

The Effect of a Functional Training on Psychological Functions of Healthy Elderly Men

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ABSTRACT

Introduction: The purpose of this study was to investigate the effect of a functional training on the psychological functions of healthy elderly men.

Materials and methods: In this study, 30 subjects, all of them had general health, voluntarily participated, were divided into experimental (n=15) and control (n=15) groups. The experimental group performed the exercise protocol for 6 weeks. After 6 weeks of training, both experimental and control groups received post-test.

Results: The results showed that functional training had a significant effect on general mental health (P=0.001), and somatic symptoms (P=0.049), anxiety and insomnia (P=0.001), depression (P=0.001), and job scales. There was a significant (p=0.001) social experiment in the experimental group but no significant changes in the control group. The results of independent t-test showed that there was a significant difference between the mean scores of general mental health in the experimental and control groups after the intervention (P <0.05).

Conclusion: According to the findings of this study, it can be concluded that functional training has a positive effect on general mental health, physical symptoms, anxiety and insomnia, depression and social functioning. Therefore, paying attention to these exercises is important in the process of working with the elderly and in their rehabilitation interventions.

Keywords

Functional Training, General Health, Elderly, Cognitive Performance.

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Introduction

Aging is a natural process and one of the stages of development in which specific physical, mental and social changes occur (Haywood & Getchell, 2009). In other words, aging is automatic degrading and retrograde irreversible changes in which physical and mental strength is significantly reduced (Goodway, Ozmun, & Gallahue, 2019). In Iran, with the increase of life expectancy, the elderly population is increasing; It is predicted that in 1400, more than 10% of the country's population will be over 60 years old (Mirzaie & Darabi, 2017). Therefore, paying attention to the phenomenon of aging and related factors, which is one of the most important economic, social and health challenges of the 21st century, seems very essential.

Although aging should be considered as one of the most important human achievements, unfortunately, most of the people who reach old

age suffer from several diseases and serious health related problems (Walaszek, 2009). In general, aging is associated with gradual and continuous changes that increase chronic discomfort and movement limitations (Schaie & Willis, 2010; Alexander, Matthews & Murphy, 2015). These limitations cause dependence in the elderly. Dependence also affects the feeling of well-being and welfare and leads to psychological problems (Newsom & Schulz, 1996).

Adult motor performance depends on the interaction of a wide variety of variables, some of which can be easily manipulated while others are resistant to change (Goodway, Ozmun, & Gallahue, 2019). Researchers who are working on aging issues have used a variety of methods to improve the general mental health of the elderly. One of the most useful methods is to do physical activity and exercise, including functional training. Performing these exercises by inducing neurophysiological features of motor and motor

control can develop the ability to walk (Nagy et al., 2007; Cromwell et al., 2007). motor performance, physical and functional fitness of the elderly (Thompson, Cobb, & Blackwell, 2007). In addition, researches have shown that functional training can play an effective role in learning motor skills and recalling motor units (Kornatz, Christou & Enoka, 2005), increasing motor plasticity (Kami et al., 1995) and improving muscle utilization (Carroll, Benjamin, Stephan & Carson, 2001) by creating appropriate physiological adaptations. Functional training is closely related to the increase of cortical-spinal excitability, and researches confirm that neurological adaptations resulting from these exercises are durable (Leung, Rantalainen, Teo & Kidgell, 2015).

The results of some other studies show that moderate exercise is associated with reduced depression, anxiety, psycho-physical disorders, obsessive-compulsive disorder, and psychosis (Donohue et al., 2004; Moore & Werch, 2008). Different methods can be used to improve mental health. One of the most useful ways is to exercise. The findings of the study conducted by Grant et al (2004), Cowper & Grant (2003), Saxena et al (2005), Yavarian et al (2011), Mortazavi et al (2012) showed the effect of physical activity and exercise on increasing mental health in the elderly.

Also, Elvasky et al., (2005) showed that physical activity and exercise prevent mental disorders such as psychosis, depression and anxiety in the elderly. However, in their research, Barrett & Smerdely, (2002) and Salmon, (2001) did not find a significant relationship between physical activity and a decrease in the intensity of depression in the elderly. Getting older is generally associated with disorders in various systems of the body, and especially due to the limitations of movement that occurs, a person's dependence on others in performing their daily tasks increases. In other words, due to the economic, social, and other problems faced by the elderly, the tendency to keep them in nursing homes has increased (Khazaei Jalil et al., 2015).

Various studies have shown that doing health-promoting behaviors such as physical activity and diet control, and active lifestyle awareness in the elderly are relatively low (Morovatisharifabad et al., 2004; Samadi et al., 2007; Malek Afzali et al,

2007). Depending on the intensity and duration of the exercise, physical exercises can have different effects on some of the psychological and physical aspects of the elderly ones. Accordingly, considering the importance of the issue of aging and the necessity to study various aspects related to it and considering the few studies done in this field, the present study aims to examine the effect of functional training on some psychological characteristics of the elderly to find out whether functional exercises can improve the general mental health of the elderly or not. The findings of this study can provide an appropriate model for movement trainers, physiotherapists and occupational therapists to utilize these benefits when working with the elderly and performing training and rehabilitation interventions if these exercises are effective.

Materials and Methods

The present study is a semi-experimental intervention in terms of method and a practical one in terms of purpose. The statistical population included all men over 60 years of age in Tehran who had referred to a sports club in 1398, among which 30 subjects were examined in a similar study in a similar study (Kemoun et al, 2010). Entry criteria included at least 60 years of age, as well as non-cardiovascular, orthopedic and muscular, neurological (stroke, Parkinson's and paralysis) and congenital disorders, and were selected in 1 experimental group (15 people who performed the functional training program). And a control group (15 people performing their daily activities) was assigned. Exit criteria includes chronic neurological diseases, especially Parkinson's, severe vision and hearing problems, movement pathology of the upper and lower limbs, especially deformity, and limited mobility of the joints of the limbs, which affects doing motor activity, and the history of drug addiction, which was examined in this researcher-made questionnaire.

To ensure the ability of the subjects to participate and complete the training course, the Physical Activity Readiness Questionnaire (with a validity factor of 0.90 in the diagnosis and determination of the individual's readiness) was used. The Physical Activity Readiness Questionnaire is a

screening and qualitative assessment tool for the readiness of participation in physical activity.

This questionnaire is designed to select people when they participate in physical activities that can be severe for them, and includes 7 questions with yes and no answers which assess and determines the level of physical fitness and ability to participate in physical activity and medical condition and readiness of individuals before starting physical activity. The General Health Questionnaire (with a validity coefficient of 0.91 in the distinction between mental illness and health) was also used to assess the general mental health of the subjects.

The questionnaire includes a standard 4-scale standardized questionnaire that includes: a) physical symptoms and physical symptoms that measure symptoms related to physical pain related to mental and psychological disorders; b) anxiety and insomnia symptoms that indicate symptoms. Measures nervous insomnia, anxiety and stress in people. C) Symptoms of social dysfunction or social dysfunction that examines the signs of a person's problems in communicating with the community and individual work. D) Symptoms of depression and life expectancy that examines problems related to life expectancy, survival, and depression. All stages of the research were conducted in accordance with the ethical considerations and charter of Shahid Rajaei teacher training university and the Physical Education Research Institute and had the code of ethics of IR.SSRI.REC.1398.661. In the process of conducting the research, first the method of conducting the study was explained to the participants and they completed the consent form with full knowledge.

Participants were assured that they were not at risk and that they could withdraw from the study if the slightest problem occurred. After ensuring the necessary conditions, the participants entered the research process. First, mental health questionnaires were completed by two groups, then the experimental group underwent a six-week functional training course (3 sessions per week).

The Functional Training Protocol lasted 60 minutes. The program consisted of three stages, the first stage included 15 minutes of warm-up, which was devoted to stretching and breathing exercises, the second stage included 30 minutes of functional exercises, and the third stage included

the last 15 minutes of stretching and relaxing movements. The construction was done to return to the original state. During this time, the control group maintained its normal activities and did not participate in a specific training program and was only present in the research environment. At the end of the training session, participants were re-assessed with a general mental health questionnaire. SPSS software version 19 (version 19, SPSS Inc., Chicago, IL) was used to analyze the data. Descriptive statistics were used to calculate the average and standard deviation and plot charts and to examine the performance of the subjects independent and dependent t-tests were used. The alpha level was considered to be P 0.05 for all statistical operations.

Results

In this study, 15 elderly people participated in the experimental group of functional exercises and 15 elderly people in the control group. Table 1 shows the demographic characteristics of the participants in this study. The results of the independent t-test showed that before the experimental intervention, the experimental and control groups did not differ significantly from each other, which indicated that the subjects were homogeneous in individual values.

Table 1. Average and standard deviation of participants' individual characteristics

groups	amoun t	age	height	weigh t
experiment al	15	3/18 ±46/6 6	6/8 ±4/177	6/43 ±26/7 6
control	15	3/24 ±86/6 5	4/39 ±06/17 9	6/16 ±02/7 8

Central and Distribution Indicators (Average and Standard Deviation of General Mental Health in different stages of research including pre-test, post-test in experimental and control groups are presented in Table 2.

Table 2. Comparison of mean and standard deviations of general mental health scores and subscales

group stage	General mental health scores and its subscales	Experimental group Mean ± SD	Control group Mean ± SD
Pre-test	General mental health	38/53 ± 3/83	± 3/94 38/40
	physical symptoms	8/80 ± 1/47	8/93 1±/27
	anxiety and insomnia	±40/11 2/09	2±/05 12/26
	impaired social functioning	±20/10 1/82	±40/9 1/40
	depression	±13/8 1/76	±80/7 1/52
Post-test	General mental health	30/86 ± 2/97	38/93 ± 3/93
	physical symptoms	±86/7 1/24	±00/9 1/55
	anxiety and insomnia	±26/9 1/83	2/31 ±26/12
	impaired social functioning	±40/7 1/54	1/98 ±26/10
	depression	±33/6 1/29	±66/7 1/29

The participants’ pre-test and post-test data were analyzed to evaluate the effectiveness of functional training on the psychological indicators of the elderly. The results of correlated t-test showed that there was a significant difference between pre-test and post-test data of experimental group in general mental health ($P < 0.001$), physical symptoms ($P < 0.04$), anxiety and insomnia ($P < 0.001$), impaired social functioning ($P < 0.002$), and depression ($P < 0.001$), while these differences were not significant in the control group (0.05).

In addition, the results of the independent t-test showed that there was no significant difference in comparison between the overall score of participants’ mental health before the test ($P = 0.926$), but in the post-test there was a significant difference between the experimental and control groups and this difference was in favor of the experimental group ($P < 0.001$). To better understand this issue, the status of the experimental and control groups in the indicators examined is shown in Figures 1 and 2.

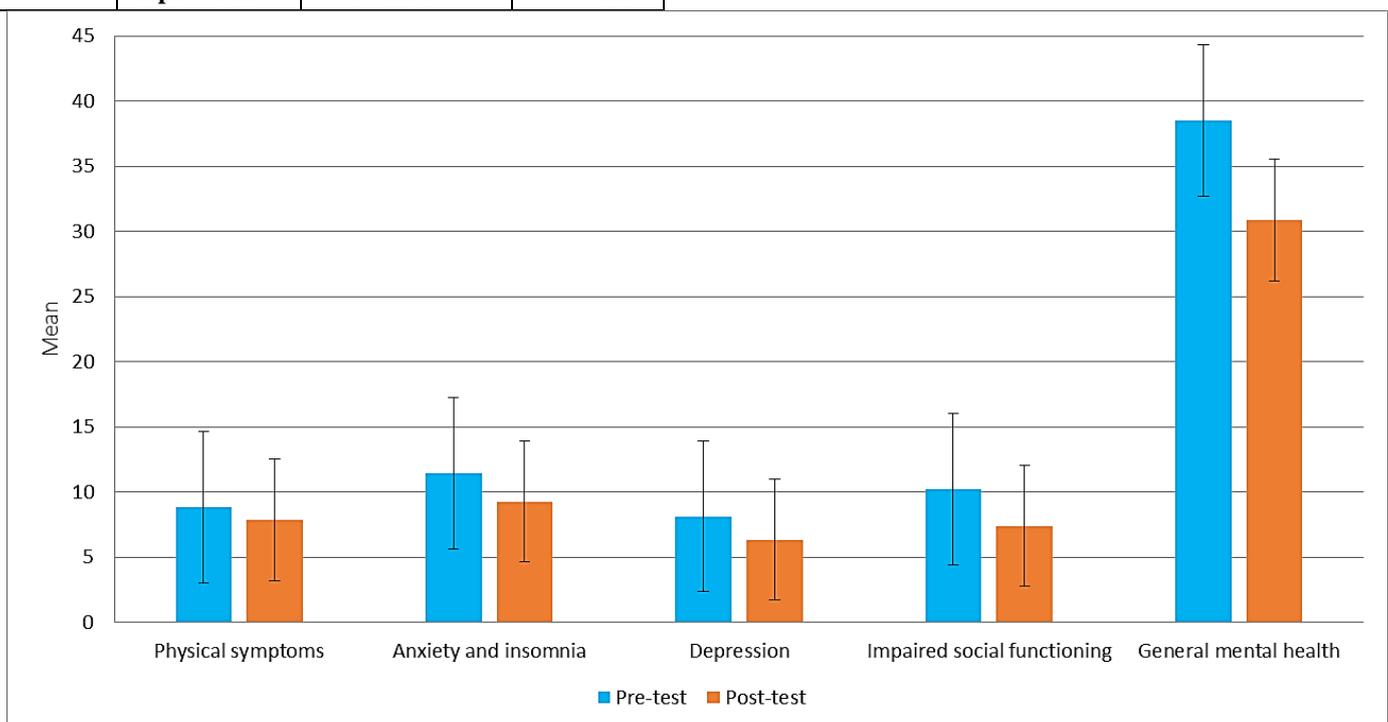


Figure 1. Average general mental health scores of the experimental group per and post the test

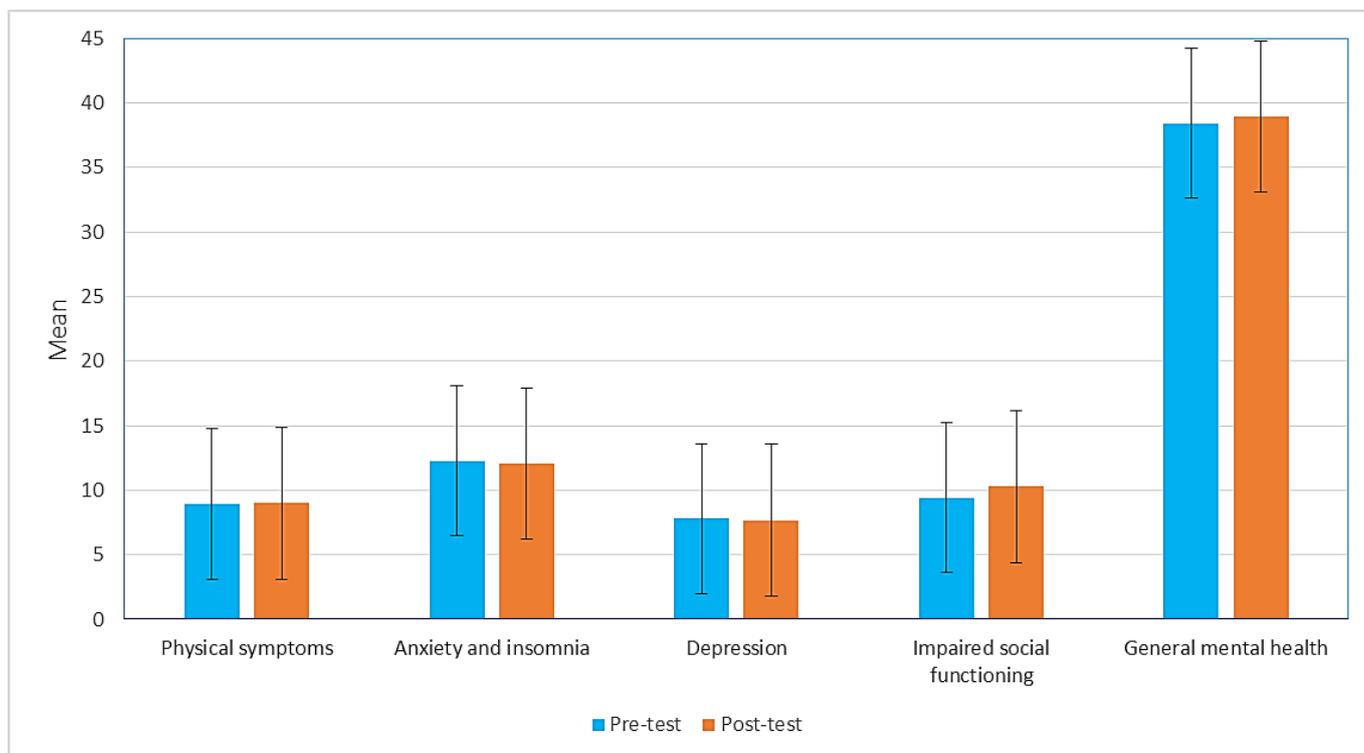


Figure 2. Average general mental health scores of the Control group pre and post the test

Discussion

The increasing growth of the elderly population in many developed and developing countries has led to a focus on the health of this age group. The aim of this study was to investigate the effect of a functional training program on the psychological performance of healthy older men. The results of this study showed that performing functional exercises has improved the general mental health of the elderly.

The findings of this study were consistent with the study of Yavarian et al., Mortazavi et al., Grant et al, Cooper et al, and Saxena et al. It is also consistent with the research of Elvasky et al. Because the results of their study showed that physical activity prevents mental disorders such as psychosis, depression and anxiety in the elderly. On the other hand, it contradicts Bart et al and Salmon research because they did not mention a significant relationship between physical activity and reducing the severity of depression in the elderly. The reason for this discrepancy is perhaps in the methodology and type of training conditions in their research.

Depression and anxiety are common mental problems in the elderly, which in turn lead to a decline in quality of life, a decline in performance,

and ultimately an increase in mortality (Goodway, Ozmun & Gallahue, 2019). In terms of the effect of motor activity and exercise on psychological factors such as anxiety and insomnia, factors such as retirement, loneliness, feelings of futility and inability to fill the leisure lead to depression and anxiety. With physical exercise and activities that require movement, the leisure time of the elderly is filled and their loneliness is reduced (Haywood & Getchell, 2019; Payne & Isaacs, 2017), which leads to a change in the attitude of the elderly towards life, a sense of collaboration and cooperation, goodness and increased self-confidence. As a result, their anxiety levels are reduced.

Elavsky et al., (2005) pointed out the effectiveness of exercise and motor activity on elderly anxiety. Singh et al. Also noted the effect of physical exercise on reducing depression (Singh, Clements & Singh, 2001). Trivedi et al., (2006) Also confirmed this result. Exercise, on the other hand, reduces anxiety; which leads to self-confidence and self-sufficiency, and according to some reports, increased self-esteem may be related to the regulation of endocrine, catecholamines, and the internal system that occurs after exercise in the body (Peluso & Andrade, 2005).

The findings of the present study showed that functional training has an effect on improving dysfunction in social action. In terms of the impact of sport on social issues, on one hand, training should be named as an effective tool for public communication, and on the other hand, the implementation of group exercises, which are social groups themselves, promotes social behavior, encourages group members to establish an active relationship with each other, thus reduces the isolation of the elderly and thus promotes social functions and improves the disorder in social functioning (Haywood & Getchell, 2019; Payne & Isaacs, 2017).

Although the mechanism of effect of exercise on various mental illnesses has not yet been fully elucidated, one theoretical model of social psychological changes associated with exercise is likely to activate the central nervous system and endorphin secretion (pacification or sedation). Therefore, participation in sports and physical activity especially in the last two decades, has been increasingly studied as an important treatment strategy to maintain and increase people's mental health (Trivedi et al., 2006). Physical activity is considered as a public health tool that can be used to prevent and treat many physical and mental illnesses (Peluso & Andrade, 2005).

Conclusion

According to the findings of the present study, performing functional exercises had a positive effect on the mental health of the elderly in general and also on the four subscales, physicalization of symptoms, anxiety, physical dysfunction and depression. In general, the results of this study showed that in the elderly aged 60 years and older, performing functional exercises as a regular and measured program increases significantly in cognitive and psychological functions. The results of this study support the idea that one of the necessities of life for the elderly is an active lifestyle. Due to the improvement of the psychological aspects of the elderly following the performance of functional exercises, the results of this study help to benefit from the use of functional exercises in the process of training and rehabilitation of the elderly.

Because these exercises can help maintain motor function and reduce the adaptability of the elderly.

Limitations

Participants' intrinsic motivation to participate in this study and the amount of sleep, rest, and nutrition they had could not be measured.

Suggestions for Further Research

It is suggested that the present study could be done about other aspects related to aging, such as dynamic and mobile balance of the elderly.

References

- [1] Alexander, M.A., Matthews, D.J., & Murphy, K.P. (Eds.). (2015). *Pediatric rehabilitation: principles and practice*. Demos Medical Publishing.
- [2] Barrett, C., & Smerdely, P. (2002). A comparison of community-based resistance exercise and flexibility exercise for seniors. *Australian Journal of Physiotherapy*, 48(3), 215-219.
- [3] Carroll, T.J., Benjamin, B., Stephan, R., & Carson, R. G. (2001). Resistance training enhances the stability of sensorimotor coordination. *Proceedings of the Royal Society of London. Series B: Biological Sciences*, 268(1464), 221-227.
- [4] Cowper, W., & Grant, S. (2003). The effect of 12-weeks group exercise program on physiological variable and function in over weight persons. *Public Health*, 191(12), 617-23.
- [5] Cromwell, R.L., Meyers, P.M., Meyers, P.E., & Newton, R.A. (2007). Tae Kwon Do: an effective exercise for improving balance and walking ability in older adults. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, 62(6), 641-646.
- [6] Donohue, B., Covassin, T., Lancer, K., Dickens, Y., Miller, A., Hash, A., & Genet, J. (2004). Examination of psychiatric symptoms in student athletes.

The Journal of general psychology, 131(1), 29-35.

- [7] Elavsky, S., McAuley, E., Motl, R.W., Konopack, J.F., Marquez, D.X., Hu, L., & Diener, E. (2005). Physical activity enhances long-term quality of life in older adults: Efficacy, esteem, and affective influences. *Annals of Behavioral Medicine*, 30(2), 138-145.
- [8] Goodway, J.D., Ozmun, J.C., & Gallahue, D.L. (2019). *Understanding motor development: Infants, children, adolescents, adults*. Jones & Bartlett Learning.
- [9] Grant, S., Todd, K., Aitchison, T.C., Kelly, P., & Stoddart, D. (2004). The effects of a 12-week group exercise programme on physiological and psychological variables and function in overweight women. *Public Health*, 118(1), 31-42.
- [10] Haywood, K., & Getchell, N. (2019). Life span motor development. Human Kinetics. PO Box 5076, Champaign, IL, 61825-5076.
- [11] Kami, A., Meyer, G., Jezzard, P., Adams, M.M., Turner, R., & Ungerleider, L.G. (1995). Functional MRI evidence for adult motor cortex plasticity during motor skill learning. *Nature*, 377(6545), 155-158.
- [12] Kemoun, G., Thibaud, M., Roumagne, N., Carette, P., Albinet, C., Toussaint, L., & Dugué, B. (2010). Effects of a physical training programme on cognitive function and walking efficiency in elderly persons with dementia. *Dementia and geriatric cognitive disorders*, 29(2), 109-114.
- [13] Khazaei Jalil, S., Azmoon, A., Abdohhali, M., Ghomi, N., & Shamsizadeh, M. (2015). Quality of life among Elderly Living at Nursing Home in Shahroud city. *Journal of Geriatric Nursing*, 2(1), 39-49.
- [14] Kornatz, K.W., Christou, E.A., & Enoka, R.M. (2005). Practice reduces motor unit discharge variability in a hand muscle and improves manual dexterity in old adults. *Journal of applied physiology*, 98(6), 2072-2080.
- [15] Leung, M., Rantalainen, T., Teo, W., & Kidgell, D. (2015). Motor skill training and strength training are associated with the same plastic changes in the central nervous system. *Journal of Science and Medicine in Sport*, 19, e19.
- [16] Malek Afzali, H., Baradaran Eftekhary, M., Hejazi, F., Khojasteh, T., Tabrizi, R., & Faridi, T. (2007). Social mobilization for health promotion in the elderly. *Hakim Research Journal*, 9(4), 1-6.
- [17] Mirzaie, M., & Darabi, S. (2017). Population aging in Iran and rising health care costs. *Iranian Journal of Ageing*, 12(2), 156-169.
- [18] Moore, M.J., & Werch, C. (2008). Relationship between vigorous exercise frequency and substance use among first-year drinking college students. *Journal of American college health*, 56(6), 686-690.
- [19] Morovatisharifabad, M.A., Ghofranipour, F.A., Heydarnia, A.R., & Babaeirochi, G.R. (2004). Perceived religious support of health promoting behavior and status doing these behaviors in Aged 65 years and older in Yazd. *The Journal of Shahid Sadoughi University of Medical Sciences*, 12(1), 23-9.
- [20] Mortazavi, S.S., Ardebili, H.E., Eshaghi, S.R., Beni, R.D., Shahsiah, M., & Botlani, S. (2012). The Effectiveness of Regular Physical Activity on Mental Health in Elderly. *Journal of Isfahan medical school*, 29(161).
- [21] Nagy, E., Feher-Kiss, A., Barnai, M., Domján-Preszner, A., Angyan, L., & Horvath, G. (2007). Postural control in elderly subjects participating in balance training. *European journal of applied physiology*, 100(1), 97-104.
- [22] Newsom, J.T., & Schulz, R. (1996). Social support as a mediator in the relation between functional status and quality of life in older adults. *Psychology and aging*, 11(1), 34.

- [23] Payne, V.G., & Isaacs, L.D. (2017). *Human motor development: A lifespan approach*. Routledge.
- [24] Peluso, M.A.M., & Andrade, L.H.S.G.D. (2005). Physical activity and mental health: the association between exercise and mood. *Clinics*, 60(1), 61-70.
- [25] Salmon, P. (2001). Effects of physical exercise on anxiety, depression, and sensitivity to stress: a unifying theory. *Clinical psychology review*, 21(1), 33-61.
- [26] Samadi, S., Bayat, A., Taheri, H., Joneid, B.S., & Rouzbahani, N. (2007). Knowledge, Attitude and Practice of Elderly Towards Lifestyle During Aging (Letter to Editor).
- [27] Saxena, S., Van Ommeren, M., Tang, K.C., & Armstrong, T.P. (2005). Mental health benefits of physical activity. *Journal of Mental Health*, 14(5), 445-451.
- [28] Schaie, K.W., & Willis, S.L. (Eds.). (2010). *Handbook of the psychology of aging*. Academic Press.
- [29] Singh, N.A., Clements, K.M., & Singh, M.A.F. (2001). The efficacy of exercise as a long-term antidepressant in elderly subjects: a randomized, controlled trial. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, 56(8), M497-M504.
- [30] Thompson, C.J., Cobb, K.M., & Blackwell, J. (2007). Functional training improves club head speed and functional fitness in older golfers. *The Journal of Strength & Conditioning Research*, 21(1), 131-137.
- [31] Trivedi, M.H., Greer, T.L., Grannemann, B.D., Chambliss, H.O., & Jordan, A.N. (2006). Exercise as an augmentation strategy for treatment of major depression. *Journal of Psychiatric Practice*®, 12(4), 205-213.
- [32] Walaszek, A. (2009). Clinical ethics issues in geriatric psychiatry. *Psychiatric Clinics*, 32(2), 343-359.
- [33] Yavarian, Y., & Nikakhtar, M. (2011). Effects of Aerobic Exercise, on Women Mental Health. *Nursing and Midwifery Journal*, 9(1), 0-0.