

UNIVERSITY STUDENTS' MOTIVATION FOR HOME-BASED EXERCISE DURING THE COVID-19 PANDEMIC: SEX AND AGE DIFFERENCES

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ABSTRACT

Home-based exercise has become the most viable choice to maintain health during the prolonged stay-at-home precautions in response to the rapidly growing threat of the COVID-19 pandemic. Understanding motivation is the key to initiate and sustain adherence to exercise behaviour. The purpose of this study was to (a) examine motivation for home-based exercise during the COVID-19 stay-at-home period and (b) whether sex and age differences play a role in motivation. University students (N = 378, M age = 21.66 yrs) completed an online version of the Exercise Motivation Inventory-2 (EMI-2). Results indicated that the top motive for home-based exercise was positive health, while the least important motive was social recognition for all participants. Males were motivated more by strength/endurance, challenge, competition, social recognition, and health pressures, than females. Students 20 years old and over were motivated more by ill-health avoidance, appearance, and agility than those younger than 20 years old. The findings underscore the important motives based on sex and age which influenced students to engage in home-based exercise during the COVID-19 stay-at-home period.

Keywords: EMI, self-determination theory, university students, exercise motivation, Oman.

1. INTRODUCTION

Physical isolation or stay-at-home mandates during the coronavirus disease (COVID-19) pandemic can lead to an increased sedentary lifestyle and physical inactivity (Chen et al., 2020) which subsequently could have adverse physical and psychological consequences such as diabetes, cardiovascular disease, frustration, stress, and anger (Pecanha et al., 2020; Jiménez-Pavón et al., 2020). Many people during stay-at-home period eat, sit down, and watch media screens more than usual. This represents a big challenge to maintaining physical activity at home, especially for normally inactive people. Therefore, the World Health Organization (WHO) recommends people to keep physically active by exercising at home to stay healthy (Chen et al., 2020; Hammami et al., 2020). However, it is unclear what motivates people to exercise during the COVID-19 stay-at-home-period. Such investigation could offer effective motivational approaches to encourage people to engage in exercise activities at home.

The COVID-19 outbreak forced countries to close schools and universities in order to contain its spread and save students' lives. 60.5% of the world's student population in 109 countries are affected by school closures (UNESCO, 2020). This closure can have an impact on students' physical and mental health. Staying at home and online teaching can change students' lifestyle such as increased physical inactivity and screen time for both studying and

leisure. This assertion was supported by a study conducted among 2427 children and adolescent students in Shanghai and China (Xiang et al., 2020). The results indicated substantial increases in physical inactivity and screen time during the COVID-19 pandemic.

Up till now, the COVID-19 outbreak is expected to continue at least till the end of 2020 (Experts, 2020). This means the continuance of schools and universities closure and students home confinement which may lead to a profound reduction in physical activity and an increase in sedentary behaviour. Home-based exercise programmes are proposed to keep people physically active at home in order to improve physical and mental health during stay-at-home periods (Chen et al., 2020; European WHO [EWHO], 2020). Although home-based exercise is safe, simple, low-cost, and adjustable, students can lose their motivation and passion for such exercise for many reasons: a) physical and mental negative impacts associated with staying at home for a long time, b) students may struggle to find time to regularly participate in home-based exercise due to academic pressure and the longer time consumed in e-learning in contrast to traditional face to face learning, c) lack of knowledge, supervision, and accessible resources of home-based exercise, and d) home-based exercise is less enjoyable and boring because they are regularly performed individually and independently.

Research consistently showed that adults fail to meet physical activity guidelines and physical activity levels decline with aging, especially for girls (Cooper et al., 2015; Dos Santos et al., 2018; WHO, 2018). This trend could be higher for university students as evidence shows that they do not engage in sufficient levels of physical activity leading to weight gain or becoming obese (Alkhateeb et al., 2019; Egli et al., 2011; Mohammad, & Ahsan, 2016; Kilpatrick et al., 2010). University life is often accompanied by unhealthy behaviour such as a sedentary lifestyle, physical inactivity, and unhealthy dietary practices (e.g., Al-Kilani et al., 2012; Musaiger et al., 2015; Waly et al., 2014; Widyasri & Turnip, 2019).

Motivation is the best psychological determinant of exercise adherence (Mohammad, & Ahsan, 2016; Rintaugu & Ngetich, 2012). It has been defined as an integrated cognitive and emotional process to begin, guide, and maintain goal-oriented behaviour (Ford, 1992). The initiation and adherence behaviour for participation in exercise activities can be achieved by understanding and identifying motives for such behaviour. Self-determination theory (Ryan & Deci, 2002, 2017) offers a holistic framework to understand motivation for participation in exercise and physical activity. This theory proposes a continuum of motivation starting with lack of motivation; amotivation (i.e., when individuals have no intent or drive to engage in a particular activity), the least self-determined form of motivation in the middle; extrinsic motivation (i.e., engage in an activity through external pressures and outcomes), and the most self-determined form of motivation at the opposite end; intrinsic motivation (i.e., engage in an activity for enjoyment, interest, and inherent satisfaction).

A review of the existing literature showed that the top motives for (SQU) students to participate in exercise activities were strength and endurance, agility, and positive health for males and positive health, ill-health avoidance, and appearance for females (Li et al., 2014). UK university male students reported that positive health, strength and endurance, and competition were the most important motives for exercise and physical activity whereas, females reported higher weight management and appearance (Roberts et al., 2015). Also, U.S university male students rated strength and endurance, positive health, and agility as their primary motives for exercise, whereas positive health, weight management, and appearance were the highest rated motives by females (Ednie & Stibor, 2017; Egli et al., 2011).

Age differences in exercise motivation for university students was also examined. A study conducted by Roberts et al. (2015) revealed that participants over 23 years old rated higher levels of stress management, revitalisation, and ill-health avoidance than the younger participants. Furthermore, Egli et al. (2011) found age differences between participants above

and younger than 20 years old in affiliation, health pressures, and ill-health avoidance motivators.

Students' physical and mental health could be at risk during the COVID-19 stay-at-home period. During this unusual circumstance, students are predisposed to an increased physical inactivity and sedentary lifestyle. As recommended by WHO, 2018, people should stay physically active at home to avoid physical and mental health problems. However, some students may lose motivation and fail to maintain regular participation in exercise activities at home. Identifying students' motivation for home-based exercise may provide valuable insights into influencing them to be more physically active. Therefore, the primary purpose of this study was to investigate university students' motivation for participation in home-based exercise during the COVID-19 stay-at-home mandates in Oman. A secondary purpose was to investigate differences between sex and age groups (< 20 years old and \geq 20 years old) on motivation for home-based exercise. No hypothesis was generated due to lack of existing research on such issue, but one would expect that students during the pandemic would be more motivated by intrinsic motivators (e.g., positive health) in order to stay physically and mentally healthy.

2. METHODS AND MATERIALS

2.1 Participants

Participants were male ($n = 192$) and female ($n = 186$) students from different colleges at Sultan Qaboos University (SQU): Education ($n = 101$), Engineering ($n = 50$), Economics and Political Sciences ($n = 75$), Agricultural and Marine Sciences ($n = 5$), Medicine and Health Sciences ($n = 24$), Art and Social Sciences ($n = 29$), Law ($n = 41$), Nursing ($n = 14$), Sciences, ($n = 39$). They ranged in age from 23 to 47 years ($M = 21.66$, $SD = 4.56$). The participants were undergraduate ($n = 347$) and postgraduate ($n = 31$) students. As shown in Table 1, 29.2% of the participants were sedentary during the stay-at-home period, while 70.4% of them engaged in home-based exercise. 34.1% of them had gained weight with the majority gaining 2 kg at least and males had gained weight more than females. 36.8% of them reported being engaged in moderate and vigorous home-based exercise \geq 3-4 times per every week. 56.4% of exercisers performed exercise activities for less than 30 minutes per every session.

2.2 Procedure

An online questionnaire administered in Google Form was distributed randomly via email among (SQU) students. A consent form was not used in the survey as the responses were anonymous. The data collection was carried out between April and June in the spring semester of 2020 after five weeks of COVID-19 stay-at-home precautions had been taken. The (SQU) suspended study by Sunday, March 15, 2020 corresponding with Oman's Supreme Committee's pronouncement for dealing with the COVID-19 outbreak.

2.3 Measures

Demographic data and physical activity status. Participants were asked to self-report their age, gender, location of residence, college, university level, year in college, body weight and type, frequency, and level of physical activity at home.

Exercise motivation. The Exercise Motivation Inventory-2 (EMI-2, Markland & Ingledew, 1997) was used to assess home-based exercise motivation for exercisers and non-exercisers. It consists of 51 items with 14 subscales which are grouped into five categories: psychological motives (challenge, enjoyment, revitalization, stress management); interpersonal motives

(affiliation, social recognition, competition); health motives (health pressures, ill-health avoidance, positive health); body related motives (appearance, weight management); fitness motives (agility, strength & endurance). The instruction and some items of the inventory were modified to make them applicable for home-based exercise. Participants were to read each item and determined their reasons (motives) for exercising at home. Responses were made on a five-point Likert scale with anchors of not at all true for me (1) and very true for me (5). The 14 scales demonstrated good factorial and discriminant validity and reliability, with alpha coefficients ranging from .857 to .954 (Markland & Ingledew, 1997). One item was deleted because it was found irrelevant to study purpose. As shown in Table 2, all measures had very good internal consistency ($\alpha > .72$).

Translation of EMI-2. The original English version of the (EMI-2) was translated into Arabic by the author. Then, two fluent English and Arabic speaking colleagues checked the translation and compared the original English version and the translation. Based on their feedback, adjustments and changes in the Arabic version were made. The final Arabic version of (EMI-2) was piloted by 39 undergraduate students for clarity and appropriateness of the instructions, content, format, items, and possible responses. The piloting process was iterative until no further changes were deemed necessary.

3. RESULTS

Preliminary analyses.

Prior to the primary analysis, preliminary data screening was conducted to identify missing values, normality, and outliers for each variable. The assumptions of normal distribution were within the acceptable range. Missing data was below 5% for each variable and was replaced with the mean of the respective variable (Tabachnick & Fidell, 2001).

Rankings of Motivations for home-based exercise

Table 1: Frequency and percentage of age, sex, weight status, levels, number, and minutes of exercises activity at home (N = 378)

Variables	n (%)	n (%)	Total n (%)
	Age		
	< 20 years	≥ 20 years	
	185 (48.9)	193 (51.1)	378 (100)
	Sex		
	Male	Female	
	192 (50.8)	186 (49.2)	378 (100)
Daily sedentary behaviour	54 (28.1)	58 (31.2)	112 (29.2)
Exercisers at home	138 (71.9)	128 (68.8)	266 (70.4)
Weight status			
Stable	126 (65.6)	123 (66.1)	249 (65.9)
Gained	66 (34.4)	63 (33.9)	129 (34.1)
	1kg/ 15 (7.8)	1kg/ 24 (12.9)	39 (10.3)
	2kg/ 24 (12.5)	2kg/ 24 (12.9)	48 (12.7)
Gained weight (kg)	3kg/ 16 (8.3)	3kg/ 9 (4.8)	25 (6.6)
	4kg & above/ 11 (5.8)	4kg & above/ 6 (3.2)	17 (4.6)
	Exercisers at home (n = 266)		
Levels of EA	Male	Female	
Light	53 (38.4)	74 (57.8)	127 (33.6)
Moderate	71 (51.4)	54 (42.1)	125 (33.1)
Vigorous	14 (10.1)	—	14 (3.7)

Number of EA per week			
1-2 times	30 (21.7)	43 (33.5)	73 (19.3)
3-4 times	57 (41.3)	47 (36.7)	104 (27.5)
5-6 times	17 (12.3)	20 (15.6)	37 (9.8)
7 times and more	26 (18.8)	18 (14)	44 (11.6)
More than 7 time	8 (5.8)	—	8 (2.1)
Minutes of EA per session			
Less than 30 minutes	90 (65.2)	60 (46.8)	150 (39.7)
More than 30 minutes	48 (34.7)	68 (53.1)	116 (30.7)

Note. *n* = number of participants, EA= exercises activity

Table 2: Alpha coefficients and mean rankings of motivation subscales for total sample (N = 378)

Variables	α	Ranking	<i>M</i>	<i>SD</i>
Enjoyment	0.89	6	2.76	1.42
Challenge	0.87	10	2.31	1.40
Revitalization	0.90	4	2.83	1.44
Stress management	0.91	9	2.31	1.45
Social recognition	0.86	14	1.27	1.23
Affiliation	0.83	11	2.01	1.36
Competition	0.91	12	1.92	1.48
Health pressures	0.72	13	1.41	1.26
Ill-health avoidance	0.90	5	2.81	1.46
Positive health	0.92	1	3.14	1.38
Appearance	0.85	8	2.54	1.31
Weight management	0.83	7	2.70	1.32
Strength & endurance	0.92	3	2.84	1.47
Nimbleness	0.90	2	2.96	1.43

Note. α = Alpha coefficients

Table 3: Mean rankings of motivation subscales by sex and age (N = 378)

Variables	Male			Female			< 20 years			≥ 20 years		
	Ranking	<i>M</i>	<i>SD</i>	Ranking	<i>M</i>	<i>SD</i>	Ranking	<i>M</i>	<i>SD</i>	Ranking	<i>M</i>	<i>SD</i>
Enjoyment	5	2.76	1.41	6	2.76	1.43	5	2.71	1.40	6	2.80	1.43
Challenge	8	2.46	1.40	10	2.15	1.36	10	2.26	1.40	9	2.36	1.40
Revitalization	4	2.77	1.42	3	2.90	1.47	4	2.72	1.47	4	2.94	1.41
Stress management	11	2.22	1.40	9	2.40	1.51	9	2.26	1.43	10	2.35	1.48
Social recognition	13	1.57	1.27	14	0.97	1.11	14	1.20	1.20	14	1.34	1.26
Affiliation	12	2.05	1.33	11	1.97	1.40	11	1.97	1.36	11	2.05	1.37
Competition	10	2.30	1.44	12	1.55	1.43	12	1.91	1.47	12	1.94	1.50
Health pressures	14	1.56	1.25	13	1.27	1.26	13	1.30	1.30	13	1.52	1.22
Ill-health avoidance	6	2.77	1.42	4	2.85	1.50	6	2.63	1.52	3	2.98	1.38
Positive health	2	3.07	1.40	1	3.22	1.37	1	3.04	1.40	1	3.24	1.36
Appearance	9	2.49	1.28	7	2.60	1.33	8	2.38	1.30	8	2.69	1.30
Weight management	7	2.63	1.33	5	2.78	1.32	7	2.62	1.33	7	2.78	1.31
Strength & endurance	1	3.10	1.45	8	2.58	1.44	2	2.83	1.47	5	2.86	1.47
Nimbleness	3	3.00	1.47	2	2.92	1.40	3	2.78	1.46	2	3.13	1.38

Table 2 showed that all participants were motivated by positive health, agility, and strength/endurance to engage in home-bases exercise. The least important motives were social recognition and health pressures. As can be seen in Table 4, males identified strength/endurance and positive health as the most important motives whereas, positive health and agility were ranked by females as the top motives. Participants younger than 20 years old rated positive health and strength/endurance as their top motives, whereas participants 20 years old and above were more motivated by positive health and agility for home-bases exercise.

Sex and age differences

Table 4: Mean, standard d, F-statistic and effect of motivation subscales by sex and age (N = 378)

Variable	<i>M</i>		<i>SD</i>		<i>F</i> (1,376)	η_p^2
	Male	Female	Male	Female		
Sex	Male		Female			
Challenge	2.46	1.40	2.15	1.36	4.66*	.01
Social recognition	1.57	1.27	0.97	1.11	23.57**	.06
Competition	2.30	1.44	1.55	1.43	24.77**	.06
Health pressures	1.56	1.25	1.27	1.26	5.07*	.01
Strength & endurance	3.10	1.45	2.58	1.44	11.73**	.03
Age	< 20 years		≥ 20 years			
Ill-health avoidance	2.63	1.52	2.98	1.38	5.25*	.01
Appearance	2.38	1.30	2.69	1.30	5.18*	.01
Nimbleness	2.78	1.46	3.12	1.38	5.77*	.01

A Multivariate Analysis of Variance (MANOVA) was performed to investigate differences in gender and age group across all the motivation subscales. The analysis indicated a significant main effect for sex $F(14, 363) = 10.58, p = .001, \eta_p^2 = .30$ and age group $F(14, 363) = 2.173, p = .008, \eta_p^2 = .07$. Thus, one-way analyses of variance (ANOVA) were conducted to examine sex and age differences in each of the motivation subscales. Partial eta squared (η_p^2) is reported as the effect size, and values of .01, .06, and .14 represent small, medium and large effect sizes, respectively (Cohen, 1992).

ANOVA analyses revealed five significant sex differences in motives for home-based exercise. As shown in Table 4, males were more motivated by challenge, social recognition, competition, health pressures, and strength/endurance than females. The analyses also revealed three significant age differences. Participants 20 years old and greater were more likely to be motivated by ill-health avoidance, appearance, and agility than those younger than 20 years old to engage in home-based exercise.

4. DISCUSSION

Following the stay-at-home mandates of the COVID-19 pandemic, the (SQU) was lockdown in order to limit the spread of the infection amongst students. This may eventually force students to become physically inactive at home for a long time and could have adverse physical and psychological consequences for them (e.g., Pecanha et al., 2020; UNESCO, 2020). Maintaining physical activity by exercising at home is a recommended strategy to stay healthy and mitigate the adverse health effects of COVID-19 (e.g., Chen et al., 2020; WHO, 2020). Therefore, the motives that influence students to engage in home-based exercise during the COVID-19 stay-at home-period need to be explored.

The findings revealed that health and fitness motives (i.e., positive health, agility, and strength/endurance) were the top for the students to exercise at home. These motives have been characterized as intrinsic (Markland & Ingledew, 1997). This indicates that the students realize the importance of being physical active and fit during stay-at home-period of the COVID-19 pandemic for their health. These findings are, to some extent, consistent with past research (Ednie & Stibor, 2017; Egli et al., 2011; Li et al., 2014) which has shown that positive health was the top exercise motive for university students. However, past research revealed that extrinsic motives such as weight management and appearance were also the main motives for exercise which were less important for the students in the present study. According to self-determination theory, intrinsically motivated people are more likely to sustain exercise participation and have greater persistence in face of adversity (Ryan & Deci,

2002; Markland & Tobin, 2010). Therefore, students who had higher levels of intrinsic motivation were more likely to engage in home-based exercise during stay-at-home period.

Sex comparison analysis showed significant differences in five motivation subscales for males than for females. Males were more motivated by intrinsic motivational factors for home-based exercise. These findings are in line with previous research showing that men were highly motivated by strength/endurance, competition, challenge, and social recognition for exercise (e.g., Kilpatrick et al., 2005). Interestingly, no significant differences emerged for females which is inconsistent with previous research (Ednie & Stibor, 2017; Egli et al., 2011; Li et al., 2014) showing that females significantly rated weight management and appearance when compare with males. This inconsistency could be explained by that females in the current study had more concerns about maintaining positive health during the critical time of COVID-19 pandemic than their body weight status and appearance. However, this explanation is tentative and needs to be further investigated in future research.

The impact of age differences in motivation for home-based exercise was consistent with previous findings (Roberts et al., 2015). Students aged 20 years and older were highly motivated by extrinsic motivators (i.e., ill-health avoidance, agility and appearance) than those 19 years old and younger. However, these findings are in contrast to the results reported by Egli et al. (2011) which showed that students less than 20 years old were motivated by health motives (e.g., ill-health avoidance) than the older students. These inconsistent findings could be due to the fact that older students have more awareness and obsessive concerns over their physical health and attractiveness than younger students. (Roberts et al., 2015). Final-year students are expected to be more preoccupied with their diet and physical appearance than first-year students.

5. CONCLUSION

The present study contributes to the literature on home-based exercise and exercise motivation by demonstrating the critical role of intrinsic motivation for participation in home-based exercise during the COVID-19 pandemic. Based on the findings, health professionals and sport practitioners can develop different online home-based exercise programs for maintaining students physically active during the prolonged stay-at-home period while taking into account sex and age differences. These programs should also involve information about the adverse health effects of being physically inactive and guidelines for exercising in a safe home environment. Home-based exercise is an alternative way, in the absence of outdoor activities (e.g., playground & sport facilities), for people to stay safe and healthy during the COVID-19 stay-at-home period.

6. LIMITATIONS

The study had some limitations. First, its cross-sectional design does not allow conclusions to be drawn about exercise motivation during the stay-at-home period of the pandemic. A longitudinal study is needed to find out the extent to which individuals' motivation vary over the stay-at-home period. Second, the study relied mainly on self-reported data which is inherently prone to inaccuracy in recall and social desirability. Future research, could use an objective measure of physical activity as well as (EMI-2). Third, the findings pertain only to (SQU) students. Therefore, the generalization of the current findings to other samples should be done with caution. Fourth, the sample size was not representative of the entire (SQU) students population. Future research could consider using a large cross-university sample. Finally, the study only focused on motivation for home-based exercise. There are other psychological factors influence exercise behaviour such as attitude, self-efficacy, and intention (Blanchard et al., 2007), which it would be useful to investigate by future research.

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