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The Effect of Regular Exercise on Depression, Mental Well-Being and Life Satisfaction

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ABSTRACT

This study aimed to examine the effect of regular exercise on depression (happiness), mental well-being, and life satisfaction. The research employed a pre-test/post-test control group experimental design. The study was conducted in 2024 in a gym in Balıkesir, Turkey, with 30 participants. During the study, a functional training method was applied to the experimental group for eight weeks, twice a week, with each session lasting one hour. Meanwhile, the control group did not perform any exercises. At the beginning of the study and after eight weeks, both the control and experimental groups were administered the "Personal Information Form, Short Form of Mental Well-Being Scale, Depression and Happiness Scale-Short Form, and Life Satisfaction Scale". According to the findings obtained in the study, the mental well-being rate increased by 42.86% in the experimental group and decreased by -3.01% in the control group; the life satisfaction rate increased by 97.20% in the experimental group and decreased by -1.41% in the control group, with a significant difference between the two groups in favor of the experimental group. In the final finding of the study, it was determined that the happiness rate increased by 22.87% in the experimental group and by 4.95% in the control group, with no significant difference between the two groups. In conclusion, it can be stated that functional training enhances mental well-being, life satisfaction, and overall happiness.

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INTRODUCTION

It is estimated that over 300 million people worldwide suffer from depression, and the World Health Organization (WHO) considers depression the leading cause of global disability (Smith, 2014). The suicide rate, particularly during adolescence when severe depression is experienced, increases 30-fold due to depression (Stringaris, 2017). Can depression, which is so effective in the experience of adverse situations, be reduced with regular exercise? Does regular exercise contribute positively to an individual's mental well-being and life satisfaction? What kind of changes does this cause in an individual's daily life?

This study focuses on the impact of regular exercise on mental health. Specifically, the research centers on how depression, mental well-being, and life satisfaction are affected by regular exercise. This topic is crucial in enabling individuals who feel unhappy to opt for exercise over medication, resulting in a happier social life, increased work efficiency, and improved overall life expectancy. According to the National Mental Health Action Plan (2020-2023) report, there are 3.43 mental health and illness specialists per 100,000 people in our country; this number is 1.63 in the field of child and adolescent mental health and diseases (Ministry of Health, 2020). Considering the inadequacy and insufficiency of this number in meeting treatment demands, along with the increasing need for mental health support, it is crucial to effectively expand the reach of exercise in this area to serve a larger population. Indeed, the contributions of depression to decreased work efficiency, substance abuse, suicide, and reduced life expectancy are known (Murray et al., 2015; Vos et al., 2017). Additionally, increasing subjective well-being is crucial for a fulfilling life. While one of the structures that comprise subjective well-being is life satisfaction, expressed as a cognitive component, the other is happiness, expressed as an emotional component, which involves minimizing depression (Veenhoven, 2012). Mental well-being contributes to social, intellectual, and emotional development while at the same time increasing self-esteem (World Health Organization, 2012).

Over the last 20 years, there has been a significant increase in knowledge regarding the role of physical activity in improving health and preventing diseases (Berrigan et al., 2012). However, this information mainly pertains to objective health. While there are numerous studies in the literature on the effects of physical activity on objective health (absence of disease based on doctor examinations and diagnostic test results), there are few studies on

subjective health (an individual's perception of their physical, mental, and social condition) (An et al., 2020; Bolsoy & Sevil, 2006). Numerous studies have demonstrated the positive effects of physical activity on mortality (Abell et al., 2017; Anderson et al., 2014), glycemic control (Aljawarneh et al., 2019; Chastin et al., 2019), respiration (Burton et al., 2004), body composition, and improved functional capacity (Penedo & Dahn, 2005; Vogel et al., 2009). However, there are a limited number of studies on life satisfaction and physical activity (Maher et al., 2015) and happiness and physical activity (Zhang & Chen, 2019), which are referred to as subjective health. While studies generally find that physical activity has positive effects on objective and subjective health, some studies have found contradictory results (Panza et al., 2019; Wicker & Frick, 2015). One study found a relationship between moderate to vigorous intensity physical activity and high levels of quality of life (Loprinzi & Davis, 2016); another study found that the highest level of subjective well-being was achieved with low-intensity physical activity (Downward & Dawson, 2016). Therefore, the degree of benefit can vary depending on individual fitness levels, age groups, population types, and the intensity of physical exercises (Vina et al., 2012).

Due to the varying effects of different exercise types and intensities on subjective health, this study aims to determine the impact of the functional training method on depression, mental well-being, and life satisfaction. This will not only clarify the conflicting findings in the existing literature from an academic but also guide the development of strategies for improving subjective health through regular exercise from a practical perspective.

Therefore, the primary research question of this study is: 'Does participation in regular exercise positively affect depression, mental well-being, and life satisfaction?' The research sub-problems are as follows:

- Do individuals who participate in regular exercise have higher levels of mental well-being compared to those who do not participate in regular exercise?
- Do individuals who participate in regular exercise have higher life satisfaction levels compared to individuals who do not participate in regular exercise?
- Do individuals who participate in regular exercise have higher levels of happiness compared to individuals who do not participate in regular exercise?

This article consists of five main sections. Following the introduction, the second section will present the theoretical framework related to the topic. The third section will explain the research methodology, the fourth section will present the findings, and the final section will discuss the results.

Theoretical Framework

This research is based on Diener's Subjective Well-Being Model (SWB) and Beck's Cognitive Theory (Beck, 1964; Diener et al., 2018). Diener's Subjective Well-Being Model's emphasis on life satisfaction, along with positive and negative emotions, offers important perspectives in explaining the formation of depression, mental well-being, and life satisfaction. According to Beck's cognitive theory, depression stems from interpretations of events that are detached from reality. These interpretations, in turn, guide emotions and behaviors (Beck et al., 2011).

SWB encompasses people's evaluations of their own lives. These evaluations are characterized by high life satisfaction, high positive emotions, and low negative emotions (Diener, 1984). When people evaluate their lives in general or make judgments about specific areas, such as work or health, they establish certain standards to feel satisfied. Therefore, whether individuals are satisfied with their lives can vary depending on what they value (Diener et al., 2018). Diener initially began by addressing the inconsistency in philosophers' explanations of a good life, stating that a good life should be evaluated based on standards determined by individuals themselves (Diener, 1984). SWB has been regarded as central to scientific studies examining human happiness. Such research is based on the democratic assumption (that individuals determine their own standards of life satisfaction) and the scientific assumption (that knowledge about life satisfaction can be gained through empirical evidence), and both assumptions have served to illuminate life satisfaction (Diener, 2000). Currently, it is observed that information presented by Diener is being utilized in research on the well-being levels of citizens in more than 40 countries (Diener et al., 2018). However, there are still important questions that need to be answered regarding the conceptual form and position of SWB., such as the exact components of SWB, how it should be regulated, and its relationship with other constructs, are sources of concern regarding SWB (Kaufman et al., 2022); therefore, more research is needed.

Beck's cognitive theory is considered one of the most important approaches regarding depression. Beck et al. (2024) state that individuals with depression have negative beliefs not

only about themselves but also about the entire world and the future. This leads to negative thoughts and negative self-perception. According to Beck's cognitive theory, depression stems from distorted interpretations of events. These interpretations also influence emotions and behaviors (Beck et al., 2011). According to the cognitive model, it is not the situation itself but the individual's interpretation of the situation that affects their feelings. These interpretations manifest themselves through automatic thoughts. As depression develops, negative automatic thoughts become more frequent and intense (Özdel, 2015). Beck, who defined depression as a type of thought disorder, focused on the thoughts expressed by individuals in his clinical practice and tried to correct the distortions within them. This theory, developed in the seventies for the treatment of depression, grew and evolved with the contributions of authors like Clark, Salkovskis, Scott, Fairburn, Freeman, Burns, Epstein, Padesky, Rush, Gelenberger, Wells, Wright, Barlow, and Heimberg, starting from the eighties, and has also been used in the treatment of many other mental disorders today (Türkçapar & Sargın, 2012). Although the model remains one of the best-validated and most frequently used therapeutic interventions (Cuijpers et al., 2019), the validity of the cognitive biases explicitly stated in the model is relatively unknown (Nieto et al., 2020).

In Beck's cognitive theory, individuals experiencing depression possess negative thoughts and a negative self-perception. According to Beck's cognitive theory, depression stems from distorted interpretations of events. These interpretations influence emotions and behaviors (Beck et al., 2011). Diener also proposed that well-being should be evaluated using individuals' subjective assessments, categorizing these evaluations into cognitive and affective components. The affective component encompasses the presence of positive emotions, such as happiness and joy, and the absence of negative emotions, including sadness and anger (Diener, 1984). Therefore, similar to cognitive theory, SWB fundamentally emphasizes life satisfaction. From this perspective, both theories focus on human happiness. When considering factors that can influence happiness, sport comes to mind as a potentially effective tool. The increasing global prevalence of mental health issues has led to numerous studies focusing on physical activity as a potential preventative measure for mental health disorders, including anxiety and depression (Nixdorf et al., 2016; Schaal et al., 2011). Several studies indicate the benefits of physical activity for the mental health of young people exhibiting moderate to severe depressive symptoms (Boone & Leadbeater, 2006; Sabiston et al., 2016). Studies exist demonstrating the positive effects of sport on cognitive decline (Anderson et al.,

2014; Barbaric et al., 2010; Barlow et al., 2014), hormonal status (Kraemer & Ratamess, 2005), life satisfaction (Maher et al., 2015), happiness (Zhang & Chen, 2019), subjective well-being (Yarnal et al., 2008), and depressive symptoms (Adamson et al., 2015; Vogel et al., 2009).

For this study, a theoretical framework known as the "Functional Happiness Model" was developed by combining the two theories mentioned above. This model integrates the perspectives of Diener's Subjective Well-Being Model in explaining the formation of mental well-being and life satisfaction, Beck's cognitive theory of depression, and the functional training model used as an experimental method. This synthesis will allow a more comprehensive understanding of the effects of regular physical activity participation on life satisfaction, mental well-being, and depression.

Our proposed Functional Happiness Model has some limitations. Primarily, the model is based on theories predominantly developed in Western societies, and its validity in different cultural contexts has not been tested.

The proposed Functional Happiness Model offers a suitable framework for answering our research question: "How does regular exercise affect levels of depression, mental well-being, and life satisfaction?" This theoretical framework provides the necessary conceptual tools to test our hypothesis. The model will help us understand how regular exercise shapes depression (Beck's Cognitive Theory), mental well-being, and life satisfaction (Diener's Subjective Well-Being Model). This theoretical framework provides the conceptual tools needed to test our hypothesis.

In conclusion, this study will utilize the Functional Happiness Model, created by integrating Beck's Cognitive Theory and Diener's Subjective Well-Being Model. This model offers a comprehensive framework for examining the impact of regular exercise on depression, mental well-being, and overall life satisfaction. In the next section, we will outline the research methodology developed in accordance with this theoretical framework.

METHODS

Research Model

The research is designed with a pretest-posttest control group experimental design. In a pretest-posttest control group design, subjects are measured on the dependent variable both before and after the experimental study. In this design, the subjects are divided into two

groups: an experimental group and a control group (Büyüköztürk, 2016). The symbolic representation of the pretest-posttest control group design is as follows:

Table 1
Pre-Test and Post-Test Control Group Design

Group	Assignment Type	Pre-Test	Training Model	Post-Test
EG	R	O1	X	O3
CG	R	O2		O4

Note. EG, experimental group; CG, the control group; R, the random assignment of groups; O1 and O3, the pretest and posttest measurements applied to the experimental group; O2 and O4, the pretest and posttest measurements applied to the control group; and X, the independent variable (training model) applied to the experimental group.

Participants

A power analysis was conducted to ensure the generalizability of the research. The total sample size required for a medium effect size (= 0.40) to be statistically significant was determined to be 24 (12 participants per group) ($\alpha = 0.05$; $1-\beta = 0.95$). To balance the experimental and control groups and anticipate potential dropout, 30 participants were included: 13 women (mean age: 30.6±4.91) and 13 men (mean age: 32.4±3.66), resulting in an overall mean age of 31.50±4.35. The power analysis was performed using G*Power 3.9.1 software.

Data Collection Instruments

The Short Form of the Warwick-Edinburgh Mental Well-being Scale (WEMWBS-SF)

Developed by Tennant et al. (2007) to measure the mental well-being of individuals residing in the UK, the scale was adapted for use in Turkey by Keldal (2015). Comprising 14 items, the scale addresses positive mental health, encompassing psychological and subjective well-being. Employing a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree), scores range from 14 to 70, with all items positively phrased. The scale's Cronbach's alpha coefficient was found to be 0.89. Further details regarding the scale are presented in Table 2.

Depression and Happiness Scale Short Form (DHS-SF)

The Depression and Happiness Scale - Short Form (DHS-SF), developed by Joseph et al. (2004), is a bipolar instrument designed to assess depression and happiness. The original 25-item scale was translated and shortened to a 6-item version in Turkish by Sapmaz & Temizel (2013). Participants indicate the frequency of experiencing specific moods (e.g., "I felt satisfied") using a 4-point scale (0 = Never felt, 1 = Rarely felt, 2 = Sometimes felt, 3 = Very

often felt). Three items are reverse-scored. Scores range from 0 to 18, with higher scores indicating positive affect and lower scores suggesting depression. The scale's internal consistency coefficient was 0.80, supporting its validity and reliability as a single-factor measure of depression and happiness in the Turkish population. Details about the scale are provided in Table 2.

Satisfaction With Life Scale

To assess participants' life satisfaction, the Satisfaction with Life Scale, developed by Diener et al. (1985), was employed. This 5-item scale, adapted to Turkish by Dağlı and Baysal in 2016, demonstrated a Cronbach's alpha reliability coefficient of 0.88 (Dağlı & Baysal, 2016). Using a 5-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree), total scores range from 5 to 25. Further information on the scale is presented in Table 2.

Table 2
Normality Results of Pre-Test and Post-Test Values of Measurement Tools

	Groups	Variables	Skewness	Kurtosis	Kolmogorov-Smirnov	Shapiro-Wilk	Cronbach's α
Pre-Test	Experimental Group	Mental Wellbeing	.114	-1.283	.200	.444	.870
		Life Satisfaction	.001	-.997	.200	.578	.602
		Happiness	-.008	-.941	.200	.575	.686
	Control Group	Mental Wellbeing	-,.77	-.375	.200	.990	.733
		Life Satisfaction	-.103	-1.394	.200	.128	.790
		Happiness	-.845	1.506	.051	.052	.681
Post-Test	Experimental Group	Mental Wellbeing	.552	-.066	.200	.700	.657
		Life Satisfaction	-.420	-.560	.080	.567	.621
		Happiness	.820	.196	.111	.082	.695
	Control Group	Mental Wellbeing	-.125	-.528	.200	.815	.605
		Life Satisfaction	-.034	-1.115	.200	.285	.758
		Happiness	.146	.246	.200	.595	.680

Examination of Table 2 reveals that the skewness and kurtosis values for the measured variables, grouped by participants, fall within the acceptable range of -2 to +2 for normal distribution (George & Mallery, 2019). Furthermore, the Kolmogorov-Smirnov and Shapiro-Wilk test results confirm the normal distribution of the data ($p > 0.05$). All tests demonstrate

Cronbach's alpha coefficients ranging from 0.602 to 0.870, indicating high reliability according to Karagöz (2023).

Data Collection and Procedures

To carry out the study, permission was first obtained from Balıkesir University (Decision No. 2023/122), and the necessary information about the study was provided to those who would participate. Participation in the research was voluntary. Necessary permissions were obtained to administer the relevant scales. A Personal Information Form, the Short Form of the Warwick-Edinburgh Mental Well-being Scale (WEMWBS-SF), the Short Form of the Depression and Happiness Scale (DHS-SF), and the Life Satisfaction Scale were used to collect data from the volunteers participating in the research. Experimental and control groups were formed for the experimental research. Pretests were conducted by administering the scales to both groups. The experimental group engaged in an 8-week functional training program, exercising for one hour twice a week, while the control group received no intervention. Post-tests were conducted by re-administering the scales to both groups after eight weeks. A one-hour exercise session generally consisted of a 10-minute warm-up and stretching, followed by 40 minutes of functional training, and a final 10-minute cool-down and stretching period. Functional training is a training system that simulates certain movements commonly performed in daily life, utilizing free weights and specialized equipment. This system helps strengthen muscles by working multiple muscle groups simultaneously through multi-joint movements, making daily life easier with the ease of executing daily functional movements. In this training system, where a single movement primarily targets the spinal muscles and therefore engages all muscle groups in the body, multiple muscle groups are worked simultaneously, rather than through individual muscle exercises, with exercises focused on balance, strength, rehabilitation, and the whole body (Oliver & Brezzo, 2009). The study's functional training program is in Appendix 1.

Data Analysis

Data obtained through the survey application were analyzed using the SPSS 25 software package. Repeated Measures ANOVA was used for statistical analysis, with a significance level of $p<.05$. Additionally, percentage differences over time were calculated using the formula "% Δ = (Post-test – Pre-test) / Pre-test *100" (Işık & Doğan, 2018).

RESULTS

The results obtained from the scales administered before and after the 8-week functional training model was applied to the experimental and control groups are presented below.

Table 3 reveals a significant difference in the mental well-being scores of the participants between the experimental and control groups (F = 77.836; p = .000). A significant difference was also observed between the pre-test and post-test mean scores of the participants over time (F = 78.548; p = .000). Accordingly, the experimental group showed an increase in values, while the control group showed a decrease. Finally, a significant difference was also found in the group-time interaction (F = 102.279; p = .000).

Examination of Table 4 reveals a significant difference in the life satisfaction scores of the participants between the experimental and control groups (F = 34.691; p = .000). A significant difference was also found between the pre-test and post-test mean scores of the participants over time (F = 172.344; p = .000). Accordingly, the experimental group showed an increase in values, while the control group showed a decrease. Finally, a significant difference was also found in the group-time interaction (F = 182.480; p = .000).

Table 3
Comparison of Mental Well-Being Scores of Participants by Group and Measurement Time

Variables	**n**	**Pre-Measurement**	**Post-Measurement**	**Total**	**%Δ**	**F**	**p**
		$\overline{X}$ ±SD	$\overline{X}$ ±SD	$\overline{X}$ ±SD			
Experimental	13	40.92±6.63	58.46±3.15	39.58±1.01	%42.86		
Control	13	38.23±3.06	37.08±2.72	47.77±.58	%-3.01	77.836	.000
Total	26	39.58±5.24	47.77±11.28				
		F = 78.584; p = .000			Group X Time Interaction F = 102.279; p = .000		

Table 4
Comparison of Life Satisfaction Scores of Participants by Group and Measurement Time

Variables	n	Pre-Measurement	Post-Measurement	Total	%Δ	F	p
		$\overline{X}$ **±SD**	$\overline{X}$ **±SD**	$\overline{X}$ **±SD**			
Experimental	13	11.08±2.99	21.85±2.08	11.19±.54	%97.20		
Control	13	11.31±2.46	11.15±2.34	16.50±.43	%-1.41	34.691	.000
Total	26	11.19±2.68	16.50±5.87				
		F = 172.344; p = .000			Group X Time Interaction F = 182.480; p = .000		

Examination of Table 5 reveals no significant difference in happiness scores between the experimental and control groups (F = 1.552; p = .225). A significant difference was found between the participants' pre-test and post-test averages over time (F = 13.711; p = .001). Accordingly, while both the experimental and control groups showed an increase in scores, the increase was greater in the experimental group. Finally, a significant difference was also found in the group-time interaction (F = 5.080; p = .034).

Table 5
Comparison of Happiness Scores of Participants by Group and Measurement Time

Variables	n	Pre-Measurement	Post-Measurement	Total	%Δ	F	p
		$\overline{X}$ ±SD	$\overline{X}$ ±SD	$\overline{X}$ ±SD			
Experimental	13	12.46±2.76	15.31±1.25	13.31±.40	%22.87		
Control	13	14.15±.80	14.85±1.57	15.08±.28	%4.95	1.552	.225
Total	26	13.31±2.17	15.08±1.41				
		F = 13.711; p = .001			GroupX Time Interaction F = 5.080; p = .034		

DISCUSSIONS

This section will discuss the findings related to the mental well-being, life satisfaction, and happiness scales administered before and after the implementation of the 8-week functional training model to the experimental and control groups. The findings will be discussed in relation to the study's aim: the effect of regular exercise participation on happiness, mental well-being, and life satisfaction. In this experimental study, while a significant difference was found between the experimental and control groups in mental well-being and life satisfaction scores, no significant difference was observed between the groups in happiness scores. According to the World Health Organization (WHO), efforts to increase physical activity are interventions that promote sustainable health (Bull et al., 2020). Indeed, even in the presence of physical activity, a lifestyle characterized by excessive sitting has been shown to contribute to an increased risk of chronic physical and mental conditions such as depression (Kandola et al., 2020).

In this experimental study, a significant difference was found in mental well-being scores between the experimental and control groups. It was also determined that the participants' pre-test and post-test averages differed significantly over time. Accordingly, while he experimental group's scores increased, the control group's scores decreased. The functional training model implemented resulted in a 42.86% increase in mental well-being in

the experimental group. Based on the findings, the study's first hypothesis, "The mental well-being levels of individuals participating in regular exercise will be higher than those who do not participate in regular exercise," was accepted. Functional training, by enabling individuals to perform their daily tasks more easily, allows them to accomplish tasks they might otherwise perceive as challenging more readily. More clearly stated, it strengthens feelings of self-efficacy. Consequently, this is thought to contribute to improved mental well-being. Indeed, scientists argue that the positive effect of sports activities on well-being stems from meeting the need for autonomy (Sirgy et al., 2017). It is also hypothesized that exercise has a positive effect on mental well-being due to its physiological and psychological benefits, as well as its reduction of the stress factor. One study found a negative correlation between stress and mental health (Ibrahim et al., 2013). It is also known that physical activity improves mental health and quality of life (Snedden et al., 2019; VanKim & Nelson, 2013) and reduces stress and anxiety (Henriksson et al., 2022; VanKim & Nelson, 2013). Research also suggests that mental well-being improves as physical activity levels increase (Marfil-Carmona et al., 2021). This is explained by the fact that physical exercise promotes self-care and helps people avoid risk factors for their health. Furthermore, physical activity promotes greater life satisfaction by improving overall health and increasing self-efficacy, which directly influences an individual's psychological well-being (An et al., 2020; Morgan et al., 2018). A review of the literature reveals that other studies have obtained similar findings to those of this study.

This study found a significant difference in life satisfaction scores between the experimental and control groups. A significant difference was also found between the participants' pre-test and post-test averages over time. Accordingly, while the experimental group's scores increased, the control group's scores decreased. The implemented functional training model resulted in a 97.20% increase in life satisfaction for the experimental group. Such a significant increase can be attributed to the improvement in individuals' physical condition through functional training, which is reflected in other areas. One of the important principles of development is its holistic nature. Development in the physical domain can also influence the emotional and cognitive domains. Functional training can contribute to increased self-confidence through the development of physical capacity and an improved body image, and it can also positively impact the individual's interaction with others. Indeed, studies show that sport is equally related to the emotional and cognitive dimensions of well-being (Schulz et al., 2018). Frederick et al. (2016) state that body and appearance satisfaction

contribute to life satisfaction. Therefore, the more satisfied individuals who are actively participating in sports are with their appearance, the more positive their outlook on life becomes. Apart from these, the belief in one's own competence to do things will also develop in individuals who undergo physical development. An individual with high self-efficacy is more likely to enjoy life. Many studies have shown that participation in sports has a positive effect on life satisfaction (Hamer et al., 2009; White et al., 2017): Becchetti et al. (2008) found that in both team and individual sports, both active and passive participants in sports activity experienced increased life satisfaction; Piko & Keresztes (2006) found that students who participated more actively in physical exercise had higher life satisfaction and better physical and mental health; Ammar et al. (2020) concluded that participation in indoor and outdoor physical activities is effective in improving mental health. A review of the literature reveals that other studies have obtained findings similar to those of this study.

The study found no significant difference in happiness scores between the experimental and control groups. However, there was a significant difference between the participants' pre-test and post-test averages over time. While both groups experienced an increase in their scores, the increase was higher in the experimental group. The functional training model implemented resulted in a 22.87% increase in happiness in the experimental group. Similar to studies by Grasdalsmoen et al. (2020), the frequency of physical exercise has been found to be negatively correlated with depressive symptoms, as physical activity supports the release of endorphins and maintains mitochondrial function. Participation in sports also contributes to psychological benefits by reducing anxiety and depression (Scully et al., 1998). Studies consistently demonstrate a positive relationship between physical activity and happiness (Brown et al., 2015; Dolan et al., 2014; Huang & Humphreys, 2012; Richards et al., 2015; Sigvartsen et al., 2016). Downward and Rasciute (2011) conducted a large-scale, longitudinal study to examine the impact of sports participation on, finding a significant relationship. They attributed this to the increased happiness derived from social interaction through sports. Downward and Rasciute (2010), conducted a longitudinal study with participants aged 16 and over, finding that physical activity through sports participation had a significant and positive effect on health and happiness. Ruseski et al. (2014) found a causal relationship between sports participation and happiness, observing that participants who engaged in sports were happier than those who did not. Reviewing these studies reveals similarities with the findings of the current research.

Limitations

This study has limitations in terms of methodology and findings. Different exercise frequencies and intensities have yielded different results in the literature. Therefore, the exercise program used can be seen as a limitation. Depending on life circumstances, other significant factors may have contributed to the results, and it is possible that factors beyond functional training influenced the dependent variables. These factors include personal, social, and family problems and relationships, economic status, work-life balance, traumatic events, or illnesses experienced by the individual. This study is limited because it excludes all other possible factors. Finally, gender differences, age, sports cultures, traditions, and work schedules may have also played a role in the outcomes.

Despite these limitations, this study has unique strengths. First, three highly reliable and valid scales were used. Second, the sample possesses the characteristics intended to be measured, and the functional training was conducted in the researcher's own gym by a specialist in the field. Ultimately, the study illuminates future research by filling a gap in the literature and making a significant contribution to the field.

CONCLUSION

The study found that functional training had a significant effect on mental well-being and life satisfaction, but not on happiness, although it did contribute to it. Therefore, functional training should be implemented to improve mental well-being, increase life satisfaction, and boost happiness levels.

Downward & Dawson (2016) found that lower intensity sports activities are associated with higher overall well-being levels compared to high-intensity exercise. Therefore, different types, intensities, and frequencies of exercise may yield different results. Studying diverse sample groups (such as nursing homes, prisons, and orphanages) may lead to more striking outcomes. Ultimately, further research on the effects of functional training in various areas (e.g., anxiety, motivation, physical performance) can significantly contribute to the existing literature.

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Authors' Contribution

Duygu Adile Eker contributed to the conceptualization of the study, conducted the investigation, and prepared the original draft of the manuscript. Serhat Turan was responsible for the methodology and formal analysis, contributed to the original draft, participated in the review and editing of the manuscript, performed visualization tasks, and supervised the overall study.

Declaration of Conflict Interest

There is no conflict of interest between the authors.

Ethics Statement

In order to carry out the study, permission was first obtained from the BAUN Non-Interventional Research Ethics Committee (Decision No: 2023/122 Date: 05/12/2023) and the necessary information about the study was given to those who would participate in the study.

REFERENCES

Abell, B., Glasziou, P., & Hoffmann, T. (2017). The contribution of individual exercise training components to clinical outcomes in randomised controlled trials of cardiac rehabilitation: A systematic review and meta-regression. *Sports Medicine - Open*, *3(*1), 19. https://doi.org/10.1186/s40798-017-0086-z

Adamson, B. C., Ensari, I., & Motl, R. W. (2015). Effect of exercise on depressive symptoms in adults with neurologic disorders: A systematic review and meta-analysis. *Archives of Physical Medicine and Rehabilitation*, *96*(7), 1329–1338. https://doi.org/10.1016/j.apmr.2015.01.005

Aljawarneh, Y. M., Wardell, D. W., Wood, G. L., & Rozmus, C. L. (2019). A systematic review of physical activity and exercise on physiological and biochemical outcomes in children and adolescents with type 1 diabetes. *Journal of Nursing Scholarship*, *51*(3), 337–345. https://doi.org/10.1111/jnu.12472

Ammar, A., Mueller, P., Trabelsi, K., Chtourou, H., Boukhris, O., Masmoudi, L., … ECLB-COVID19 Consortium. (2020). Psychological consequences of COVID-19 home confinement: The ECLB-COVID19 multicenter study. *PLOS ONE*, 15(11), e0240204. https://doi.org/10.1371/journal.pone.0240204

An, H.-Y., Chen, W., Wang, C.-W., Yang, H.-F., Huang, W.-T., & Fan, S.-Y. (2020). The relationships between physical activity and life satisfaction and happiness among young, middle-aged, and older adults. *International Journal of Environmental Research and Public Health*, 17(13). https://doi.org/10.3390/ijerph17134817

Anderson, D., Seib, C., & Rasmussen, L. (2014). Can physical activity prevent physical and cognitive decline in postmenopausal women? *Maturitas*, 79(1), 14–33. https://doi.org/10.1016/j.maturitas.2014.06.010

Barbaric, M., Brooks, E., Moore, L., & Cheifetz, O. (2010). Effects of physical activity on cancer survival: A systematic review. *Physiotherapy Canada*, 62(1), 25–34. https://doi.org/10.3138/physio.62.1.25

Barlow, P. A., Otahal, P., Schultz, M. G., Shing, C. M., & Sharman, J. E. (2014). Low exercise blood pressure and risk of cardiovascular events and all-cause mortality: Systematic review and meta-analysis. *Atherosclerosis*, 237(1), 13–22. https://doi.org/10.1016/j.atherosclerosis.2014.08.029

Becchetti, L., Pelloni, A., & Rossetti, F. (2008). Relational goods, sociability, and happiness. *Kyklos*, 61(3), 343–363. https://doi.org/10.1111/j.1467-6435.2008.00405.x

Beck, A. T. (1964). Thinking and depression: II. Theory and therapy. *Archives of General Psychiatry*, 10(6), 561–571. https://doi.org/10.1001/archpsyc.1964.01720240015003

Beck, A. T., Rush, A. J., Shaw, B. F., Emery, G., DeRubeis, R. J., & Hollon, S. D. (2024). *Cognitive therapy of depression*. Guilford Press.

Beck, J. S. (2011). *Cognitive behavior therapy: Basics and beyond* (2nd ed.). Guilford Press.

Berrigan, D., Carroll, D. D., Fulton, J. E., Galuska, D. A., Brown, D. R., Dorn, J. M., … Paul, P. (2012). Vital signs: Walking among adults—United States, 2005 and 2010. *Morbidity and Mortality Weekly Report*, 61, 595–601.

Bolsoy, N., & Sevil, Ü. (2006). Sağlık-hastalık ve kültür etkileşimi. *Anadolu Hemşirelik ve Sağlık Bilimleri Dergisi*, 9(3), 78–87.

Boone, E. M., & Leadbeater, B. J. (2006). Game on: Diminishing risks for depressive symptoms in early adolescence through positive involvement in team sports. *Journal of Research on Adolescence*, 16(1), 79–90. https://doi.org/10.1111/j.1532-7795.2006.00122.x

Brown, J. L., MacDonald, R., & Mitchell, R. (2015). Are people who participate in cultural activities more satisfied with life? *Social Indicators Research*, 122(1), 135–146. https://doi.org/10.1007/s11205-014-0678-7

Bull, F. C., Al-Ansari, S. S., Biddle, S., Borodulin, K., Buman, M. P., Cardon, G., … Willumsen, J. F. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *British Journal of Sports Medicine*, 54(24), 1451–1462. https://doi.org/10.1136/bjsports-2020-102955

Burton, D. A., Stokes, K., & Hall, G. M. (2004). Physiological effects of exercise. *Continuing Education in Anaesthesia Critical Care & Pain*, 4(6), 185–188. https://doi.org/10.1093/bjaceaccp/mkh050

Büyüköztürk, Y. (2016). *Deneysel desenler*. Pegem Akademi.

Chastin, S. F. M., De Craemer, M., De Cocker, K., Powell, L., Van Cauwenberg, J., Dall, P., … Stamatakis, E. (2019). How does light-intensity physical activity associate with adult cardiometabolic health and mortality? *British Journal of Sports Medicine*, 53(6), 370–376. https://doi.org/10.1136/bjsports-2017-097563

Cuijpers, P., Noma, H., Karyotaki, E., Cipriani, A., & Furukawa, T. A. (2019). Effectiveness and acceptability of cognitive behavior therapy delivery formats in adults with depression. *JAMA Psychiatry*, 76(7), 700–707. https://doi.org/10.1001/jamapsychiatry.2019.0268

Dağlı, A., & Baysal, N. (2016). Yaşam doyumu ölçeğinin Türkçe'ye uyarlanması: Geçerlik ve güvenirlik çalışması. *Elektronik Sosyal Bilimler Dergisi*, 15(59). https://doi.org/10.17755/esosder.263229

Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, 95(3), 542–575.

Diener, E. (2000). Subjective well-being: The science of happiness and a proposal for a national index. *American Psychologist*, 55(1), 34–43. https://doi.org/10.1037/0003-066X.55.1.34

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment*, 49(1), 71–75. https://doi.org/10.1207/s15327752jpa4901_13

Diener, E., Oishi, S., & Tay, L. (2018). Advances in subjective well-being research. *Nature Human Behaviour*, 2(4), 253–260. https://doi.org/10.1038/s41562-018-0307-6

Dolan, P., Kavetsos, G., & Vlaev, I. (2014). The happiness workout. *Social Indicators Research*, 119(3), 1363–1377. https://doi.org/10.1007/s11205-013-0543-0

Downward, P., & Dawson, P. (2016). Is it pleasure or health from leisure that we benefit from most? *Social Indicators Research*, 126(1), 443–465. https://doi.org/10.1007/s11205-015-0887-8

Downward, P., & Rasciute, S. (2010). The relative demands for sports and leisure in England. *European Sport Management Quarterly*, 10(2), 189–214. https://doi.org/10.1080/16184740903552038

Downward, P., & Rasciute, S. (2011). Does sport make you happy? *International Review of Applied Economics*, 25(3), 331–348. https://doi.org/10.1080/02692171.2010.483572

Frederick, D. A., Sandhu, G., Morse, P. J., & Swami, V. (2016). Correlates of appearance and weight satisfaction in a U.S. national sample. *Body Image*, 17, 191–203. https://doi.org/10.1016/j.bodyim.2016.05.003

George, D., & Mallery, P. (2019). *IBM SPSS Statistics 26 step by step* (16. bs.). Routledge.

Grasdalsmoen, M., Eriksen, H. R., Lønning, K. J., & Sivertsen, B. (2020). Physical exercise, mental health problems, and suicide attempts in university students. *BMC Psychiatry*, 20(1), 175. https://doi.org/10.1186/s12888-020-02583-3

Hamer, M., Stamatakis, E., & Steptoe, A. (2009). Dose-response relationship between physical activity and mental health: The Scottish Health Survey. *British Journal of Sports Medicine*, 43(14), 1111–1114. https://doi.org/10.1136/bjsm.2008.046243

Henriksson, M., Wall, A., Nyberg, J., Adiels, M., Lundin, K., Bergh, Y., Eggertsen, R., Danielsson, L., Kuhn, H. G., & Åberg, M. (2022). Effects of exercise on symptoms of anxiety in primary care patients: A randomized controlled trial. *Journal of Affective Disorders*, 297, 26–34. https://doi.org/10.1016/j.jad.2021.10.006

Huang, H., & Humphreys, B. R. (2012). Sports participation and happiness: Evidence from US microdata. *Journal of Economic Psychology*, 33(4), 776–793. https://doi.org/10.1016/j.joep.2012.02.007

Ibrahim, A. K., Kelly, S. J., Adams, C. E., & Glazebrook, C. (2013). A systematic review of studies of depression prevalence in university students. *Journal of Psychiatric Research*, 47(3), 391–400. https://doi.org/10.1016/j.jpsychires.2012.11.015

Işık, Ö., & Doğan, İ. (2018). Effects of bilateral or unilateral lower body resistance exercises on markers of skeletal muscle damage. *Biomedical Journal*, 41(6), 364–368. https://doi.org/10.1016/j.bj.2018.10.003

Joseph, S., Linley, P. A., Harwood, J., Lewis, C. A., & McCollam, P. (2004). Rapid assessment of well-being: The Short Depression-Happiness Scale (SDHS). *Psychology and Psychotherapy: Theory, Research and Practice*, 77(4), 463–478. https://doi.org/10.1348/1476083042555406

Kandola, A., Lewis, G., Osborn, D. P. J., Stubbs, B., & Hayes, J. F. (2020). Depressive symptoms and objectively measured physical activity and sedentary behaviour throughout adolescence: A prospective cohort study. *The Lancet Psychiatry*, *7*(3), 262–271. https://doi.org/10.1016/S2215-0366(20)30034-1

Karagöz, Y. (2023). *SPSS ve AMOS uygulamalı nicel-nitel-karma araştırma yöntemleri ve yayın etiği* (4. bs.). Nobel Akademik Yayıncılık.

Kaufman, V. A., Horton, C., Walsh, L. C., & Rodriguez, A. (2022). The unity of well-being: An inquiry into the structure of subjective well-being. *International Journal of Applied Positive Psychology*, 7(3), 461–486. https://doi.org/10.1007/s41042-022-00082-2

Keldal, G. (2015). Warwick-Edinburgh Mental İyi Oluş Ölçeği'nin Türkçe formu: Geçerlik ve güvenirlik çalışması. **Journal of Happiness and Well-Being*, 3*(1), 103–115.

Kraemer, W. J., & Ratamess, N. A. (2005). Hormonal responses and adaptations to resistance exercise and training. *Sports Medicine*, 35(4), 339–361. https://doi.org/10.2165/00007256-200535040-00004

Loprinzi, P. D., & Davis, R. E. (2016). Bouted and non-bouted moderate-to-vigorous physical activity with health-related quality of life. *Preventive Medicine Reports*, 3, 46–48. https://doi.org/10.1016/j.pmedr.2015.12.005

Maher, J. P., Pincus, A. L., Ram, N., & Conroy, D. E. (2015). Daily physical activity and life satisfaction across adulthood. *Developmental Psychology*, 51(10), 1407–1419. https://doi.org/10.1037/dev0000037

Marfil-Carmona, R., Ortega-Caballero, M., Zurita-Ortega, F., Ubago-Jiménez, J. L., González-Valero, G., & Puertas-Molero, P. (2021). Impact of the mass media on adherence to the Mediterranean diet, psychological well-being and physical activity. Structure equation analysis. *International Journal of Environmental Research and Public Health*, 18(7), 3746. https://doi.org/10.3390/ijerph18073746

Ministry of Health. (2020). Ulusal Ruh Sağlığı Eylem Planı (2021–2023). T.C. Sağlık Bakanlığı. https://dosyasb.saglik.gov.tr/Eklenti/39096,ulusal-ruh-sagligi-eylem-plani-2021-2023pdf.pdf

Morgan, J. A., Singhal, G., Corrigan, F., Jaehne, E. J., Jawahar, M. C., & Baune, B. T. (2018). The effects of aerobic exercise on depression-like, anxiety-like, and cognition-like behaviours over the healthy adult lifespan of C57BL/6 mice. *Behavioural Brain Research*, 337, 193–203. https://doi.org/10.1016/j.bbr.2017.09.022

Murray, C. J. L., Barber, R. M., Foreman, K. J., Ozgoren, A. A., Abd-Allah, F., Abera, S. F., Aboyans, V., Abraham, J. P., Abubakar, I., Abu-Raddad, L. J., Abu-Rmeileh, N. M., Achoki, T., Ackerman, I. N., Ademi, Z., Adou, A. K., Adsuar, J. C., Afshin, A., Agardh, E. E., Alam, S. S., … Vos, T. (2015). Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990–2013: Quantifying the epidemiological transition. *The Lancet*, 386(10009), 2145–2191. https://doi.org/10.1016/S0140-6736(15)61340-X

Nieto, I., Robles, E., & Vazquez, C. (2020). Self-reported cognitive biases in depression: A meta-analysis. *Clinical Psychology Review*, 82, 101934. https://doi.org/10.1016/j.cpr.2020.101934

Nixdorf, I., Frank, R., & Beckmann, J. (2016). Comparison of athletes' proneness to depressive symptoms in individual and team sports: Research on psychological mediators in junior elite athletes. *Frontiers in Psychology*, 7, 893. https://doi.org/10.3389/fpsyg.2016.00893

Oliver, G. D., & Di Brezzo, R. (2009). Functional balance training in collegiate women athletes. *Journal of Strength and Conditioning Research*, 23(7), 2124–2129. https://doi.org/10.1519/JSC.0b013e3181b3dd63

Özdel, K. (2015). Dünden bugüne bilişsel davranışçı terapiler. *Türkiye Klinikleri Psikiyatri Özel Konular*, 8(2), 10–20.

Panza, G. A., Taylor, B. A., Thompson, P. D., White, C. M., & Pescatello, L. S. (2019). Physical activity intensity and subjective well-being in healthy adults. *Journal of Health Psychology*, 24(9), 1257–1269. https://doi.org/10.1177/1359105317691589

Penedo, F. J., & Dahn, J. R. (2005). Exercise and well-being: A review of mental and physical health benefits associated with physical activity. *Current Opinion in Psychiatry*, 18(2), 189–193. https://doi.org/10.1097/00001504-200503000-00013

Piko, B. F., & Keresztes, N. (2006). Physical activity, psychosocial health and life goals among youth. *Journal of Community Health*, 31(2), 136–145. https://doi.org/10.1007/s10900-005-9004-2

Richards, J., Jiang, X., Kelly, P., Chau, J., Bauman, A., & Ding, D. (2015). Don't worry, be happy: Cross-sectional associations between physical activity and happiness in 15 European countries. *BMC Public Health*, 15(1), 53. https://doi.org/10.1186/s12889-015-1391-4

Ruseski, J. E., Humphreys, B. R., Hallman, K., Wicker, P., & Breuer, C. (2014). Sport participation and subjective well-being: Instrumental variable results from German survey data. *Journal of Physical Activity and Health*, 11(2), 396–403. https://doi.org/10.1123/jpah.2012-0001

Sabiston, C. M., Jewett, R., Ashdown-Franks, G., Belanger, M., Brunet, J., O'Loughlin, E., & O'Loughlin, J. (2016). Number of years of team and individual sport participation during adolescence and depressive symptoms in early adulthood. *Journal of Sport and Exercise Psychology*, 38(1), 105–110. https://doi.org/10.1123/jsep.2015-0175

Sapmaz, F., & Temizel, S. (2013). Turkish version of the Short Depression-Happiness Scale: A validity and reliability study. *Journal of European Education*, 3(1), 34–39.

Schaal, K., Tafflet, M., Nassif, H., Thibault, V., Pichard, C., Alcotte, M., Guillet, T., El Helou, N., Berthelot, G., Simon, S., & Toussaint, J.-F. (2011). Psychological balance in high-level athletes: Gender-based differences and sport-specific patterns. *PLOS ONE*, 6(5), e19007. https://doi.org/10.1371/journal.pone.0019007

Schulz, P., Schulte, J., Raube, S., Disouky, H., & Kandler, C. (2018). The role of leisure interest and engagement for subjective well-being. *Journal of Happiness Studies*, 19(4), 1135–1150. https://doi.org/10.1007/s10902-017-9863-0

Scully, D., Kremer, J., Meade, M. M., Graham, R., & Dudgeon, K. (1998). Physical exercise and psychological well being: A critical review. *British Journal of Sports Medicine*, 32(2), 111–120. https://doi.org/10.1136/bjsm.32.2.111

Sigvartsen, J., Gabrielsen, L. E., Abildsnes, E., Stea, T. H., Omfjord, C. S., & Rohde, G. (2016). Exploring the relationship between physical activity, life goals and health-related quality of life among high school students: A cross-sectional study. *BMC Public Health*, 16(1), 709. https://doi.org/10.1186/s12889-016-3407-0

Sirgy, M. J., Uysal, M., & Kruger, S. (2017). Towards a benefits theory of leisure well-being. *Applied Research in Quality of Life*, 12(1), 205–228. https://doi.org/10.1007/s11482-016-9482-7

Smith, K. (2014). Mental health: A world of depression. *Nature*, 515(7526), 180–181. https://doi.org/10.1038/515180a

Snedden, T. R., Scerpella, J., Kliethermes, S. A., Norman, R. S., Blyholder, L., Sanfilippo, J., McGuine, T. A., & Heiderscheit, B. (2019). Sport and physical activity level impacts health-related quality of life among collegiate students. *American Journal of Health Promotion*, 33(5), 675–682. https://doi.org/10.1177/0890117118817715

Stringaris, A. (2017). Editorial: What is depression? *Journal of Child Psychology and Psychiatry*, 58(12), 1287–1289. https://doi.org/10.1111/jcpp.12844

Tennant, R., Hiller, L., Fishwick, R., Platt, S., Joseph, S., Weich, S., Parkinson, J., Secker, J., & Stewart-Brown, S. (2007). The Warwick-Edinburgh Mental Well-being Scale (WEMWBS): Development and UK validation. *Health and Quality of Life Outcomes*, 5(1), 63. https://doi.org/10.1186/1477-7525-5-63

Türkçapar, M. H., & Sargın, A. E. (2012). Bilişsel davranışçı psikoterapiler: Tarihçe ve gelişim. *Bilişsel Davranışçı Psikoterapi ve Araştırmalar Dergisi*, 1(1), 7–14.

VanKim, N. A., & Nelson, T. F. (2013). Vigorous physical activity, mental health, perceived stress, and socializing among college students. *American Journal of Health Promotion*, 28(1), 7–15. https://doi.org/10.4278/ajhp.111101-QUAN-395

Veenhoven, R. (2012). *Happiness: Also known as "life satisfaction" and "subjective well-being". In K. C. Land, A. C. Michalos, & M. J. Sirgy (Eds.), Handbook of social indicators and quality of life research* (pp. 63–77). Springer. https://doi.org/10.1007/978-94-007-2421-1_3

Vina, J., Sanchis-Gomar, F., Martinez-Bello, V., & Gomez-Cabrera, M. C. (2012). Exercise acts as a drug; the pharmacological benefits of exercise. *British Journal of Pharmacology*, 167(1), 1–12. https://doi.org/10.1111/j.1476-5381.2012.01970.x

Vogel, T., Brechat, P.-H., Leprêtre, P.-M., Kaltenbach, G., Berthel, M., & Lonsdorfer, J. (2009). Health benefits of physical activity in older patients: A review. *International Journal of Clinical Practice*, 63(2), 303–320. https://doi.org/10.1111/j.1742-1241.2008.01957.x

Vos, T., Abajobir, A. A., Abate, K. H., Abbafati, C., Abbas, K. M., Abd-Allah, F., Abdulkader, R. S., Abdulle, A. M., Abebo, T. A., Abera, S. F., Aboyans, V., Abu-Raddad, L. J., Ackerman, I. N., Adamu, A. A., Adetokunboh, O., Afarideh, M., Afshin, A., Agarwal, S. K., Aggarwal, R., … Murray, C. J. L. (2017). Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: A systematic analysis for the Global Burden of Disease Study 2016. *The Lancet*, 390(10100), 1211–1259. https://doi.org/10.1016/S0140-6736(17)32154-2

White, R. L., Babic, M. J., Parker, P. D., Lubans, D. R., Astell-Burt, T., & Lonsdale, C. (2017). Domain-specific physical activity and mental health: A meta-analysis. *American Journal of Preventive Medicine*, 52(5), 653–666. https://doi.org/10.1016/j.amepre.2016.12.008

Wicker, P., & Frick, B. (2015). The relationship between intensity and duration of physical activity and subjective well-being. *The European Journal of Public Health*, 25(5), 868–872. https://doi.org/10.1093/eurpub/ckv131

World Health Organization. (2012). Adolescent mental health: Mapping actions of nongovernmental organizations and other international development organizations. WHO. https://www.who.int/publications/i/item/adolescent-mental-health

Yarnal, C. M., Chick, G., & Kerstetter, D. L. (2008). "I did not have time to play growing up… So this is my play time. It's the best thing I have ever done for myself": What is play to older women? *Leisure Sciences*, 30(3), 235–252. https://doi.org/10.1080/01490400802017456

Zhang, Z., & Chen, W. (2019). A systematic review of the relationship between physical activity and happiness. *Journal of Happiness Studies*, 20(4), 1305–1322. https://doi.org/10.1007/s10902-018-9976-0

Appendix 1

Functional Training Programme

Training-1	**Training-2**
Every 3 minsx4 sets	Dumbell Push Press x 5 reps 3*
12 cobra curtsy squat L	Dumbell Power Jerk x 5 reps 3*
12 cobra curtsy squat R	Rest 90 second
Run 100 metre	Dumbbell Romanian Deadlift 10 reps 3*
Dumbell split squat 8 / side	rest 30 second
Strict or banded pullup 8 reps	2. Dumbbell Glute Bridge Floor Press 10 reps 3*
3 sets	Rest 90 second back to 1.
20 half squat lateral walk R	For Time
20 half squat lateral walk L	10-9-8-7-6-5-4-3-2-1
12 alternate curtsy squat to high knee	Dual Dumbbell Pendlay Row
16 alternate cobra tall kneeling to stand	Push Up
Rest 90 second	rest 2mins
	For Time
	10-9-8-7-6-5-4-3-2-1
	Dumbbell Strict Press
Training-3	**Training-4**
3 Sets 10 Dumbbell Power Clean	1. Anterior Tibialis Raise x 10 reps 3*
rest 15sec	rest 10 sec
6 Kneeling Jump	2. Standing Calf Raise x 10-20 reps 3*
EMOM x 12 mins	rest 10 sec
1st - DB Gorilla Row; 12 reps	3. Forearm Plank Knee to Elbow x 10 reps (5/side)
2nd - Dumbbell Hammer Curl x 10 reps	Rest 1 minute, then back to 1
3rd - DB Russian Twist x 12 reps (R+L = 1)	1. Patrick Step 8-12 reps/leg
EMOM x 12 mins	rest 15 seconds 3*
1st - Half Kneeling DB Chop and Lift x 6/side	2. Air Squat; 8-12 reps 3* -rest 2 minutes
2nd - Single Arm KB Turkish Sit Up x 6/side	Balance
3rd - Tall Kneeling Single Arm DB Press x 6/side	1. Dumbbell Glute Bridges; 10-20reps 3*
Run 100m 3*	rest 10 sec
8 Single Arm DB Snatch R 3*	2. Toes Elevated Bodyweight Jefferson Curl x 5-8 reps
8 Single Arm DB Snatch L3*	3*
20 DB Tall Plank Knee to Elbow	rest 30-60 sec
	10mins Continuous Effort
	3-6-9-12-15.....increase by 3 reps every round
	Jump Squats
	Hanging Knee Tucks
	Shuttle Runs
Training-5	**Training-6**
1. Forearm Plank x 30-60 sec	EMOM x 12mins
rest 30sec 3*	1st - 6-8/side Cobra Leg Behind Pistol Squat
2. Quadruped Shoulder Taps x 20reps (10/side)3*	2nd - 5-6 DB Muscle Snatch/arm
rest 15 sec	3rd - 6 Full Squat Burpee
3. Passive Hang x 1 min	1. Dumbbell Split Squat; 12, 10, 8/leg 3*
rest 1 minute before going back to 1.3*	rest 30 sec 3*
1. Dumbbell Single Arm Z Press; 8-10 reps/arm 3*	2. Strict Supinated Pullup; 5-8reps 3*
rest 30 sec	rest 30 sec
2. Supinated Pullup Isometric; 15-30 sec 3*	15 Kettlebell Swings
rest 60 sec	rest 15sec 3*
1. Prone Pillowcase Body Row; 10 reps 3*	12 Kettlebell Rack Tall Kneel to Stand 3*
rest 30 sec	rest 15 sec
2. Half Pushup Isometric; 20-30 second 3*	10 Burpee to High Knee (5/side)3*
rest 30 sec	rest 90sec
6 Burpees 4*	
6 Renegade Rows (R+L=1) 4*	
12 DB Push Press 4	

Appendix 1 (Continued)

Training-7	Training-8
DB Push Press x 4 reps DB Power Jerk x 4 reps rest 90 sec 1. Dumbbell Split Stance RDL; 6-8 reps/side 4* rest 30 seconds 2. Alternating Dumbbell Glute Bridge Floor Press 5-7 reps/side4* For Time 15-12-9-6-3 DB Gorilla Row (R+L = 1 Rep) DB Push Up DB Plank Knee to Elbow rest 2mins For Time 14-12-10-8-6-4-2 DB See-Saw Press Strict Pull-Ups or Band Assisted Pull-Ups	EMOM x 12mins 1st - Single Arm Bent Over DB Row x 5-7reps/side 2nd - Dual Dumbbell Bicep Curl x 10 reps 3rd - Tuck Up + V Up x 6-8reps of complex EMOM x 12 mins 1st - Alternating Tall Kneeling DB Press x 12reps 2nd - Reverse Crunch x 12reps 3rd - Alternating DB Plank Rows x 12reps 2 sets Run 200m 8 Dumbbell Hang Squat Clean 30sec Hollow Flutter Kick Run 200m 12 Prone Pillowcase Row 12 Bench Dips 18 Bodyweight Russian Twist
Training-9	**Training-10**
1. Patrick Step Level 8-12 reps/leg 3* rest 15 seconds 2. 1-1/4 Air Squat; 8-12 reps rest 1 minutes 3* 1. Single Leg Glute Bridge;8-12/leg3* rest 10 sec 2. Toes Elevated Bodyweight Jefferson Curl; 5-8reps 3* rest 30-60 sec, then back to 1 10mins Continuous Effort 5-10-15-5-10-15-5-10-15.... DB Front Squats Tall Plank Knee to Elbow (R+L = 1) *Run 100m	1. Alternating Dumbbell Z Press; ; 6-8/arm 3* rest 30 sec 2. Pronated Pullup Isometric; 15-20 sec 3* rest 60 sec Intervals EMOM x 8mins 1st min- 5 Gorilla Burpee 2nd min- 10-16 Downdog Shoulder Taps *Gorilla Burpee = Jump Lunge L, Jump Lunge R, Burpee. rest 2mins EMOM x 8mins 1st - 40 Jumping Jacks 2nd min - 6-8 Burpee to Target
Training-11	**Training-12**
1. Dumbbell Reverse Lunge; 10, 8, 6/side 4* rest 30 sec 2. Strict or banded Pronated Pullup; 5-8reps 4* rest 30 sec 3. Shuttle Run x5 Shuttle run 10 meter = 1 rep 20 Duck Walk Steps (10/side) rest 15sec 3* 12 Alternating DB Suitcase Drop Lunge 3* rest 15sec 10 Full Squat Burpee rest 90sec 3	Single-Leg Dumbbell RDL; 5-7 reps/leg 4* rest 30 seconds 2.Single Arm Dumbbell Floor Press; 6-8 reps/arm 4* rest 30 sec rest 1 minute For Time 10-9-8-7-6-5-4-3-2-1: Strict or Banded Pull-Up Bench Dip OR Push Up rest 2mins For Time 3-6-9-12-9-6-3: Single Arm DB Z-Press Single Arm DB Z-Press L Anchored Sit-Ups

Appendix 1 (Continued)

Training-13	Training-14
EMOM x 12 mins 1st - Chainsaw Row; 5-7/side 2nd - Dual DB Bent Over Row Isometric x 20-30sec 3rd - Cross Body Toe Touch x 5-6/side EMOM x 12 mins 1st - Dumbbell Halo x 6-8/side 2nd - L Crunch x 15-20reps 3rd - Half Kneeling Single Arm DB Press x 8/side Run 100m 3* 15meter Reverse DB Bear Crawl 12 Dumbbell Upright Row 50 Jumping Jacks -rest 90sec-	Assisted KOT Squat x 5-8reps rest 15 seconds 3* 2. Jump Squat x 12-20reps 3* 1. Glute Bridge V Walkouts x 5-8reps 3* rest 10 sec 2. Toes Elevated Dumbell Jefferson Curl x 5-8reps 3* rest 60 sec, then back to 1 3-6-9-12-15.....increase by 3 reps every round Jump Squats Hanging Knee Tucks Shuttle Runs (10 m =1 rep)

Training-15	Training-16
Scapular Pushup on Elbow x 10reps 3* rest 30sec 2. Beast to Sit Through x 10reps (5/side)3* rest 15 sec 3. Mix Grip Passive Hang x 1 min/side3* rest 1 minute before going back to 1. 1. Dual Dumbbell Z Press; 8-10reps 3* rest 30 sec 2. Mix Grip Chin Over Bar Isometric; 10-20sec/side 3* rest 60 sec 6 Burpees 4* 6 Renegade Rows 4* 12 Tall Kneeling DB Push Press4* rest 1 minute between sets	EMOM x 12 mins 1st - 12 Alternating Dumbbell Suitcase Curtsy Squat 2nd - 12 Dumbbell Sumo Deadlift High Pull 3rd - 8-10 Burpee to High Knee (4-5/side) 1. Dumbbell Reverse Lunge; 12, 10, 8/side 4* rest 30 sec 2. Strict or Banded Supinated Pullup; 5-8 reps; 4* rest 30 sec 3. Shuttle Run x5 (10 m=1 rep) Rest:1min4* 10 Lateral Duck Walk Steps R 3* 10 Lateral Duck Walk Steps L3* rest 15sec 14 Alternating DB Power Snatch 3* rest 15sec 7 Burpee Broad Jump rest 90sec