Is There Any Association Between Regular Physical Activity and Ejaculation Time?.

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Purpose: Premature ejaculation (PE) is a prevalent disorder in males leading to sequelae such as lack of self-confidence, anxiety, depression and unsatisfactory intercourse for these men and their partners. The aim of this study was to evaluate the relationship between ejaculation and physical activity.

Materials and Methods: Group 1 comprised 112 participants who took regular physical activity and Group 2 comprised 126 participants with a sedentary lifestyle. The participants were 18-45 years old, same ethnic origin, in same location and had regular sexual activity for at least 6 months. A comparison was made by metabolic equivalents (MET), premature ejaculation diagnostic tool (PEDT) and intravaginal ejaculatory latency time (IELT).

Result: The mean age of Groups 1 and 2 was 25.34 years (range, 18-41 years) and 28.49 years (range, 19-45 years), respectively (P = .21). The mean PEDT score was 6.18 in Group 1, and 10.02 in Group 2. Significant differences were found between Groups 1 and 2 (P = .001). The mean MET score of Group 1 was 3448.23 MET-min/week (3012-4496 MET- min/week) while the MET score of Group 2 was 201.87 MET- min/week (66-744 MET- min/week) (P = .001). The mean IELT of Groups 1 and 2 were 316.42 s (120-1530 s) and 189.32 s (20-450 s), respectively. The mean IELT was significantly higher in Group 1 (P = .001).

Conclusion: The study results demonstrated that PE was less frequent in men that perform regular physical activity compared to those with a sedentary lifestyle. It can be assumed that regular physical activity may be effectual in gaining a sexual life of higher quality. Prospective studies with longitudinal data are needed to further understand the potential relationship between regular physical activity and premature ejaculation.

Keywords: intravaginal ejaculatory latency time; metabolic equivalents; premature ejaculation; premature ejaculation diagnostic tool; regular physical activity.

INTRODUCTION

Premature ejaculation (PE) is the most frequent sexual dysfunction in males, and its prevalence has been reported as 21-33% [1,2]. Currently, there are no universal criteria for the diagnosis, or treatment strategies or approaches for PE. Lack of observational studies directed to PE makes comprehension of this sexual dysfunction difficult[3,4]. The common point for definition of PE is a short duration between penetration and ejaculation, little or no control of the voluntary control of ejaculation, and the frustration and negative effect of this condition on the individual[5]. There are various treatment methods since ejaculation physiology and neuroanatomy has not yet been clearly demonstrated[3]. It has been shown that trace elements necessary in the body composition, such as magnesium, have an important effect in the pathophysiology of premature ejaculation[6] . According to the neurobiological hypothesis of Waldinger[4], a dysfunction in the serotonin pathway of the central system such as serotonin-2C hyposensitivity and/or serotonin-1A receptor hypersensitivity is a possible cause of lifelong PE. These experimental animal models showed that serotonergic activity at the hypothalamic level inhibited the ejaculation reflex. Based on this physiological effect, selective serotonin reuptake inhibitors (SSRI), and serotonin agonists increase intravaginal ejaculation latency time (IELT). A number of studies have shown that exercise increased the functional effect of serotonin in the human brain[7].

The effects of physical activity level on human health have attracted interest worldwide. Lack of physical activity forms the basis of various health problems, whereas regular physical activity contributes to the prevention and treatment of a number of disorders[8]. The results of studies investigating the effect of physical exercise on ejaculation are controversial. Aloosh M et al.[6] claimed that long-term exercise caused premature ejaculation by reducing the extracellular magnesium level. On the other hand, Kilinc et al.[9] recently reported that physical activity might be an alternative treatment for patients with lifelong PE.

In the current study, a comparison was made of ejaculation control, IELT, and the prevalence of PE in men undertaking regular physical activity, and those with a sedentary lifestyle.

MATERIAL AND METHODS

Study population

Approval for the study was granted by the Local Ethics Committee. The study was conducted between November 2016 and January 2017 and included 112 males who regularly performed callisthenic and/or fitness exercise

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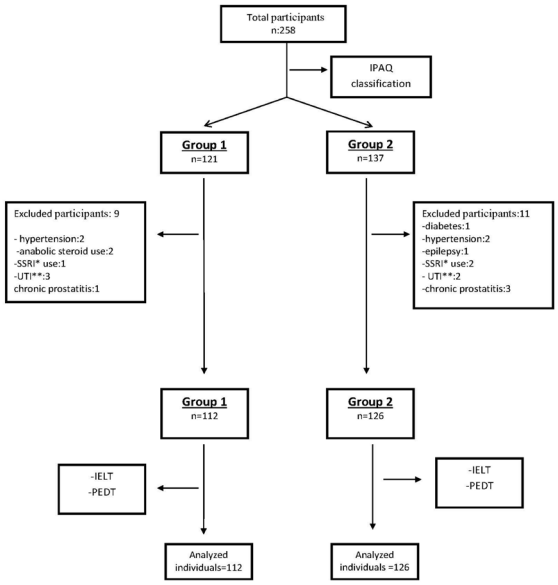

Figure 1. Flow diagram of the study

in a sports center for at least 6 months, and 126 individuals with a sedentary lifestyle who were staff in our hospital. All participants were living in Ankara, Turkey and all of them were same ethnic origin (Caucasian). Informed consent was obtained from all individual participants included in the study. This trial was registered with ClinicalTrials.gov, number NCT02984592. The exclusion criteria were the presence of chronic systemic disorders such as diabetes or hypertension, use of narcotic/hypnotic drugs or stimulants, anabolic steroids, selective serotonin receptors inhibitors (SSRI) and previous diagnosis and treatment for PE. Urinalysis and urine cultures were obtained from all the participants, and those with urinary infection were excluded. The participants were questioned about the presence of chronic pelvic pain and dysuria and those with suspected chronic prostatitis were not included in the study. The enrolment algorithm for the participants is illustrated in **Figure 1**.

Patient Selection and Evaluation

The voluntary participants were informed about the subject and context of the study. The participants included in the study were 18-45-years old, sexually active, heterosexual,without erectile dysfunction, and had a sexual partner for at least six months, and sexual intercourse at least twice a week. All participants completed the International Index of Erectile Function (IIEF) questionnaire[10]. None of the participants had erectile dysfunction.

The IELT value was taken according to the duration determined by the sexual partner with the stopwatch method, and < 1 minute was considered as PE. Either one of the couple was allowed to be responsible for handling the stopwatch, although it was requested that the same person remained responsible for each IELT measurement for the duration of the study. The instructions stated that the duration of IELT is calculated from time of vaginal penetration until ejaculation of semen. All calibrated stopwatches were provided by the researchers before the study. Participants were instructed not to use a condom, lubricant gel or any other medication during sexual intercourse.

The economic status of the family was estimated by taking into account the limits for hunger and poverty line announced annually by The Turkish Statistical Institute. Families with an income below the hunger limit were considered to have a low economic status, an income between the hunger and poverty limits was considered moderate, and those with an income above the poverty limit were considered to have a high economic status[11].

The participants that met the inclusion criteria completed the Premature Ejaculation Diagnostic Tool (PEDT) [12] and International Physical Activity Questionnaire (IPAQ)[13]. The Turkish version of PEDT[14] , as validated by Serefoglu, and IPAQ[15], as validated by Karaca, were used in this study. Sexual partner satisfaction and performance status were assessed with the Premature Ejaculation Profile, as validated by Serefoglu.[16] Measurement of IELT was explained to the participants, and the durations were recorded in the second interview.

In the short form of the IPAQ,[13] the following equations were used to calculate Metabolic Equivalent of Task (MET)-min/week scores in relation to the physical activity status and durations of the participants (**Table 1**).The participants were divided into two groups. Group 1 included those who performed regular sporting activities such as fitness and callisthenic exercise and were at least in the minimally active category of the IPAQ classification (**Table 1**) . The participants in Group 2 had a sedentary lifestyle and were in the inactive category of the IPAQ classification.

The minimum sample size was estimated using an a priori power analysis based on a confidence level of 0.95 and a power of 0.80. The mean of the significant differences was based on the data of the first 88 participants. The 2 groups were compared in respect of mean IELT, MET scores and PEDT scores. The data analysis was performed using SPSS for Windows, version 11.5 software (SPSS Inc., Chicago, IL, United States). Descriptive statistics for variables with a non-normal distribution and categorical variables were shown as median (min-max) and the number of cases (n) and percentage (%), respectively. The Mann Whitney U test was used for the intergroup analysis of continuous variables. Categorical variables were analyzed with the Chi square test. The relationships between PEDT, IELT and MET were evaluated with Pearson bivariate correlation analysis. A value of $P < .05$ was considered statistically significant.

RESULTS

Of the total 258 participants, a prospective analysis was made of 238 who met the inclusion criteria. Group 1 comprised 112 participants and Group 2, 126 (**Table 2**). A total of 20 participants were excluded from the study.(**Figure 1**)

The individuals in Group 1 stated that they had participated in regular exercise programs for the previous 6 months. The participants in Group 2 stated that they had not performed any regular exercise in the previous 6 months. The mean age of Group 1 (sportsmen group) was 25.34 years (range, 18-41 years) and the mean age of Group 2 (sedentary group) was 28.49 years (range, 19-45 years). The distribution of age was similar in Groups 1 and 2 ($P = .21$).

The mean MET scores were 3448.23 MET- min/week

Table 1. Categories of physical activity

Inactive (Category 1) <600 MET-min/week	Conditions that cannot be included in category 2 and 3 are considered as inactive
Minimally Active (Category 2) 600-3000 MET-min/week	• ≤ 3 days of rigorous activity for at least 20 minutes • ≤ 5 days of moderate activity or daily walking for at least 30 minutes • ≤ 5 days of walking and moderate activity combination providing a minimum of 600 MET-min/week
Highly active (Category 3) >3000 MET-min/week	• Rigorous activity providing a minimum of 1500 MET-min/week for at least 3 days • ≤7 days of walking combined with moderate or rigorous activity providing a minimum of 3000 MET-min/week

(3012-4496 MET- min/week) and 201.87 MET- min/week (66-744 MET- min/week) in Groups 1 and 2, respectively. The MET score of Group 1 was significantly higher than Group 2 (P = .001). The mean IELT was 314.39 s (120-1530 s) in Group 1, and 186.29 s (20-450 s) in Group 2. The mean IELT was significantly longer in Group 1 (*P* = .001). IELT was not shorter than 60 secs in any of the participants in Group 1, whereas 34 subjects (26.98%) in Group 2 reported IELTs shorter than 60 secs. The mean PEDT score was 6.18 in Group 1, and 10.02 in Group 2. The PEDT scores of Group 1 were significantly lower than those of Group 2 (*P* = .001). None of the participants in Group 1 had a PEDT score ≥ 11, whereas 32.53% of the participants in Group 2 had PEDT scores ≥ 11. In Group 1, 79.47% (89) of the participants found their sexual performance adequate, but 20.53% (23) felt that their sexual performances were not adequate. Those rates were 64.28% (81) and 35.72% (45), respectively, in Group 2. There was a significant correlation between IELT and MET (*P* > .001 r : 0.368). There was a significant negative correlation between PEDT and MET (*P* > .001 r : -0.383). The participants in Groups 1 and 2 were asked whether their sexual partners were completely satisfied with the sexual intercourse. In Group 1, 75.90% (85) of the participants thought that their partners were completely satisfied, 14.28 % (16) thought that their partners were partially satisfied, and 9.82% (11) thought that their partners were not completely satisfied. Those rates were 56.35% (71), 25.40% (32), and 18.25% (23), respectively in Group 2. None of the participants in Group 1 were diagnosed with PE, whereas 24.60% (31) of Group 2 were diagnosed with PE (**Table 2**).

DISCUSSION

In this study, a comparison was made of participants with high MET scores that employed regular physical activity in their daily lives, with men with sedentary lifestyles. The group who undertook sport was found to have longer IELT, and lower PEDT scores. It was also demonstrated that PE was less frequent in men with regular exercise compared to the sedentary individuals.

Premature ejaculation is a quite frequent sexual dysfunction, which significantly affects quality of life and the sexual lives of the partners[17] . The current definition of PE according to the International Society of Sexual Medicine (ISSM) is: "Ejaculation that always or nearly always occurs prior to or within about 1 minute of vaginal penetration (lifelong PE), or a clinically significant and bothersome reduction in latency time, often to about 3 minutes or less (acquired PE), the inability to delay ejaculation on all or nearly all vaginal penetrations, negative personal consequences, such as distress, bother, frustration, and/or the avoidance of sexual intimacy"[18] .

This guideline describes secondary (acquired) premature ejaculation as a clinically significantly short time to ejaculation after vaginal penetration; this duration is usually shorter than 3 minutes, ejaculation cannot be delayed, and this condition causes stress, discomfort, distress, and/or avoidance of sexual intercourse in the individual. PEDT is a psychometric test developed to diagnose PE. It was developed by Symond et al.[12] and validated in Turkish by Serefoglu et al.[14] This test measures the control of the individual over ejaculation, whether it occurs with a low level of stimulus, the frequency of the condition, and whether it causes stress and discomfort to the individual. PE is not present if the test score is ≤ 8, a score 9-10 indicates probable PE, and a score ≥ 11 indicates PE. The participants in this study were given the short-IPAQ, which is a questionnaire used to determine the physical activity and sedentary lifestyles of adults. The physical activity is divided into 3 basic classes in the survey: 1) Vigorous physical activity (football, basketball, aerobics, fast cycling, weightlifting, heavy lifting, etc.); 2) Moderate physical activity (carrying light weights, normal-speed cycling, folk dancing, dancing, bowling, table tennis etc.); 3) Walking. The final question of the questionnaire queries the duration of activities performed without moving (sitting, lying down, etc.). The level of physical activity is calculated with the metabolic equivalent (MET) method. One MET equals energy consumption in ml/kg/min while sitting still. In an average adult, 1 MET

Table 2. Participants characteristics

	GROUP 1	GROUP 2	*P* value
Mean age (years)	25.34 ± 5.56 (18-41)	28.49 ± 6.22 (19-45)	*P* = .21
Mean Body Mass Index (kg/m^2)	23.45 ± 6.34	25.12 ± 9.19	*P* = .16
Mean number of sexual intercourse(weekly)	3.08 ± 1.61	2.73 ± 1.01	*P* = .22
Economic Status			
Low	37 (%33)	43 (%34.1)	*P* = .32
Medium	54 (%48.2)	58 (%46)	
High	21(%18.7)	25 (%19.8)	
MET score (met-min/week)	3448.23 ± 357.27 (3012-4496)	201.87 ± 152.66 (66-744)	*P* = .001
IELT (seconds)	316.42 ± 187.59 (120-1530)	189.32 ± 112.26 (20-450)	*P* = .001
PEDT score	6.18 ± 1.75	10.02 ± 3.56	*P* = .001
PE (%)	0	24.60%	

= 3.5 ml/kg/min. This value may be used to determine resting O_2 and energy consumption rates.

A number of studies have investigated a correlation of erectile dysfunction and exercise[18]. Erectile dysfunction has been associated with individuals with a sedentary lifestyle, and daily exercise of less than 200 kcal. The risk of erectile dysfunction has been reported to decrease by 70% in those who increased regular physical activity in their daily lives[19,20]. A study performed on a young and healthy population reported that regular physical activity improved erectile function, and sexual dysfunction was more frequent in young males with sedentary lifestyles[21].

Serotonin (5-hydroxytriptamin) plays a very important role in ejaculation activity[22]. Serotonergic fibers are found among the sensory axons and motor neurons in the spinal cord that play a role in ejaculation. They are found in the dorsal and ventral horns, dorsal commissural gray and thoracolumbar intermediolateral cell column, and sacral parasympathetic nucleus of the lumbosacral spinal cord[23]. However, serotonergic postsynaptic receptors are found in the lumbar spinothalamic region, suggesting that serotonin plays a role in ejaculation through possible connections in the spinal cord. Serotonergic neurons in nucleus paragigantocellularis that is situated in the ventrolateral medulla of the brain stem innervate bulbospongiosus muscles that play a role in the inhibition of ejaculation[24]. SSRIs are used in the treatment of PE based on the effect of serotonin on ejaculation. SSRIs block 5-HT transporters in synapses, stop axonal reuptake of serotonin, increase neurotransmission of 5-HT, stimulate 5-HT2C receptors in the post-synaptic membrane, and delay ejaculation[25]. Post et al.[26] increased the physical activities of the patients with depression, and measured the levels of biogenic amines in cerebrospinal fluid before and after this intervention. Physical activity was seen to increase the level of 5-hydroxyindoleacetic acid (5-HIAA). Chaouloff et al.[27] performed a study on rats, and showed that tryptophan and 5-HIAA levels increased in the brain ventricles of the rats with increased physical activity. Intracerebral dialysis studies have shown that exercise increased extracellular serotonin and 5-HIAA levels in various regions of the brain, such as the hippocampus and cortex[28-30]. Jacobs et al.[31] suggested two mechanisms to explain the increase of serotonin levels with exercise. Motor activity increases the activity of serotonin neurons, and hence synthesis and release of serotonin increase. The other mechanism suggests an increase of a serotonin precursor, tryptophan, after exercise[32].

A recent, prospective, sham-controlled study was the first clinical study to demonstrate an association between regular exercise and premature ejaculation[9]. 105 patients diagnosed with PE were divided into three groups; 35 were treated with dapoxetine, 35 performed moderate exercise, and 35 performed minimal exercise (sham). At the end of the study, when comparison was made of the premature ejaculation diagnostic tool (PEDT) and intravaginal ejaculatory latency time (IELT), there was a statistically significant decrease in PEDT scores, and increase in IELT in the dapoxetine and moderate exercise groups compared to the sham group. It was emphasized that regular exercise of longer than 30 min at least 5 times a week leads to ejaculation delay and may be an alternative treatment for PE.

The main limitation of the current study is that it was a cross-sectional study. Therefore, there are no data of the long-term follow-up of these participants. Self-reporting of the subjects is a limitation of this study. Self-reported IELT tends to be more inaccurate than stopwatch-recorded IELT and PE status based on PEDT score. Some authors have argued that the specificity of PEDT is relatively low to be a reliable tool in diagnosing PE[33].

CONCLUSIONS

The results of this study showed that PE was less frequent in men who performed regular physical exercise compared to those with a sedentary lifestyle, and it can be assumed that regular physical exercise may be effectual in gaining a sexual life of a higher quality. Prospective studies with longitudinal data are needed to further understand the potential relationship between regular physical activity and premature ejaculation.

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CONFLICT OF INTEREST

The authors have no conflicts of interest.

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