 2,145 faculty and staff). For the 2019-2020 school year, Commit to Fit had 973 participants and Group Exercise had 462 participants. Thus, out of the total campus population during that school year, 8.16% of individuals were available to participate in the study. A sample size of 210 students, faculty, and staff was needed for this study based on a confidence level of 95% and confidence interval of +/- 5 calculated with a G*Power analysis.

Recruitment

Since this study was designed for program enhancement, approval from an Institutional Review Board (IRB) was not needed. Due to COVID-19 and campus closure, all classes moved to online learning on March 30, 2020. A link to the anonymous survey on the online survey platform, Qualtrics was sent via email on April 20th, and again on April 27th, to all possible participants. Potential participants were given roughly three weeks to complete the survey and the survey was officially closed May 12, 2020.

Demographics

Participants completed a questionnaire that included demographic questions regarding gender, GPA, ethnicity, campus living status, campus recreation usage, and age.

Campus Recreation Usage

Participants were asked the following question to determine if they were a frequent user, occasional user, or nonuser of campus recreation. The question stated, "Before COVID-19, in a typical week, how often did you use campus recreation facilities for the purpose of being physically active?". They selected one of four options that included: "I have never visited campus recreation", "less than 1 visit per week", "1-3 visits per week", and "4 or more visits per week". This question was structured after a similar survey regarding campus recreation usage (Ellis et al., 2002). "User" was defined as using campus recreation facilities on average 4+ times per week, "occasional user" was defined as using campus recreation facilities 1-3 times per week, and "nonuser" was defined as using it less than once per month (Ellis et al., 2002).

To gain an understanding of what activities participants used to participate in prior to COVID-19, participants were asked "What physical activities were you doing at campus recreation before COVID-19?". Example responses included group exercise, weight rooms, cardio equipment, gym space, classes, and "other" with the option to provide a response. Additionally, to gain an understanding of where participants were active outside of campus recreation, participants were asked "Where else did you obtain your physical activity?" included responses gym, outdoors, home, and "other" with the option to provide a response.

An additional open-ended question was used to identify ways campus recreation could support students, faculty, and staff during campus closure. This question stated, "How can campus recreation

support you to be physically active when you are not on campus?".

Physical Activity

The International Physical Activity Questionnaire (IPAQ) contains seven questions and has been widely used in universities to determine levels of physical activity (Dinger et al.,2006). The IPAQ has been validated against accelerometers utilizing pooled coefficients with 0.3 criterion validity (Fogelholm et al., 2006). Further, correlation coefficients that ranged from 0.71 – 0.89 indicating moderate to high reliability, and the time spent in vigorous physical activity from the IPAQ was significantly correlated with steps/day from the accelerometer and pedometer, as well as all count variables (ρ: 0.30 – 0.47, $p < 0.01$) (Dinger et al.,2006). A sample question includes "During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?".

Stage of Change

The Stages of Change questionnaire is based on the Transtheoretical Model and classifies people into the stages of change, which include pre-contemplation, contemplation, preparation, action, and maintenance (McConnaughy et al., 1983). This questionnaire consists of four questions and has strong construct validity when used with college students (Schumann et al., 2002). Further, it shows adequate test-retest reliability based on a two-week interval with an intraclass correlation coefficient of 0.8 (Cengiz et al., 2010). When used directly with physical activity, the test-retest reliability has a correlation of 0.59 (Donovan et al., 1998). Example questions include "I am currently physically active" and "I intend to become more physically active in the next 6 months". Participants respond by selecting "yes" or "no" to each question.

Data Analysis

Following the collection of the questionnaires, incomplete responses and "nonusers" were removed prior to analysis. The IPAQ data was scored according to the protocol into both a categorical variable (low, moderate, or high) and a continuous variable (MET minutes) (Forde, 2018; Sjostrom et al., 2005). A high score on the IPAQ indicates participants were vigorously active on 3+ days per week or obtained 7 days of combined activity. A moderate score on the IPAQ indicated participants were vigorously active 3 days per week, moderately active 5 days per week, or obtained 5+ days of combined activities. A low score on the IPAQ indicates a participant obtained neither of those requirements. Following protocol, periods of activity less than 10 minutes in duration were not scored. Additionally, moderate-to-vigorous physical activity (MVPA) was determined utilizing the MET minutes from the IPAQ data. The Stages of Change questionnaire was scored according to protocol (Marcus & Forsyth, 2009) and each participant was categorized into one of the five stages of precontemplation, contemplation, preparation, action, or maintenance.

SPSS was used to run descriptive analyses for age, gender identity, race, position in school, grade point average, campus recreation usage, and status of living (on or off of campus). Independent t-tests were run to measure differences between minutes of moderate to vigorous physical activity (MVPA) and all demographic variables. Summative content analysis was used to evaluate the open-ended question. Summative content analysis identifies certain words in the text portions of the open-ended questions to help interpret the answers to the questions through keywords (Hsieh & Shannon, 2005). First, the lead author reviewed all answers and developed codes based on the responses. Next, the senior author reviewed the codes and documented any coding disagreements. Then they met to discuss all discrepancies until consensus was reached.

RESULTS

After removing incomplete questionnaires and all "nonusers", 282 responses were used for analysis fulfilling the power analysis requirement. Most of the participants were white (76.8%) and between the ages of 18-24 years old (68.4%, $M = 1.63$, $SD = 1.1$). (See Table 1).

Table 1

Student, Faculty, and Staff Demographics

Demographic		n=282	%
Age	18-24	193	68.4
	25+	89	31.6
Gender	Male	115	40.8
	Female	162	57.4
	Other	5	1.8
Race	White	215	76.2
	Hispanic	27	9.6
	Black	20	7.1
	Asian	16	5.7
	American Indian/Alaska Native	2	0.7
	Pacific Islander	2	0.7
GPA	3.5-4.0	152	54.0
	<3.49	130	46.0
Grade/Position	Freshman	35	12.4
	Sophomore	59	20.9
	Junior	48	17.0
	Senior	52	18.4
	Graduate	38	13.5
	Faculty/Staff	50	17.7
Campus Living Status	On-Campus	70	23.8
	Off-Campus	210	76.2
Before COVID-19 Usage of Campus Recreation	1-3 visits per week	112	39.7
	4 or more visits per week	170	60.3

Campus Recreation Usage and Physical Activity

Overall, 39.7% of participants were occasional users and 60.3% were frequent users of campus recreation. Physical activity results from the IPAQ revealed that without access to campus recreation facilities, 85.8% of individuals were still meeting the aerobic physical activity recommendations. When examining the results by level of activity, 54.2% scored high, 31.6% scored moderate, and 14.2% scored low levels of physical activity. Further, comparing physical activity by campus recreation usage, results revealed that frequent users obtained more mean minutes of MVPA per week compared to occasional users (p = 0.031). There were no other significant differences between any of the demographic variables and minutes of MVPA, including gender (p = 0.051), age (p = 0.548), race (p = 0.436), credit hours (p = 0.993), GPA (p = 0.440), and campus living status (p = 0.617).

Stages of Change

The Stages of Change questionnaire found that most participants (59.9%) were in the maintenance stage. The minutes of MVPA increased with each stage until maintenance. All stages, except precontemplation, were meeting the guidelines for physical activity. More information is available in Table 2.

Table 2

Minutes of Physical Activity Per Week

Stage of Change	Average Minutes Per Week	n=282	Percentage (%)
Precontemplation	0.0	1	0.4
Contemplation	155.37	67	23.8
Preparation	158.4	25	8.9
Action	399.0	20	7.1
Maintenance	308.8	169	59.9

Campus Closure Activity Options

When asked what activities users of campus recreation used most often prior to campus closure, responses included weight rooms (64.2%), cardio equipment (59.2%), and group exercise (45.7%). When asked where participants do most of their physical activity other than campus recreation (prior to COVID-19), responses included "outdoors, other gyms, and at home". These responses were given as part of the "other" option in the questionnaire.

When asked "How can campus recreation best support faculty/staff/students to be physically active when they are not on campus in regard to physical activity?", a variety of responses were given (see Table 3). The highest categories of response were suggestions for online exercise options (33.3%). 6.4% of participants desired the reopening of campus recreation, while others (4.3%) suggested rental options for equipment (e.g., borrow weights).

Table 3

Campus Recreation Support

Campus Recreation Support Categories	n=282	Percentage (%)	Examples
Social Media/Online/Home Exercise Options	94	33.3	"Classes online"
Reopening Campus Recreation	18	6.4	"Open the gym"
Rent Equipment Options	12	4.3	"Rental options"
Incentives	9	3.2	"Money incentive"
No Suggestions/NA	132	46.8	"None"
Other	17	6.0	"Other gym options"

DISCUSSION

The purpose of this study was to determine if individuals who were users of campus recreation prior to campus closure continued to be physically active if campus closed. A secondary purpose of this study was to understand how a public university campus recreation facility can help support students, faculty, and staff to be physically active when they are not on campus. The results of this study confirmed that the students, faculty, and staff, who were users of campus recreation facilities before COVID-19 campus closures, remained physically active when campus was closed. Of those in this study, 85.8%

were meeting the physical activity recommendations.

The major finding of this study came from comparing recreation user status with minutes of physical activity. There was a significant difference when comparing minutes of MVPA and campus recreation user status, suggesting that the more often individuals used campus recreation prior to campus closure, the more active they were when campus was closed. This is similar to other research which has found more frequent "users" of campus recreation, compared to "nonusers", were more physically active (Castle et al., 2015; Zizzi et al., 2004). In our study, frequent users obtained a mean of 168 minutes of MVPA per week while occasional users of campus recreation obtained a mean of 138.17 minutes of MVPA each week. This suggests that those who were more frequent users of campus recreation may have developed skills for maintaining and/or increasing their physical activity when campus recreation facilities were open. Frequent users could have had increased self-efficacy skills for physical activity due to previous participation that allowed them to meet the physical activity guidelines. Future research is needed to look at the differences between users of and nonusers of campus recreation to further explore the impact of campus recreation.

This study found no significant differences on most demographic factors with minutes of MVPA per week including gender, age, race, credit hours, GPA, and campus living status. This is contrary to other research which has found differences in MVPA based on demographic factors (Castle et al., 2015; Mettling et al., 2017; Zizzi et al., 2004). For example, several studies in university settings have found significant differences in MVPA between genders, with males being more physically active than females (Castle et al., 2015; Mettling et al., 2017; Zizzi et al., 2004).

Further, Castle et al. (2015) found significant differences based on where students lived, suggesting that living on campus and/or closer to campus recreation facilities increased campus recreation usage (Castle et al., 2015). The lack of significance in our study may be due to the fact that participants had been active in campus recreation facilities. Future research should look at usage of campus recreation and the location of where students, faculty, and staff live in relation to campus recreation facilities.

Participants in this study listed a variety of ways they were physically active outside of campus recreation with the outdoors (45%) being most popular. This was followed by other gyms (34.8%) and home workouts (23.8%). Some participants wrote in "other" options, including local community centers, and yoga studios. Future research could look further into the various places that students, faculty, and staff do their physical activity to further understand if campus recreation is used more often than other options, which can then lead to improving what is offered from campus recreation to encourage usage. Research should also look more in depth at how long students, faculty, and staff spend on campus per week to determine if there is any connection between time on campus and campus recreation use.

When looking at the Stages of Change data, 7.1% of individuals in the study were in the action stage and 59.9% of individuals were in the maintenance stage. Interestingly, those in contemplation and preparation still reported meeting the aerobic physical activity guidelines. Typically, those in contemplation and preparation do not report meeting the physical activity recommendations (Garber et al., 2008). While this does not follow the expected pattern of activity, the surveyed population in this study were all users of campus recreation, so they had either been using campus recreation for physical activity or were familiar with campus recreation facilities to begin with. Regardless, campus recreation should continue or develop programs to not only help existing users, but also non-users, to utilize campus recreation facilities and programming through stage-matched strategies.

Participants also provided a variety of ways they felt campus recreation could support them while off campus. The most popular responses included "social media" and "online". Following the campus closure, campus recreation has started using social media and online resources to give students, faculty, and staff a chance to continue to be active while away from campus. However, it is unclear how many of the participants in this survey were aware of these efforts. Thus, to best support students, faculty, and staff to be physically active when they are not on

campus, universities could focus on building their social media presence and following. This can be done by both posting workouts for people to do on their own time and/or having virtual exercise classes live via online access.

Strengths and Limitations

The biggest strength of this study is that it is one of the first to describe the physical activity levels of previous campus recreation users during the closure of campus due to the pandemic. An additional strength of this study is the response rate. 384 original responses out of the 1,435 who received a link to take the survey is a 26.8% response rate. When compared to other campus recreation studies, this response rate is higher than other studies of a similar population (Mettling et al., 2018; Zizzi et al., 2004). An additional strength is that most of the previous research has focused only on the student population (Castle et al., 2015; Mettling et al., 2018; Zizzi et al., 2004). This study adds to the literature by including faculty and staff.

There were several limitations to this study. First, the survey was administered less than a month following campus closure. Administering a survey so close to campus closure limits the understanding of how students, faculty, and staff adapted to the campus closure. Second, participants in the study were already affiliated with campus recreation and thus more likely to have been physically active. Additional research is needed to determine how to best support non-users of campus recreation. Third, this survey was only sent to group exercise users and Commit to Fit participants, so there is a variety of students, faculty, and staff that use campus recreation that were not included in this study. Fourth, this survey was only conducted at one specific university and may not be generalizable to other university settings. Finally, this study used a self-report questionnaire and previous research has found that participants are likely to overreport their physical activity levels via self-report (Sallis & Saelens, 2000). Thus, additional studies, using objective measures of physical activity are needed so there is potential for false reports from participants.

CONCLUSION

Campus recreation facilities are a helpful resource to promote physical activity in college students, faculty, and staff. This study adds to the research of the impact of COVID-19 and helps campus recreation facilities further understand how to support student, faculty, and staff physical activity when they are not on campus. Results revealed that a majority of previous users of campus recreation were physically active during campus closure and individuals desire a larger social media presence and options for equipment rentals. Future research should continue to examine how to support students, faculty, and staff's physical activity who do not regularly use campus recreation facilities.

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