Journal of Applied Psychology & Behavioral Science. Vol., 9 (1), 48-54, 2024
Available online at http://www. japbs.com/
ISSN 2536-524X © 2024

The Effects of Pilates Training on Static and Dynamic Balance of Older Adults with History of Fall

Tayebeh Baniasadi

College of Human Science& Education, School of Kinesiology, Baton Rouge, LA.

Corresponding Author Email: tbania1@lsu.edu

ABSTRACT: Background and Purpose: There has been limited focus on the influence of Pilates exercises on balance in older individuals who have previously fallen. Hence, the aim of this study was to assess the effects of participating in a Pilates exercise regimen on both static and dynamic balance in elderly individuals with a history of falls.
Methods: The study conducted was semi-experimental in nature, utilizing a pre-test and post-test design with both control and experimental groups. 73 old adults aged over 65 were randomly assigned to either the experimental (37 individuals) or control group (36 individuals). The Pilates regimen consisted of a structured routine lasting 21 minutes, comprising 11 minutes for warming up, 41 minutes for Pilates exercises, and 11 minutes for cooling down. This regimen was followed three times a week for a duration of eight weeks. Data was collected using standard questionnaires. T tests was used to analyze data.
Results: The BMI of the participants was higher than normal (mean=29.67). The results showed a significant distinction between the experimental and control groups in static balance ($t=10.27$, $P<0.001$) and dynamic balance ($t=12.07$, $P<0.001$) after intervention, where Pilates group had significantly higher scores than control group.
Conclusions: The research findings indicate a significant improvement in both static and dynamic balance among the participants in the Pilates group. Consequently, it is imperative to incorporate these exercises into the routine of elderly individuals with a history of falls.

Keywords: Pilates, Sport, Balance, Fall, Older Adults

INTRODUCTION

Aging is an inevitable occurrence in human society. It is a natural process where the physiological structures and functions of the body, including the central and peripheral nervous systems, gradually deteriorate and undergo erosive changes, leading to a noticeable decline in cognitive and motor skills among the elderly (Dana et al. 2021, 2023; Sadeghipor et al. 2021). The elderly are individuals aged 21 and above, with a growth rate of 2.4% compared to the global population growth rate of 1.7%. Projections suggest that this demographic will reach one billion two hundred and nine million by 2125, indicating a doubling of their population every 25 years (Bandura, 1997; Baniasadi, et al. 2018; Chaharbaghi, et al. 2022; Chris, et al. 2010; Conner & Davidson, 2003; Zaborova et al. 2023).

Conversely, a critical challenge faced by the elderly is the issue of balance, which is essential for carrying out daily activities. Balance is defined physiologically as the coordination of various mechanisms, and biomechanically as the ability to maintain the body's center of gravity within a stable range (Davidson, 2003;

Ellis et al. 2013; Faircloth, 2017; Seyedi Asl et al. 2016, 2021). It also involves maintaining correct posture in both dynamic and static tasks, requiring a complex interaction of environmental, visual, muscular, neural, and motor factors affected by aging (Hosseini, et al. 2022; Khosravi, et al. 2023; Shafaei et al. 2024). Maintaining static and dynamic balance is crucial for the physical health of the elderly, as a decline in capabilities can have detrimental effects on daily activities. Imbalance has been identified as a major cause of falls among the elderly, highlighting the importance of the balance and posture control system, which involves the coordination of the vision, vestibular, and deep sensory systems (American Psychological Association, 2014; Sadeghipor et al. 2021; Vasconcelos et al. 2013).

Physical activity and exercise play a crucial role in preventing, delaying, or treating issues related to aging (Hazrati et al. 2022; Herrick & Ainsworth, 2003; Seyyedrezaei et al. 2021). The positive impact of physical activity on the quality of life of older individuals is well-documented. It is widely acknowledged that engaging in physical activity can help prevent balance issues and enhance lung function in the elderly. Despite being a cost-effective and low-risk method for maintaining and improving balance and pulmonary function, the full extent of exercise benefits on these systems remains a topic of debate (Ghorbani et al. 2020a, 2020b). Experts emphasize the importance of tailoring exercise programs to the specific physical and functional needs of older adults, considering their muscle weakness, physical limitations, and fear of falling (Abdoshahi & Ghorbani 2022; Ohler et al. 2010; Ramachandra et al. 2013; Taghva et al. 2020). Pilates, a form of exercise that focuses on balance and controlled breathing, is recognized as a unique approach to physical fitness. This method combines strength training, flexibility, and breathing techniques to strengthen muscles and promote muscle balance.

Numerous research studies have demonstrated that Pilates exercises offer a suitable approach for training the mind and body, enhancing postural control through the strengthening of the neuromuscular system, and improving sensorimotor control of trunk and central body muscles (Letvak et al. 2012; Masten, 2001; Shafaei et al. 2024). Additionally, these exercises have been found to enhance balance in elderly individuals (Afsanepurak et al. 2012; Sadeghipor & Aghdam, 2021a, 2021b; Taso et al. 2014). While several studies have explored the impact of physical activity and exercise on balance in the elderly, some indicating that sports activities can lead to improved balance and coordination, the effect of Pilates exercises on balance in elderly individuals who have experienced falls has received less attention. Consequently, the objective of this study was to examine the impact of participating in a Pilates exercise program on both static and dynamic balance in elderly individuals who have a history of falls.

METHODS

The study conducted was semi-experimental in nature, utilizing a pre-test and post-test design with both control and experimental groups. The research focused on elderly aged over 65. Despite 93 volunteers initially expressing interest, most were deemed ineligible based on entry and exit criteria. Ultimately, 73 qualified subjects meeting the necessary conditions were randomly assigned to either the experimental (37 individuals) or control group (36 individuals), adhering to the minimum sample size requirement of 30 participants per group in experimental and semi-experimental studies. Inclusion criteria encompassed factors such as age, mobility, a history of fall, and health status, while exclusion criteria included chronic illnesses and non-compliance with the study protocol. Following a thorough examination and approval from a medical professional, participants were granted permission to engage in the exercise program.

In order to assess the static balance, the Flamingo balance test (Chaharbaghi, et al. 2022), also known as the stork test, was utilized. The procedure involved the subject placing their hand on their waist (above the crown of the head) and positioning the sole of their non-dominant foot next to the knee of their other foot. While maintaining their balance, they were required to place their chest on the superior leg. The individual's score was then recorded in terms of the duration (in seconds) from the moment they stood on the chest of the leg until their balance was disrupted and their legs and hands separated.

The Timed Up and Go (TUG) test (Davidson, 2003) was used for assessing dynamic balance which involves standing up from a seated position in a chair, walking three meters, maneuvering around a plastic cone, and returning to a seated position, all timed in seconds. Lower scores on the TUG test indicate better balance ability. This test is not only a measure of dynamic balance but also a reflection of overall mobility, as it encompasses various body transitions, changes in direction, and shifts in the center of mass. Each participant completed the test twice, with the best score (lowest value) being utilized for data analysis.

The Pilates regimen consisted of a structured routine lasting 21 minutes, comprising 11 minutes for warming up, 41 minutes for Pilates exercises, and 11 minutes for cooling down. This regimen was followed three times a week for a duration of eight weeks. The Pilates routine began with basic exercises and progressed to include advanced stretching techniques, muscle endurance, balance, flexibility, and neuromuscular coordination, targeting major muscle groups in the upper and lower body, in standing, sitting, and lying positions, utilizing specialized equipment. To adhere to the principle of overload, the speed and repetitions of

movements were gradually increased in each session, starting with 11 repetitions in the initial week and culminating in 31 repetitions by the end of the eighth week.

The mean and standard deviation for the samples in each group were used to express the results. The Kolmogorov-Smirnov estimation test was utilized for statistical analysis after confirming the normality of the data. To examine the impact of Pilates exercises on the desired variables within each group, the t-test was employed, while the analysis of variance test was conducted to identify variations between groups. Data analysis was carried out using SPSS software (version 26). The results obtained were evaluated at a significance level below 0.05.

RESULTS

Demographic data showed that mean age of the participants was 69.67 years old. In addition, the BMI of the participants was higher than normal (mean=29.67).

Table 1. Demographic data and descriptive results across gender

Indicator	Group	No.	mean±SD	P
age (year)	Male	37	69.33±5.97	0.89
	female	36	69.99±3.67	
height (M)	Male	37	1.68±0.08	0.001
	female	36	1.59±0.06	
weight (Kg)	Male	37	78.97±5.91	0.008
	female	36	72.61±6.39	
body mass index (Kg/M^2)	Male	37	29.49±3.39	0.63
	female	36	30.47±2.54	

First of all, the results of Kolmogorov-Smirnov tests showed that all research variables had normal distribution (all P>0.05).

Table 2. Results of normal distribution

	Chi square	P
1. statis balance	0.023	0.20
2. dynamic balance	0.005	0.20

Static balance

The results showed that during the initial evaluation, there was no noticeable difference in the performance of the static balance test between the experimental and control groups (t=0.33, P>0.05). However, after the intervention period, the post-evaluation results revealed a significant distinction between the experimental and control groups (t=10.27, P<0.001). Specifically, the participants in the experimental group demonstrated a significant improvement in their performance on the static balance test compared to those in the control group. Therefore, it can be concluded that the implementation of Pilates exercises had a positive impact on the static balance test of older adults with a history of falls. This conclusion is supported by the data presented in Table 3 and Figure 1.

Table 3. Comparison of static balance scores among groups

	Pretest		**Posttest**	
	Mean	SD	Mean	SD
Pilates	2.61	1.06	4.19	1.33
Control	2.59	0.76	2.48	1.22

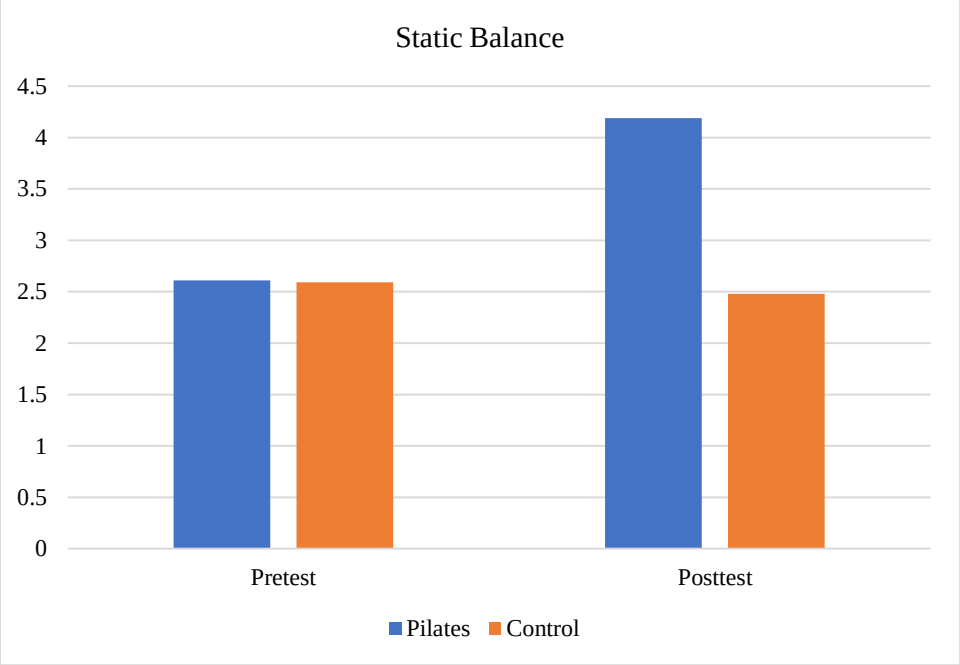

Figure 1. Mean of static balance scores among groups

Dynamic Balance

The findings indicated that there was no notable disparity in the performance of the dynamic balance test between the experimental and control groups during the initial evaluation (t=0.09, P>0.05). Nevertheless, following the intervention period, the post-assessment outcomes demonstrated a significant differentiation between the experimental and control groups (t=12.07, P<0.001). Specifically, the participants in the experimental group exhibited a substantial enhancement in their dynamic balance test performance in comparison to those in the control group. Hence, it can be inferred that the implementation of Pilates exercises had a beneficial influence on the dynamic balance test of older adults with a history of falls. This deduction is corroborated by the information presented in Table 4 and Figure 2.

Table 4. Comparison of dynamic balance scores among groups

	Pretest		**Posttest**	
	Mean	SD	Mean	SD
Yoga	2.39	0.58	4.07	1.08
Control	2.41	0.66	2.27	1.21

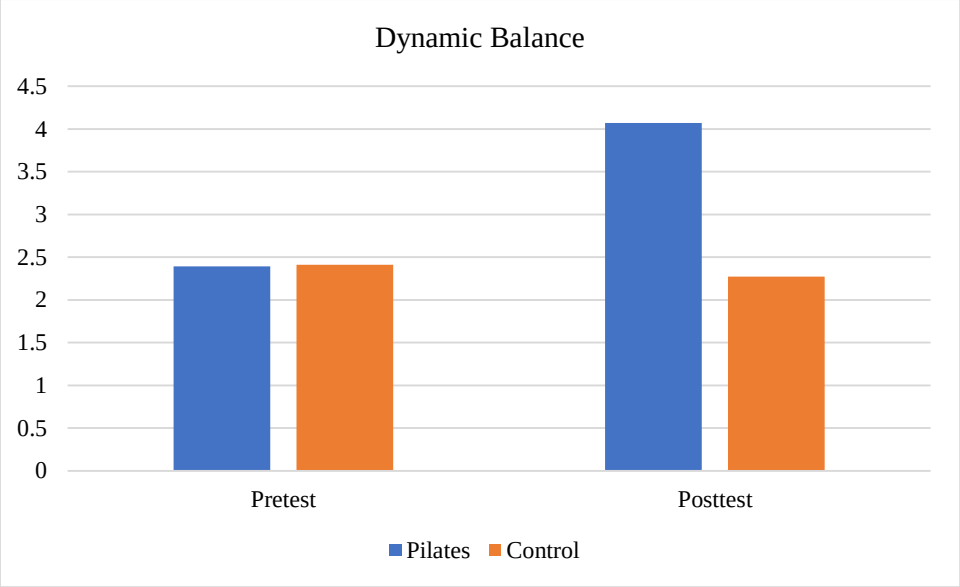

Figure 2. Mean of dynamic balance scores among groups

DISCUSSION

Various research studies have delved into the effects of physical activity and exercise on balance among the elderly, with some suggesting that engaging in sports activities can enhance balance and coordination. However, there has been limited focus on the influence of Pilates exercises on balance in older individuals who have previously fallen. Hence, the aim of this study was to assess the effects of participating in a Pilates exercise regimen on both static and dynamic balance in elderly individuals with a history of falls. The findings indicated that following the intervention period, the post-assessment results demonstrated a notable enhancement in the static and dynamic balance performance of participants in the experimental group compared to those in the control group. Consequently, it can be inferred that the incorporation of Pilates exercises yielded positive outcomes on the static and dynamic balance abilities of older adults who have experienced falls.

The research findings generally demonstrate the positive impact of mental imagery and Pilates practice on the elderly (Chaharbaghi, et al. 2022; Chris, et al. 2010; Conner & Davidson, 2003). Overall, the studies included in this research consistently show a significant enhancement in the static balance of older individuals. Static balance refers to the body's corrective movements aimed at maintaining a stable body position. Postural sway is typically assessed while a person is standing still, reflecting the body's efforts to sustain equilibrium. An increase in postural sway indicates greater effort and a decline in balance. This phenomenon can be explained by the fact that Pilates exercises promote neuromuscular stimulation, suggesting that these exercises may enhance neuromuscular function more effectively in individuals with compromised postural control, such as the elderly (Sadeghipor & Aghdam, 2021a, 2021b). Furthermore, from an anatomical perspective, strengthening the muscles around the body's center of gravity (as targeted by Pilates movements) enhances the neuromuscular system, reduces the displacement of the center of gravity beyond the support surface, minimizes fluctuations, and consequently decreases the risk of balance loss and falls (Sadeghipor et al. 2021; Vasconcelos et al. 2013). In conclusion, Pilates exercises are generally considered an effective approach for enhancing mind-body awareness, controlling postural movements, and meeting high neuromuscular demands, particularly in cases where balance is compromised due to aging, ultimately leading to improved static balance.

Joseph Pilates believed that individuals can gain control over their bodies by practicing contrololology, which involves coordinating the mind and body. Through this practice, they can develop sensory-motor control over the deep and central muscles of the body (Chris, et al. 2010; Conner & Davidson, 2003). By incorporating Pilates exercises into their training routine, individuals can challenge the mechanisms responsible for maintaining static balance, thereby enhancing their balance. The improvement in balance achieved through Pilates exercises can be attributed to the enhancement of muscle strength and psychological factors among participants. When the muscle strength in the lower limbs decreases, it can lead to an imbalance in the placement of the center of gravity, causing balance issues and potential falls. Conversely, by improving muscle strength, the center of gravity can be shifted towards the ankle joint, resulting in improved balance (Ellis et al. 2013; Faircloth, 2017).

The enhancement of balance is the outcome of various factors, and these factors play a significant role in improving balance. These factors include sensory integration, the musculoskeletal system, and the nervous system. The combined effect of these factors influences an individual's overall balance (Ghorbani et al. 2020a, 2020b). As individuals age, these systems tend to deteriorate, and enhancing these indicators can result in improved balance in old age. By engaging in Pilates exercises, the strength of the lower limb extensors is increased, which in turn improves walking mechanics. This improvement leads to an increase in walking speed, a reduction in 10-minute walking time, and an improvement in standing and walking duration. Furthermore, Pilates exercises enhance the control of movement in the lower back. This is achieved by activating muscles such as the transverse abdominal, internal oblique, external oblique, and multiceps. Additionally, improving the proprioceptive system in the central muscles of the body can enhance posture and alignment of the trunk. Strengthening these muscles also helps maintain stability in the pelvis and vertebrae, preventing anterior pelvic tilt and increasing hip flexion range of motion within the pelvis. Ultimately, this aids in increasing stride length in older individuals (Letvak et al. 2012; Masten, 2001).

CONCLUSION

The research findings indicate a significant improvement in both static and dynamic balance among the participants in the Pilates group. Consequently, it is imperative to incorporate these exercises into the routine of elderly individuals with a history of falls. A substantial portion of Pilates exercises focuses on enhancing balance, strength, and flexibility. As a result, it is evident that the experimental groups experienced enhanced balance and body flexibility. The decline in strength, flexibility, and muscular endurance can lead to altered stepping patterns and increase the likelihood of falls. However, a carefully designed program can help mitigate these risks. It is important to acknowledge that the present study had limitations, such as the limited duration due to space and facility constraints. Future studies should address these limitations and explore the role of

psychological factors, such as fear, anxiety, stress, depression, and self-esteem, in the physical activity and performance of elderly individuals, as they can contribute to an increased risk of falling.

REFERENCES

Abdoshahi, M., & Ghorbani, S. (2022). Effects of Playground Availability on Participation of Children in Physical Activity: The Role of Socioeconomic Status. *International Journal of School Health*, 9(3), 186-191. [Google Scholar] [Publisher] doi:10.30476/intjsh.2022.96051.1245

Afsanepurak, S. A., Bahram, A., Dana, A., Abdi. J. (2012). The effect of self-talk and mental imagery on self-efficacy in throwing darts in adolescents. *International Research Journal of Applied & Basic Sciences*, 3(3), 594-600. [Google Scholar] [Publisher]

American Psychological Association. (2014). *The Road to Resilience*. Washington, Dc: American Psychological Association. [Google Scholar] [Publisher]

Bandura, A. (1997). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191–215. [Google Scholar] [Publisher] doi:10.1037/0033-295X.84.2.191

Baniasadi, T., Namazizadeh, M., Sheikh, M. (2018). Attentional focus can affect sway in postural and supra-postural tasks in community-dwelling older adults. *The Annals of Applied Sport Science*, 6, 31–37. [Google Scholar] [Publisher]

Chaharbaghi, Z., Baniasadi, T., & Ghorbani, S. (2022). Effects of Teacher's Teaching Style in Physical Education on Moderate-to-Vigorous Physical Activity of High-School Students: An Accelerometer-based Study. *International Journal of School Health*, 9(3), 143-150. [Google Scholar] [Publisher] doi:10.30476/intjsh.2022.95204.1224

Chris, C., et al. (2010). Effects of yoga versus walking on mood, anxiety, and brain levels: A randomized controlled MRS study. *The Journal of Alternative and Complementary Medicine*, 16(11), 1145-1152. [Google Scholar] [Publisher] doi:10.1089/acm.2010.0007

Conner, K. M., & Davidson, J. R. T. (2003). Development of a new Resilience scale: The Conner – Davidson Resilience Scale (CD-RISC). *Depression & Anxiety*, 18, 76-82. [Google Scholar] [Publisher] doi:10.1002/da.10113

Dana, A., Ranjbari, S., Chaharbaghi, Z., & Ghorbani, S. (2023). Association between Physical Activity and Motor Proficiency among Primary School Children. *International Journal of School Health*, 10(3), 128-135. [Google Scholar] [Publisher] doi:10.30476/intjsh.2023.98237.1295

Dana, A., Ranjbari, S., Salehian, M. H., & Shayan Matin, P. (2021). Effects of Cognitive-Behavioral Therapy on Mental Health of High-School Students during COVID-19 Pandemic. *International Journal of School Health*, 8(4), 201-208. [Google Scholar] [Publisher] doi:10.30476/intjsh.2021.92100.1165

Davidson, C. (2003). Development of a new resilience scale: The Connor Davidson resilience scale (CD-RISC). *Journal of Depression and anxiety*, 18, 76-82. [Google Scholar] [Publisher] doi:10.1002/da.10113

Ellis, N., Randall, J., & Punnett, G. (2013). The effects of a single bout of exercise on mood and self-esteem in clinically diagnosed mental health patients. *Open Journal of Medical Psychology*, 2(3), 81-85. [Google Scholar] [Publisher] doi:10.4236/ojmp.2013.23013

Faircloth, A. L. (2017). Resilience as a mediator of the relationship between negative life events and psychological well-being. *Electronic Theses & Dissertations*, 1373. [Google Scholar] [Publisher]

Ghorbani, S., Ghanati, P., Dana, A., & Salehian, M. H. (2020a). The Effects of Autonomy Support on Observational Motor Learning. *Iranian Journal of Learning and Memory*, 3(11), 77-87. [Google Scholar] [Publisher] doi:10.22034/iepa.2021.242953.1195

Ghorbani, S., Yadolahzadeh, A., Shakki, M., & Noohpisheh, S. (2020b). Association between Second to Fourth Digit Ratio with Handwriting Quality and Speed among Elementary School Children. *International Journal of Pediatrics*, 8(9), 12053-12060. [Google Scholar] [Publisher] doi:10.22038/ijp.2020.47498.3854

Hazrati, Z., Ranjbari, S., Baniasadi, T., & Khajehaflaton, S. (2022). Effects of Social Support on Participation of Children with ADHD in Physical Activity: Mediating Role of Emotional Wellbeing. *International Journal of Pediatrics*, 10(10), 16880-16886. [Google Scholar] [Publisher] doi:10.22038/ijp.2022.64698.4899

Herrick, C., & Ainsworth, A. (2003). Invest in yourself: Yoga as a self-care strategy. *Nurs-Forum*, 35(2), 32-36. [Google Scholar] [Publisher] doi:10.1111/j.1744-6198.2000.tb00996.x

Hosseini, F. B., Ghorbani, S., & Rezaeeshirazi, R. (2022). Autonomy Support, Needs Satisfaction, Motivation, and Intention to Do Physical Activities in Adolescents: A Validation study. *International Journal of Pediatrics*, 10(2), 15399-15411. [Google Scholar] [Publisher] doi:10.22038/ijp.2021.55491.4370

Khosravi, M., et al. (2023). Parenting styles, maladaptive coping styles, and disturbed eating attitudes and behaviors: a multiple mediation analysis in patients with feeding and eating disorders. *PeerJ*, 11, e14880. [Google Scholar] [Publisher] doi:10.7717/peerj.14880

Letvak, S., Ruhm, C., & Mccoy, T. (2012). Depression in hospital-employed nurses. *Clinical Nurse Specialist*, 26(3), 177-182. [Google Scholar] [Publisher] doi:10.1097/nur.0b013e3182503ef0

Masten, A. (2001). Ordinary Magic: Resilience Processes in Development. *American Psychologist*, 56(3), 227-38. [Google Scholar] [Publisher] doi:10.1037/0003-066X.56.3.227

Mikkelsen, K., Stojanovska, L., Polenakovic, M., Bosevski, M., & Apostolopoulos, V. (2017). Exercise and mental health. *National Library of Medicine*, 106, 48-56. [Google Scholar] [Publisher]

doi:10.1016/j.maturitas.2017.09.003
Moradi, J., Bahrami, A., & Dana, A. (2020). Motivation for participation in sports based on athletes in team and individual sports. *Physical Culture and Sport, Studies & Research*, 85(1), 14–21. [Google Scholar] [Pulisher] doi:10.2478/pcssr-2020-0002
Ohler, M., Forbes, D., & Kerr, M. (2010). Depression in nurses. *Canadian Journal of Nursing Research*, 42(3), 66-82. [Google Scholar] [Publisher]
Ramachandra, P. U., Varambally, S., Philip, M., & Gangadhar, B. N. (2013), Effect of yoga therapy on anxiety and depressive symptoms and quality-of-life among caregivers of in-patients with neurological disorders at a tertiary care center in India: A randomized controlled trial. *Indian Journal of Psychiatry*, 55(3), 385-389. [Google Scholar] [Publisher] doi:10.4103/0019-5545.116304
Sadeghipor, N., & Aghdam, B. H. (2021a). Investigating the effect of appropriate personal protective equipment on the stress level of care workers in the Covid19 epidemic. Iran. *Health Science Journal*, 3, 7. [Google Scholar] [Publisher]
Sadeghipor, N., & Aghdam, B. H. (2021b). The effect of pesticides on child gender and the level of sexual activities in people exposed –Iran. *MAR Gynecology*, 1(4). [Google Scholar] [Publisher] doi:10.1027/MARGY.2021.0106
Sadeghipor, N., Aghdam, B. H., & Kabiri, S. (2021). Evaluation of burnout and job stress in care worker and comparison between front-line and second line in care worker during coronavirus epidemic. *Health Science Journal*, 3, 8. [Google Scholar] [Publisher]
Sadeghipor, N., Kabiri, S., & Aghdam, B. H. (2021). Investigating the pesticides impact on mental health of exposed workers – Iran. *MAR Case Reports*, 2(6). [Google Scholar] [Publisher] doi:10.1027/MARCR.2021.0164
Seyedi Asl, S. T., Rahnejat, A. M., Elikaee, M. M., Khademi, M., Shahed-HaghGhadam, H., & Taghva, A. (2021). The role of resilience, positive/negative emotions, and character strengths in predicting burnout of military personnel. *EBNESINA*, 22(4), 4-13. [Google Scholar] [Publisher]
Seyedi-Asl, S. T., Sadeghi, K., Bakhtiari, M., Ahmadi, S. M., Nazari-Anamagh, A., & Khayatan, T. (2016). Effect of group positive psychotherapy on improvement of life satisfaction and the quality of life in infertile woman. *International Journal of Fertility & Sterility*, 10(1), 105–112. [Google Scholar] [Publisher] doi:10.22074%2Fijfs.2016.4775
Seyyedrezaei, S. H., Khajeaflaton, S., Ghorbani, S., & Dana, A. (2021). Relative Age Effects on Children's Handwriting: Role of Visual-Motor Integration. *International Journal of Pediatrics*, 9(1), 12775-12783. [Google Scholar] [Publisher] doi:10.22038/IJP.2020.52763.4179
Shafaei, H., Najafzadeh, F., Shakki, M., & Ghorbani, S. (2024). Associations between Physical Activity and Quality of Life, Happiness, and Depression among Elderly Women. *Women's Health Bulletin*, 11(2), 104-111. [Google Scholar] [Publisher] doi:10.30476/whb.2024.101984.1276
Shafaei, H., Rezaei, N., Mohammadi, S., & Ghorbani, S. (2024). Correlations between Physical Activity and Social Health, Moral Development and Physical Fitness among Middle School Students. *International Journal of School Health*, 11(2), 97-104. [Google Scholar] [Publisher] doi:10.30476/intjsh.2024.101704.1388
Sharma, M. (2014). Yoga as an alternative and complementary approach for stress management: a systematic review. *Evidence-Based Complementary & Alternative Medicine*, 19(1), 59-67. [Google Scholar] [Publisher] doi:10.1177/2156587213503344
Taghva, A., Seyedi Asl, S. T., Rahnejat, A. M., & Elikaee, M. M. (2020). Resilience, emotions, and character strengths as predictors of job stress in military personnel. *Iranian Journal of Psychiatry & Behavioral Sciences*, 14(2), e86477. [Google Scholar] [Publisher] doi:10.5812/ijpbs.86477
Taso, C. J., Lin, H. S., Lin, W. L., Chen, S. M., Huang, W. T., & Chen, S. W. (2014). The effect of yoga exercise on improving depression, anxiety, and fatigue in woman with breast cancer: a randomized controlled trial. *The Journal of Nursing Research*, 22(3), 155-164. [Google Scholar] [Publisher] doi:10.1097/jnr.0000000000000044
Vasconcelos, A., França, I; Coura, A., Enders, B., Cartaxo, H., & Sousa, F. (2013). Self-care in neurogenic intestine in subjects with spinal cord injury: An integrative review. *Online Brazilian Journal of Nursing*, 12(4), 998-1010. [Google Scholar] [Publisher] doi:10.5935/1676-4285.20133692
Zaborova, V., et al (2023). Associations between Physical Activity and Kyphosis and Lumbar Lordosis Abnormalities, Pain, and Quality of Life in Healthy Older Adults: A Cross-Sectional Study. *Healthcare (Basel)*, 29, 11(19), 2651. [Google Scholar] [Publisher] doi:10.3390/healthcare11192651