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Effectiveness of Exercise Activities on the Sleep Quality and the General Health of Prisoners

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Abstract

Introduction: The particular circumstances of a prisoner lead to physical and psychological disorders. These disorders may have a negative effect on general health and sleep quality. Therefore, the purpose of this study was to investigate the Effectiveness of exercise activities on the sleep quality and the general health of prisoners**.**

Methods: 97 people from all Jahrom County prisoners were randomly selected and divided into active (n=44) (Mean ± SD; aged: 33.7 ± 7.78yrs., height: 168.18 ± 9.50cm, weight: 76.18 ± 13.75kg) and inactive (n=53) (Mean ± SD; aged: 38.11 ± 9.49yrs., height: 169.19 ± 3.43cm., weight: 75.16 ± 7.62kg) groups. Data were collected from general health questionnaire 28 (GH28) and Pittsburgh Sleep Quality Index (PSQI). Data analysis was done by U Mann Whitney test using SPSS 18 software ($p \leq 0.05$).

Results: The results showed that, except for subjective sleep quality ($p = 0.66$) and daytime dysfunction ($p= 0.22$), there was a significant difference between the two groups in all aspects of sleep ($p \leq 0.05$). Also, there was a significant difference in overall general health ($p= 0.002$), somatic symptoms ($p= 0.003$), anxiety ($p= 0.006$) and severe depression ($p= 0.001$) between two active and inactive groups.

Conclusion: According to the results of the research, it seems that both prisoners and prison managers need to pay more attention to exercise activities and its beneficial effects and provide grounds for doing it.

Keywords: Prisoners, General Health, Sleep Quality, Exercise Activities

Introduction

Prisons are peculiar and anomalous environments with a long and special history to punish violent and law-abusive individuals which confine individuals in their physical structures, including limited physical spaces with long walls. The prison environment and the loss of freedom cause deep psychological trauma and damage (1). More than 10.1 million people worldwide and 220,000 people in Iran are imprisoned; the same figures show the importance of their physical and psychological health (2). The results of previous research have shown that criminals and prisoners are more likely to have mental disorders than other people in the community (3). Some research reported that between 10% and 15% of prisoners are suffering from mental disorders (3). The results of studies in North America and Europe also indicate mental problems in prisons. More than 71 percent of prisoners have been diagnosed with mental disorders (drug-related and personality problems) (4). In addition, research results have indicated that approximately 5% of prisoners show psychotic symptoms, and 26-29% of them have symptoms of emotional disturbances or anxiety disorders (4). The excessive amount of mental disorders in prison can be due to several factors: the misunderstanding and misconception that people with mental disorders are a danger to

society, failures in the promotion of treatment, care and rehabilitation, and more importantly, poor access to mental health services and mental stress from prison environment (5). The presence of these mental disorders can affect the general health and sleep quality of prisoners. Nowadays paying attention to health care in prisons in order to improve the physical and mental health of prisoners is one of the main goals of the organization of prisons of the country (3). Therefore, interventions should be performed to restore mental and physical health of prisoners; one of these interventions is sports activities. Research has shown that exercise can help improve physical health and the discover mental talents; also by performing exercises individuals can overcome their physical, emotional, mental and social problems and improve their indices of self-confidence, self-esteem, life expectancy, sociability and social adjustment (6-8). Physical exercises can relieve the person with release of energy and reduce his/her psychological stress, which help to prevent or treat depression (9). The result of the above is to create further sense of satisfaction in the individuals, and to increase mental health and improve the quality of life (10). An overview of past research has shown the effectiveness of sports activities on the dependent variables of the research. For example, Kargarfard *et al.* concluded that there was a significant improvement in the anxiety and depression variables in the exercise therapy group in water compared to the control group (11). Research conducted by Heidari *et al.* showed that there is a significant difference between general health, athletic identity, sport motivation and social-individual adaptability among athletes with disabilities and non-athletes with disabilities (12). Concerning the effectiveness of exercise on sleep quality, Azarniveh and Tavakoli Khormizi in a study concluded that the active group had better sleep quality than their inactive counterparts (13). Given the bolted and restricted environment of prisons encountered by prisoners, one can expect them to face physical and psychological harm, which may result in a decrease in their quality of life, general health and quality of sleep. For this reason, it is necessary to carry out research into the extent of these physical and cognitive impairments as well as the factors that contribute to their improvement. In general, prison settings and circumstances, reduced freedom, tolerance of condemnation, distance from social contacts and distance from the family could lead to increased psychological pressures among prisoners and have negative effects on their quality of life, general health and sleep quality. Considering the aforementioned issues and the importance of paying attention to the psychological and physical characteristics of prisoners and also considering the literature review and the existence of a gap in previous studies regarding the role of sports activities in improving all three variables mentioned among prisoners, this study aims to investigate the role of exercise activities in improving general health and sleep quality of prisoners in Jahrom Prison.

Methods

Data were collected in the field cross-sectional. The statistical population of the study consisted of the active and inactive prisoners of Jahrom Prison, to the size of which the researchers did not have access due to the security considerations. In order to ensure the return of the questionnaires and their accuracy, 120 questionnaires were distributed among the prisoners, based on availability. After returning the questionnaires and removing incomplete questionnaires, 97 questionnaires (44 from active people and 53 from inactive ones) were collected and analyzed. The data collection instruments consisted of a demographic data form and two questionnaires as follows: General Health Questionnaire (GHQ_28): One of the most well-known tools for screening mental disorders is the Goldberg & Hild's General

Health Questionnaire (1979) (14). This questionnaire evaluates 4 subscales of somatic symptoms, anxiety/ insomnia, social dysfunction and severe depression. Scoring is done in two ways: 4 degrees Likert (0, 1, 2, 3) and dual scale (0, 0, 1, 1). It is recommended that the Likert scale is used to measure the subscales and the total score calculated by dual scale. The total score is from zero to 84. In this method, a lower score shows better mental health (15). In a general survey, the general alpha of the questionnaire was 0.85. Also, the reliability index for physical symptoms was 0.65, anxiety and insomnia was 0.76, social function disorder was 0.50 and depression was 0.77 (14). Pittsburgh sleep quality index (PSQI) was used to assess the sleep quality of prisoners. The questionnaire consists of seven scales: 1) subjective sleep quality, 2) sleep latency, 3) sleep duration, 4) habitual sleep enough (based on the proportion of useful sleep duration from the total hours spent in bed, 5) sleep disturbances (as a person's night waking up), 6) use of sleeping medication, 7) daytime dysfunction (as problems with daytime sleep) (16).The scores for each questionnaire scales range from zero to three. Scores of zero, one, two, and three on each scale indicate normal status, a mild, moderate, and severe problem, respectively. The sum of scores of seven scales is between 0 and 21, and a total score of 5 or more means that sleep quality is inappropriate (16). In Akbari Kamrani *et al.*, using the Cronbach's alpha coefficient, the reliability of this tool and its components were obtained from 0.73 to 0.79 (17). Researchers presented the research proposal to the Center for Education and Research of the General Directorate of Prisons in order to introduce the goals and the necessity of research and obtain a license. After confirmation of the proposal, the researchers were appointed to the Jahrom Prison. After receiving the necessary information regarding the number of statistical population, prison conditions and the amount of physical activity of prisoners, the questionnaires were submitted to the Research Department of Jahrom Prison and the relevant authorities proceeded to complete them. The questionnaires were submitted individually and with the supervision of the authorities among the prisoners. Of the subjects, those who had at least three sessions per week of activity, were selected as active group, and those who did not exercise at all, were selected as inactive group. It should be noted that the subjects were assured that all information was confidential and only used in this study, so the questionnaires were completed with their informed consent. Mean and standard deviation were used for descriptive statistics and U Mann Whitney test was used for inferential statistics, in which the significance level was $P \leq 0.05$. All data analysis was done using SPSS software version 18.

Results

The demographic characteristics of the subjects are presented in Table 1. Regarding general health variables, the results of Mann Whitney U test showed that there was a significant difference between general health ($p = 0.002$), physical symptoms ($p = 0.003$), anxiety ($p = 0.006$) and depression ($p = 0.001$) in active and inactive prisoners, so that active prisoners are significantly better than those who are inactive. Also, there is no significant difference between the social impairment of active and inactive prisoners ($p = 0.16$), however, active prisoners have a better status than those who are inactive (Table 2). The results of Mann-Whitney U test on the overall score of sleep quality and the scales of quality of sleep in active and inactive prisoners showed that there is a significant difference between sleep latency ($p= 0.05$), sleep duration ($p= 0.001$), habitual sleep enough ($p= 0.001$), sleep disturbances ($p = 0.001$), use of sleeping medication ($p= 0.02$) and overall sleep quality ($p=0.001$) in active and inactive prisoners. However, there was no significant difference between subjective sleep quality ($p= 0.06$) and daytime dysfunction ($p= 0.22$)

between active and inactive prisoners. In general, the results showed that active prisoners had a better sleep quality than inactive prisoners (Table 3).

Table 1. Demographic characteristics of subjects in research groups

Variable	Group	
	Active	Inactive
Age (Year)	33.7 ± 7.78	38.11 ± 9.49
Weight (Kg)	76.18 ± 13.75	75.16 ± 7.62
Height (Cm)	168.18 ± 9.50	169.19 ± 3.43

Table 2. Mann-Whitney U test results on general health variables of subjects in different groups

Variable	Group	Mean ± Standard Deviation	p
Somatic symptoms	Active	8.02 ± 4.64	0.003*
	Inactive	11.16 ± 5.51	
Anxiety	Active	7.90 ± 4.60	0.006*
	Inactive	11.07 ± 5.45	
Social dysfunction	Active	7.32 ± 4.25	0.16
	Inactive	8.66 ± 5.43	
Severe depression	Active	6.55 ± 5.15	0.001*
	Inactive	10.96 ± 6.10	
Overall general health	Active	29.76 ± 14.80	0.002*
	Inactive	41.60 ±19.74	

Table 3. Mann Whitney U test results on scores of six scales and overall score of sleep quality in active and inactive prisoners

Variable	Group	Mean ± Standard Deviation	P
Subjective sleep quality	Active	1.06 ± 0.79	0.06
	Inactive	1.42 ± 0.95	
Sleep latency	Active	1.32 ± 0.77	0.05*
	Inactive	1.65 ± 0.81	
Sleep duration	Active	0.90 ± 0.60	0.001*
	Inactive	1.63 ± 0.76	
Habitual sleep enough	Active	1.25 ± 0.75	0.001*
	Inactive	1.86 ± 0.88	
Sleep disturbances	Active	1.55 ± 0.62	0.001*
	Inactive	2.15 ± 0.75	
Use of sleeping medication	Active	0.88 ± 1.05	0.02*
	Inactive	1.36 ± 1.08	
Daytime dysfunction	Active	1.25 ± 1.00	0.22
	Inactive	1.42 ± 0.80	
Overall sleep quality	Active	8.06 ± 3.43	0.001*
	Inactive	11.55 ± 4.04	

*: Significant difference between the two meanings

Discussion

The purpose of this study was to investigate the effectiveness of sports activities on general health and sleeping quality of prisoners. The findings of the study showed that active prisoners have significantly a better general health than inactive people regarding overall general health and subscales of anxiety, severe depression and somatic symptoms. Although there was no significant difference in the subscale of social dysfunction, in general, active prisoners were in a better position than inactive ones. A possible reason for this can be the closed space of the prison and limited connections and lack of communication with the outside world. The results of several studies are compatible and consistent with the present study. For example, Buckaloo *et al.* conducted a study on 60 prisoners and the results showed that due to exercise, stress, anxiety and depression of prisoners decreased (18). Another study reported that sport activity helps to reduce frustration and reduce self-harm in prisoners (19). The results of a recent study on the effect of running activities on prisoners showed that run-up therapy can improve performance, reduce rough behaviors, and reduce psychological symptoms, such as depression and anxiety (20). Improving general health through exercise can be attributed to many factors such as creation of learning skills, self-confidence, improving physical functioning, social support, balance, strength, flexibility, and increased serotonin secretion. Also, distraction, social support and encouragement by friends and teammates during exercise can lead to improved general health (18, 21-23). The latest findings of the research showed that active prisoners were significantly better than inactive prisoners in sub-scales of sleep latency, sleep duration, habitual sleep enough, sleep disturbances, use of sleep medication and also in overall sleep quality. It was also found that there was no significant difference between the subscales of subjective sleep quality and sleep dysfunction in the two groups, but, in general, the active subjects were in a better position compared to inactive subjects. This finding is consistent with the results of some studies. For example, the results of the study by Kline *et al.* showed that exercise activity improves the average quality of sleep. In this vein, the overall score of sleep quality and all subscales decreased due to exercise activity, which is consistent with the present study (24). A review study found that acute exercise had a small effect on sleep duration, sleep latency and habitual sleep enough, and also had a low-to-modest effect on sleep disturbances. In addition, regular exercise had a small effect on overall sleep time and habitual sleep enough, low-to-modest effect on sleep latency and significant effect on overall sleep quality. This study showed that, in general, regular exercise has a moderate to high effect on all variables other than use of medication, which is in agreement with the present study (25). Inconsistency with use of medication can be attributed to the age, sex and type of subjects, and level of exercise activity. In another study of 434 17-year-olds, it was found that sports activity could improve sleep quality in subscales of sleep latency, sleep disturbances and daytime dysfunction. It was also reported that exercise does not change overall sleep time. In the study, there is no difference in the overall sleep time dimension, which is not consistent with the results of the present study. A probable reason can be the difference in the type of statistical population (26). In a study by Elavsky *et al.*, subjects including women aged 42-48 during the menstrual transition period walked for 4 months, 3 sessions per week and 1 hour of moderate intensity, yet no significant improvement occurred in their sleep quality (27) The probable cause of this can be related to the age, sex and type of subject as well as the level, type and duration of exercise. In explaining the result, it has been reported that exercise can improve sleep quality by changes in body temperature, increased energy loss, weight loss, increased physical fitness, increased cardiovascular function, changes in

cytokines concentration, increased fatigue, changes in psychological symptoms, changes in heart rate, increased hormonal secretion, BDNF secretion and changes in body composition (25, 28).

Conclusion

According to the results of the research, it seems that both prisoners and prison managers need to pay more attention to exercise activities and its beneficial effects and provide grounds for doing it. Since limited studies have been conducted on the prisoners' sports activities and their potential effects on their physical, psychological and social health, it is suggested that further studies on the possible effects of physical activity on prisoners be proposed in the future. Future studies can take into account the potential effects of various sports activities (swimming, volleyball, football, etc.), different intensity of activity (mild, moderate and severe), and type of activity (group and individual).

Ethical issues

No applicable.

Authors' contributions

All authors equally contributed to the writing and revision of this paper

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