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An Investigation of Exercise Behaviour Patterns Amongst Varsity Athletes

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Abstract: Background: The purpose of the study was to examine the incidence of exercise dependence amongst varsity – level university athletes. **Method:** Physical activity behavior patterns were measured amongst 62 participants (31 male and 31 female) from a mid – size University in Canada for the purpose of identifying problematic exercise through a questionnaire – based survey utilizing the Exercise Addiction Inventory (EAI). **Results:** Total scores were tabulated to indicate the number of varsity athletes scoring either “at-risk”, “symptomatic” or “asymptomatic” of exercise addiction, and percentages were determined for each of the EAI categories. 72.5% scored “symptomatic” while 19.5% recorded “at – risk” and 8% attained an “asymptomatic” result on the questionnaire. Interestingly, females rated “at – risk” three times higher than males whereas “asymptomatic” scores were four times greater amongst males on the EAI scale. **Conclusion:** While the EAI can identify individuals at risk from problematic exercise, a limitation is that high scores are not necessarily indicative of exercise addiction due to some people interpreting questions differently than they were intended. In addition, underlying causes such as anxiety, depression, difficulties with relationships or coping with personal hardship can be at the root of exercise addiction. Notwithstanding, individuals who score in the “at – risk” category of the EAI might still best be advised to seek counselling as activity should be pursued so that it enhances one’s life through sustainable long – term physical, psychological and social health versus exercising for deriving a sense of physical and psychological fulfillment.

Keywords: Exercise Addiction, Exercise Dependence, Compulsive Exercise, Problematic Exercise, Physical Activity, Behavior Patterns

Introduction

It has long been known that exercise yields wide – ranging health benefits, and the advantages of maintaining a regular programme of physical activity have been well documented (Warburton & Bredin, 2017). These include (but are not limited to) improved body functioning, decreased resistance to fatigue, diminished occurrence of type 2 (adult onset) diabetes mellitus, enhanced flexibility, greater muscular strength and endurance which leads to better work efficiency and reduced risk of lower – back problems, as well as assisting in the management of a healthy weight (Reiner et al., 2013). As physical illnesses such as heart disease and cancer are the most prominent causes of death throughout industrialized nations it is not surprising that the beneficial effects of exercise on “physical” ailments are the most heavily cited in scientific literature (Meijers & de Boer, 2019). However, various psychosocial advantages are derived from consistently engaging in physical activity as well. These include a decreased risk of depression and anxiety – related symptoms in addition to the overall sense of enhancement exercise may bring to one’s mental well – being and quality of life (Rueggsegger & Booth, 2018). What has not been as well documented, (although the topic has received greater attention in more recent years) are the potentially harmful effects of exercise – particularly if taken to an extreme level (Szabo et al., 2015).

Although a plethora of evidence exists advocating the tremendous benefits of physical activity, excessive exercise can actually impact quite negatively on people’s lives (Kovacsik et al., 2018a). For example, as the fitness boom of the 1970’s initiated tremendous fervour amongst the masses, it also resulted in a sharp rise of exercise – related injuries which may have been due to the larger number of people becoming more physically active (Jones, 2004). While the majority of participants commence exercise programmes with the very best of intentions (such as managing weight or improving overall fitness and health), for some people physical activity may potentially be harmful (Bianco et al., 2019). Negative consequences of exercise can occur within both the body and mind. Harmful effects to the body manifest themselves primarily through long-term risks such as musculoskeletal injury, and detriments to mental health are typically expressed through more immediate changes in mood, such as feeling of anxiety and/or depression when unable to exercise (Lukács et al., 2019). Consequently, people immersed in problematic levels of exercise characteristically possess an uncontrollable craving for physical activity, which often compromises their physical and/or mental health (Hausenblas & Symons Downs, 2002). Not unlike others who are dependent on a particular substance, tolerance develops over a period of time which results in a greater amount of exercise required to satisfy their needs (Freimuth, et al., 2011). In addition, the insatiable compulsion for exercise is enduring, and habitually leads to feelings of being out of control (Hausenblas & Symons Downs, 2002).

This current investigation of exercise behaviour patterns amongst varsity athletes employed the Exercise Addiction Inventory (EAI) which was developed in 2003 (Terry et al., 2004). The EAI has been used in a plethora of studies and was validated by Monok et. al (2012) in an enquiry investigating the questionnaire's psychometric properties and concurrent validity with 270 male and 204 female participants from the general population of Hungary aged 18 – 64 years (mean age of 33.2 and SD 12.1). Moreover, a study by Lichtenstein et al., (2012) validated the EAI with a Danish population consisting of 588 fitness and football (more commonly referred to as soccer in Canada and the U.S.) participants (aged 14–70 years) who exercised an average of 8 hours each week. The project reported that 5.8% of their sample engaged in problematic exercise. Further investigation also by Lichtenstein et al (2014) observed exercise dependency rates of 7.1% with young male footballers (age 18–39 years) in comparison to 9.7% with participants engaged in general fitness.

With respect to use and validation of the EAI in more “age” and “population – specific” groups, work by Szabo and Griffiths (2006) compared the prevalence of self-reported symptoms of exercise dependence in 261 sports sciences students with 194 people (control group) from the general exercising population. Results confirmed that sport science students demonstrated significantly higher mean scores on the EAI vs exercisers from the general population. Moreover, 6.9% of sport science students were possibly dependent on exercise compared to only 3.6% of the general exercising population which indicates the likelihood of sports science students being more susceptible to some components of problematic exercise than those who exercise more generally.

The same author (Szabo et al., 2013) utilized the EAI with university athletes in Spain, which included 57 students enrolled in sports studies in addition to 90 students enrolled in non-sport studies as well as 95 ultra-marathon runners who were not enrolled in university studies (mean age of the total sample = 27.5 years). Questionnaire scores were greater in men vs women, with ultra-marathoners scoring higher on the EAI than both groups of university athletes. The prevalence of being at risk for exercise dependence was 8.5% in university athletes and twice as high (17%) in ultra-marathoners. Clearly, the EAI is a valid and reliable instrument in college aged athletic populations. Moreover, a review of the literature indicates that problematic exercise is a concern amongst the university aged athletic population.

This current study was conducted for the purpose of obtaining a better understanding of exercise behaviour patterns amongst varsity level university athletes; with the ultimate goal being to produce healthier athletes by informing them about the prevalence, risk and consequences of exercise dependence. The inquiry was necessary due to limited scholarly discussion of problematic exercise amongst varsity level university athletes in Canada making it an area that has been under-explored.

Methods

The study utilized a standardised questionnaire – based survey methodology (Leedy, 2016) which, according to Sheppard (2003), is the most feasible method of assessing habitual physical activity patterns. Varsity – level university coaches were contacted by the principal investigator via e-mail, and then coaches invited athletes to participate in the study. The Exercise Addiction Inventory (EAI) (Terry et al., 2004) was used as a system for gathering information on problematic physical activity behavior in order to identify people who are at risk of exercise addiction. By “at risk,” the research group who developed the questionnaire are referring to scores which are considered indicative of a symptomatic individual and are thus most problematic (Terry et al., 2004). As the EAI is recognized as possessing strong internal reliability, content validity, concurrent validity, and construct validity it is a valid and reliable instrument capable of quickly and easily identifying individuals at risk of exercise dependence. Furthermore, the fact that it is based on components of behavioral dependence rather than elements of substance dependence, the EAI identifies those at-risk from “primary” exercise disorder only (Szabo et al., 2015).

Although problematic exercise, sometimes referred to as ‘exercise addiction’ or ‘exercise dependence’ (among others) has received increased scholarly interest over the past decade, the majority of relevant scholarship has focused primarily on the phenomenon as it occurs amongst fitness – related activities and, to a lesser degree, individual sports such as running (Szabo & Demetrovics, 2022). The prevalence of problematic exercise in “team – sports”, however, has received very little emphasis. In addition, enquiries into exercise dependence amongst athletes on team sports (limited as they have been) have traditionally utilized the EAI. While the EAI is a highly valid and reliable instrument, it is best utilized for identifying “fitness – related” exercise behaviors as it contains no questions pertaining specifically to sport, team – sport practice, or other relevant activities. According to Lichtenstein et al, (2012) the EAI is perhaps better suited for identifying the condition amongst participants of individual pursuits verses competitive team sports. Moreover, Kovacsik et al. (2018b) confirm that more than one exercise addiction assessment tool is warranted when working with team sports.

Varsity team coaches were contacted by the principal investigator following approval of the research protocol by the author’s Institutional Human Research Ethics Board, and a total of 62 athletes participated. Questionnaires were forwarded to coaches who then distributed them to individual athletes to complete on their own time. The EAI required approximately 10 minutes to complete and its questions focused on components of behavioral dependence identifying those at-risk of

“primary” exercise dependence. Please refer to the Appendix for a copy of the actual Exercise Addiction Inventory.

The relatively small number of participants did not warrant use of statistical analysis software. Alternately, responses from individual questionnaire test items were initially categorized according to whether participants were either male or female. Total scores from the Exercise Addiction Inventory (EAI) questionnaires were then tabulated to indicate the number of varsity athletes who scored either “at-risk”, “symptomatic” or “asymptomatic” of exercise addiction, and percentages were determined for each of the EAI categories.

Results

62 athletes (31 male and 31 female) from a mid – size University in British Columbia, Canada from a variety of team – based varsity sports which included: baseball, basketball, rugby, volleyball, soccer and wrestling participated in this study, and responses were sub – divided according to the categories described in the data analysis section of this paper as no statistical analysis was performed. Results indicate that 72.5% of the sample scored “symptomatic” while 19.5% recorded “at – risk” and 8% attained a score of “asymptomatic” on the Exercise Addiction Inventory questionnaire.

Interestingly, there were three times as many female athletes rated “at – risk” of exercise addiction compared to male athlete participants whereas males outnumbered females at a ratio of four to one with respect to scoring “asymptomatic” on the Exercise Addiction Inventory scale while the number of participants in the “symptomatic” category remained closest (with respect to male vs female comparison) at 39% male vs. 34% female. Note that the highest score attainable on the EAI was 30 (lowest score attainable being 6), and that the highest score recorded was 27 – this was by a female athlete. The lowest score recorded was 8 – by a male athlete.

THE EXERCISE ADDICTION INVENTORY SUMMARY of RESULTS

Score	Category (Result)	Gender
0 – 12	asymptomatic	4 males and 1 female
13 – 23	symptomatic	24 males and 21 females
24 or greater	at – risk	3 males and 9 females

Note: scores ranged from a low of 8 to a high of 27 (standard deviation = 4.29) and the mean questionnaire score was 19 (* 30 was highest score attainable)

Discussion

A total of 62 varsity – level university athletes participated in the survey, and results confirmed that 72.5% of respondents rated “symptomatic” on their EAI scores. Although male (39%) vs. female (34%) participants scored somewhat similarly in the “symptomatic” category, female athletes rated “at – risk” of exercise dependence three times more than males, and four times as many male participants scored “asymptomatic” on the Exercise Addiction Inventory. Moreover, the highest score recorded of 27 – was by a female athlete and the lowest score recorded was 8 – by a male athlete. Results suggest that women in sports (relative to their male counterparts) are much more likely to engage in unhealthy – namely excessive – amounts of physical activity. While it was beyond the limited scope of this investigation to deeply explore specific motives for engaging in detrimental levels of exercise, the findings definitely warrant further discussion. Peeke (2005) maintains that women are much more concerned about their appearance and how they are perceived by others which often leads them to engage in excessive physical activity for weight loss. Many women, for example, believe they are constantly being judged and scrutinized on the basis of how they look. The need to feel valued and accepted may result in women being more likely to take drastic measures regarding physical appearance. Consequently, as females generally place greater importance on exercising for weight related reasons, they are much more prone to absorbing themselves in destructive patterns of physical activity (Craft, et al., 2014).

This research provided a meaningful contribution to the existing literature in that unlike the issue of problematic exercise amongst fitness – related activities and individual sports, The problem of excessive exercise in “team – sports”, however, has received very little emphasis.

The greatest limitation to this study is that while the EAI is a highly valid and reliable instrument, it contains no questions pertaining specifically to sport, team – sport practice, or other relevant activities; making it best suited for identifying problematic exercise amongst participants of individual pursuits such as fitness activities versus competitive team sports (Lichtenstein et al., 2014)

Moreover, the EAI is incapable of identifying whether someone places value on physical activity strictly for utilitarian purposes – which is commonly the case amongst university/college athletes’ (Tracey & Elcombe, 2004) or they perceive merit in physical activity as an avenue for fitness and health – which is commonplace amongst members of the general population but in contrast to those engaged in highly competitive sports (Theberge, 2006).

In addition, self – reporting instruments such as questionnaires are based on the methodological assumptions that respondents are willing to answer the questions or items honestly and that they perceive and interpret the items in the way they were intended (Landolfi, 2016). With respect to the EAI, it uses a 5 – point scale with 3 representing a middle or neutral opinion on each of the items. This represents a conceptual dilemma as a participant could theoretically score each of the items in a manner that “all” responses are selected as neutral; thus, yielding an outcome lacking any true level of agreement or disagreement. To combat this, use of the Revised Exercise Addiction Inventory (EAI – R) which implements a 6 – point scale is highly recommended as it eliminates a neutral choice when scoring questions (Szabo et al., 2019). Note that the EAI – R had not been published and was unavailable during the time of data collection for this study.

Further difficulty with relying exclusively on self – report instruments in examining problematic exercise is that the investigation of exercise dependence requires a more in – depth and multi – layered approach (Youngman & Simpson, 2014). Also, the limited number of participants indicates that there were too few athletes for the results to be generalized. Consequently, the degree of applicability of these results is limited. While limitations ultimately impact on the transferability of research, these findings could be used as a guide for future investigations which involve similar populations.

Conclusion

The majority (72.5%) of varsity athletes rated “symptomatic” and 19.5% recorded “at – risk” on their Exercise Addiction Inventory (EAI) scores. Although this investigation did not aim to provide implications for clinical practice, work by Youngman and Simpson (2014) suggests that individuals who score in the “at – risk” category of the EAI might be best advised to seek counselling. However, Veale (1995) notes challenges with the “at – risk” population possibly due to denial or lack of awareness by the

exercisers. In addition, some wrongly perceive their behavior as a “positive addiction” – although “positive addictions” have been deemed a misconception (Glasser, 2010). Moreover, if problematic exercises do seek professional assistance with issues concerning mental health it is typically due to something other than exercise addiction, such as anxiety, depression, difficulties with relationships or coping with personal hardship.

This study provided a snapshot of exercise behaviour patterns amongst varsity – level university athletes for the purpose of examining the prevalence of exercise dependence. It should be noted that scoring highly on the EAI is not necessarily indicative of exercise addiction. However, implementing additional methods such as in – depth interviews and / or structured focus – group discussion sessions may significantly enhance information obtained from participants. While targeting similar aspects of exercise dependence as questionnaires, use of complementary research tools will elicit collective testimonies as well as validate group narratives amongst participants which adds a further dimension to understanding exercise dependence. Consequently, a follow – up study utilizing structured focus – group discussion sessions has been approved by the Office of Research, Engagement and Graduate Studies at the author’s academic institution and will be conducted in the near future.

In closing, people should be encouraged to embrace activity so that it enhances their life through sustainable long – term physical, psychological and social health. Exercise routines ought to be reviewed by participants regularly with an emphasis not necessarily on time spent being active, but on looking beyond exercise itself for deriving a sense of physical and psychological fulfilment. Although exercise is certainly important, one must learn that the pursuit of other interests in life are just as valuable.

Funding

None.

Declaration of conflict of interest

No conflict of interest.

Availability of data and material

The data that support the findings of this study will be made available by the first author upon reasonable request.

Ethics Approval and informed consent

This study has received ethical approval from the University ethics board (1166K-19). Informed consent was obtained from all individual participants in the study.

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APPENDIX**THE EXERCISE ADDICTION INVENTORY**

Rate the questions on the form. A point value between 1-5. 1 means that you “strongly disagree”, 2 means you “disagree”, 3 means that you are “neutral”, 4 means that you “agree”, and 5 means that you “strongly agree”. There are six questions and you put a number between 1-5 beside each question.

1. Exercise is the most important thing in my life.

Strongly disagree		Neither agree nor disagree		Strongly agree
1	2	3	4	5

2. Conflicts have arisen between me and my family and/or my partner about the amount of exercise I do.

Strongly disagree		Neither agree nor disagree		Strongly agree
1	2	3	4	5

3. I use exercise as a way of changing my mood (e.g., to get a buzz, to escape, feel different etc.)

Strongly disagree		Neither agree nor disagree		Strongly agree
1	2	3	4	5

4. Over time I have increased the amount of exercise I do in a day.

Strongly disagree		Neither agree nor disagree		Strongly agree
1	2	3	4	5

5. If I have to miss an exercise session I feel moody and irritable.

Strongly disagree		Neither agree nor disagree		Strongly agree
1	2	3	4	5

6. If I cut down the amount of exercise I do, and then start again, I always end up exercising as often as I did before.

Strongly disagree		Neither agree nor disagree		Strongly agree
1	2	3	4	5