

The Effects of Yoga Training on Balance Performance and Quality of Life of Elderly with Parkinson

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Abstract

Background and Purpose: To enhance the independent living of the elderly community, especially women who are more prone to balance issues, it is crucial to investigate and diagnose the factors affecting their balance. Therefore, addressing this matter is of significant importance. As a result, this study seeks to examine the effects of yoga practice on the balance and quality of life of older individuals with Parkinson's disease.

Methods: The study conducted was of a semi-experimental nature, with a statistical population of 48 elderly individuals diagnosed with Parkinson's disease. The participants underwent a 6-week training program, with sessions held three times a week for a duration of 60 minutes each. Data was collected using standard questionnaires. The collected data was analyzed using SPSS software version 26, employing a correlated t-test at a significance level of $P < 0.05$.

Results: The findings indicated a significant distinction between the experimental and control groups regarding static balance ($t = -9.67$, $P < 0.001$), dynamic balance ($t = 5.67$, $P < 0.001$) and quality of life ($t = 13.67$, $P < 0.001$) after intervention, where experimental group showed significantly higher scores than control group.

Conclusions: Practicing Hatha Yoga exercises can have a positive impact on improving balance and overall quality of life for elderly individuals with Parkinson's disease. This suggests that incorporating concentration exercises like yoga into their routine could serve as a significant external factor in enhancing their quality of life.

Keywords: Yoga, Parkinson, Elderly, Intervention, Exercise

Introduction

Parkinson's is a persistent neurological condition that impacts physical movements. The condition arises from the degeneration, weakening, or impairment of nerve cells that produce dopamine in the substantia nigra region of the brain (Ghorbani et al. 2020a, 2020b). As dopamine levels decrease and the balance between dopamine and acetylcholine is disrupted, essential neurotransmitters in the body, other areas responsible for regulating movement function abnormally, leading to movement disorders in affected individuals (Afsanepurak et al. 2012; Sadeghipor & Aghdam, 2021a, 2021b; Taso et al. 2014). The initial signs of the disease manifest once approximately 80% of dopamine-producing cells are damaged. These signs encompass tremors, bradykinesia (slowness of movements), muscle rigidity, impaired balance, and postural instability resulting from insufficient dopamine levels.

Parkinson's disease is commonly found in the elderly population and is a leading cause of disability in this age group. As individuals age and become less physically active, the abilities and functions of those with Parkinson's disease decline (Davidson, 2003; Ellis et al. 2013; Faircloth, 2017; Seyedi Asl et al. 2016, 2021). These patients experience a faster decline in physical fitness, along with a decrease in self-confidence and coordination. As the disease progresses and reaches severe stages, functional capacity diminishes. Numerous studies have indicated that depression plays a role in the decline of motor function and the increase in disability

as the disease advances. The reduction in physical activity, self-confidence, and movement speed results in patients relying on others for assistance with daily tasks, ultimately leading to social isolation due to limited activities and decreased mobility (Abdoshahi & Ghorbani 2022; Ohler et al. 2010; Ramachandra et al. 2013; Taghva et al. 2020; Hazrati et al. 2022; Herrick & Ainsworth, 2003; Seyyedrezaei et al. 2021). The primary objective of treating Parkinson's disease is to preserve the patient's independence and enhance their overall quality of life.

The findings of the study indicate that managing Parkinson's patients' condition should involve exercise targeting both the body's sensory system and musculoskeletal system. This approach enables individuals to effectively react to unexpected shifts in their center of gravity during everyday tasks (Hosseini, et al. 2022; Khosravi, et al. 2023; Shafaei et al. 2024). Maintaining stability during standing, walking, and other routine activities is crucial. Enhancing balance and preventing falls in Parkinson's patients is essential due to their impaired proprioception and movement perception.

The research findings indicate that managing Parkinson's patients' condition should involve exercise targeting both the body's sensory and musculoskeletal systems to enable them to react effectively to sudden shifts in their center of gravity during daily tasks. Maintaining balance during activities like standing, walking, and other routine tasks is crucial (Bandura, 1997; Baniyadi, et al. 2018; Chaharbaghi, et al. 2022; Chris, et al. 2010; Conner & Davidson, 2003; Zaborova et al. 2023). Therefore, enhancing balance and preventing falls in Parkinson's patients is essential due to their impaired proprioception and movement perception. Balance, which impacts posture stability, is a key aspect to focus on in any exercise regimen. Numerous studies have demonstrated that exercise training yields positive outcomes on Parkinson's disease motor symptoms, enhancing motor function, daily task performance, balance, and flexibility (Dana et al. 2021, 2023; Sadeghipor et al. 2021).

Tai Chi, Pilates, and yoga are beneficial activities for older individuals. Yoga, a form of exercise performed in a state of calmness and relaxation, helps strengthen muscles, nerves, and internal organs (Letvak et al. 2012; Masten, 2001; Shafaei et al. 2024). People of all ages and physical conditions can participate in yoga, which can enhance attention, strength, muscular endurance, proprioception, balance, flexibility, and mobility. Hatha yoga, a popular form of yoga, improves body balance, vitality, lung capacity, and mental focus. This practice allows individuals to regulate sympathetic activity. Some studies suggest that yoga exercises significantly improve physical condition and balance in older adults, while others indicate a minimal effect (American Psychological Association, 2014; Sadeghipor et al. 2021; Vasconcelos et al. 2013). The discrepancies in research findings may be attributed to variations in training programs, intensity, and duration.

Understanding the factors that impact the balance of older individuals is crucial. Consequently, it is imperative to take measures to enhance these factors, leading to improved balance, reduced risk of falls and related injuries, and overall increased independence in performing daily tasks and enhancing quality of life. With the global rise in the elderly population, there has been a focus on addressing the healthcare and well-being of this group, including the provision of specialized services such as sports. Therefore, in order to enhance the independent living of the elderly community, particularly women who are more susceptible to balance issues, it is essential to investigate and diagnose the factors that affect their balance. This will help ensure safety during daily physical activities and exercise, and prevent fall-related injuries within this demographic. Hence, it is a significant and necessary matter to address. Consequently, this study aims to explore the impact of yoga practice on the balance and quality of life of older individuals with Parkinson.

Methods

The study conducted was of a semi-experimental nature, with a statistical population of 48 elderly individuals diagnosed with Parkinson's disease. The participants were selected using an available sampling method. Prior to commencing the research, written consent was obtained from all participants. Pre-test and post-test measurements were taken, each repeated three times, and the average was calculated for use in the study. Inclusion criteria for the research involved being in stages 1-3 of Parkinson's disease, not engaging in sports activities or physiotherapy treatments during the study, and not having chronic heart diseases or recent open surgeries. Exclusion criteria included having epilepsy, severe mental disorders, heart diseases, chronic high blood pressure, severe back pain, urinary incontinence, chronic coughs, advanced hemorrhoids, or recent open surgeries.

The measurement of static balance involved the utilization of the "Sharpanand Romberg" test, which demonstrated high reliability with eyes open (0.90-0.91) and slightly lower reliability with eyes closed (0.76-0.77) (Khosravi, et al. 2023). During this test, the subject would stand barefoot with one leg (the superior leg) positioned in front of the other leg, while crossing their arms on their chest. The duration for which the subject could maintain this position with both eyes open and closed was recorded as their score. In addition, the measurement of dynamic balance involved the implementation of the functional achievement test (anterior), specifically test 17. For this test, the subject would stand in a predetermined location near a wall, with a meter installed on the wall at their superior side. The subject would then open their legs to shoulder width apart,

creating a 90-degree angle between their body and the wall. Next, the subject would raise their arm to a 90-degree angle next to the wall, and this angle would be measured in centimeters. Subsequently, the subject would be instructed to take a step and maintain their balance while leaning forward as far as possible. After reaching their maximum displacement, the distance by which the subject had moved forward was measured once again.

The SF-36 questionnaire (Letvak et al. 2012) is a widely used general questionnaire that has been implemented in over 50 countries, including Iran. Its validity and reliability have been extensively confirmed. The Questionnaire-36SF is a concise and versatile tool for assessing visual health, consisting of only 36 questions. It is designed to evaluate the overall health of both the general population and specific groups, inform health policies, and assess treatment effectiveness. This questionnaire can be self-administered, completed with the assistance of an interviewer, or filled out in person or over the phone. It evaluates four key aspects of health: physical health, general health, social health, and mental health. Each aspect is scored on a scale ranging from zero to 135, with higher scores indicating better quality of life. The interpretation of the data varies for each aspect, with the general health section scored from 0 to 21, physical health from 0 to 27, mental health from 0 to 12, and social health from 0 to 38. Overall, a score of 0 to 36 suggests a low quality of life, 37 to 80 indicates a moderate quality of life, and 81 to 135 represents a high quality of life.

The participants underwent a 6-week training program, with sessions held three times a week for a duration of 60 minutes each. During the study, the yoga movements were tailored to suit the capabilities of the elderly individuals. Once the desired variables were intervened and completed, a subsequent measurement was conducted. The collected data was analyzed using SPSS software version 26, employing a correlated t-test at a significance level of $P < 0.05$.

Results

Static balance

The findings indicated that during the initial assessment, there was no notable disparity in the static balance test performance between the experimental and control groups ($t=0.20, P>0.05$). Nevertheless, following the intervention period of eight weeks, the post-assessment results revealed a significant distinction between the experimental and control groups ($t=-9.67, P<0.001$). Specifically, the patients in the experimental group exhibited a considerable improvement in their static balance test performance compared to those in the control group. Consequently, it can be inferred that the implementation of yoga exercises had a beneficial impact on the static balance test of individuals diagnosed with Parkinson's disease. This conclusion is supported by the data presented in Table 1 and Figure 1.

Table 1. Comparison of static balance scores among groups

	Pretest		Posttest	
	Mean	SD	Mean	SD
Yoga	5.29	1.47	7.84	2.09
Control	5.23	1.42	5.19	1.07

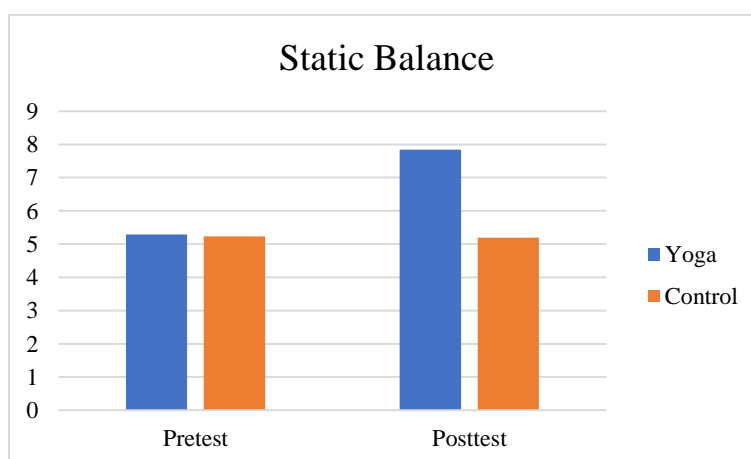


Figure 1. Mean of static balance scores among groups

Dynamic balance

The results showed that there was no significant difference in the performance of the dynamic balance test between the experimental and control groups during the initial assessment ($t=0.15, P>0.05$). However, after the eight-week intervention period, the post-assessment results revealed a significant distinction between the

experimental and control groups ($t=5.67, P<0.001$). Specifically, the patients in the experimental group showed a significant improvement in their dynamic balance test performance compared to those in the control group. Therefore, it can be concluded that the implementation of yoga exercises had a positive impact on the dynamic balance test of individuals diagnosed with Parkinson's disease. This conclusion is supported by the data presented in Table 2 and Figure 2.

Table 2. Comparison of dynamic balance scores among groups

	Pretest		Posttest	
	Mean	SD	Mean	SD
Yoga	3.09	0.92	5.37	1.23
Control	3.12	1.02	3.05	0.89

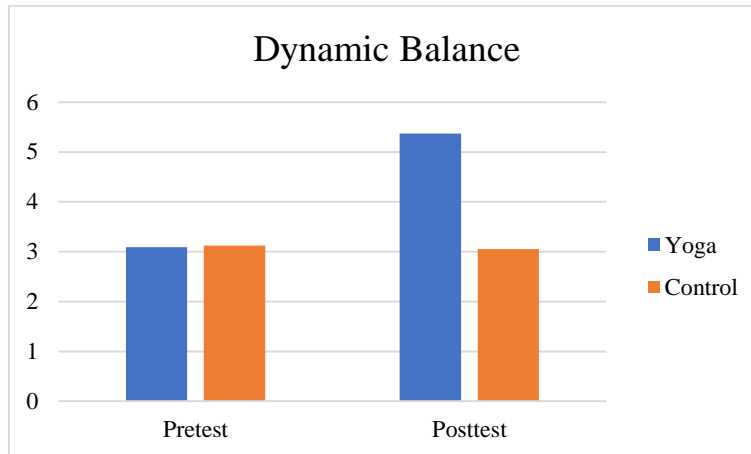


Figure 2. Mean of dynamic balance scores among groups

Quality of life

The results of the initial assessment showed no significant difference in the quality of life between the experimental and control groups ($t=0.12, P>0.05$). However, after the eight-week intervention period, the post-assessment results demonstrated a notable contrast between the two groups ($t=13.67, P<0.001$). Specifically, patients in the experimental group experienced a substantial enhancement in their quality of life compared to those in the control group. Therefore, it can be concluded that the incorporation of yoga exercises had a positive influence on the quality of life of individuals with Parkinson's disease. This assertion is backed by the information provided in Table 3 and Figure 3.

Table 3. Comparison of quality-of-life scores among groups

	Pretest		Posttest	
	Mean	SD	Mean	SD
Yoga	68.27	15.49	79.82	22.31
Control	67.30	12.08	66.93	18.67

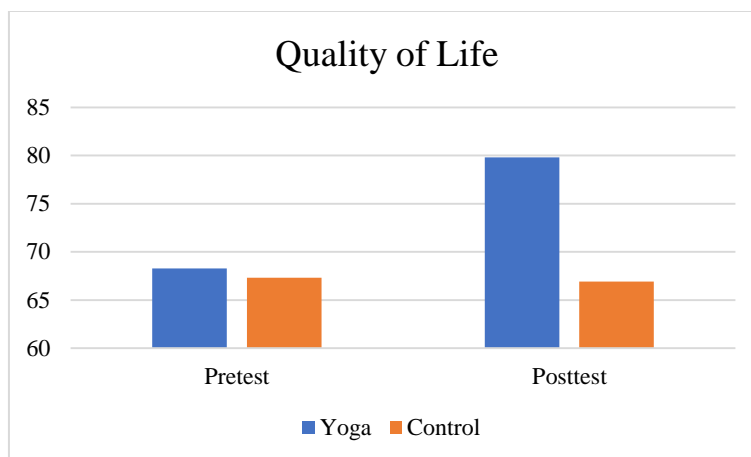


Figure 3. Mean of quality-of-life scores among groups

Discussion

To enhance the independent living of the elderly community, especially women who are more prone to balance issues, it is crucial to investigate and diagnose the factors affecting their balance. This is essential for ensuring safety during daily physical activities and exercise, and for preventing fall-related injuries in this demographic. Therefore, addressing this matter is of significant importance. As a result, this study seeks to examine the effects of yoga practice on the balance and quality of life of older individuals with Parkinson's disease. The results of the study revealed a notable improvement in both static and dynamic balance test performance among patients in the experimental group compared to those in the control group after an eight-week intervention period. This suggests that incorporating yoga exercises had a positive impact on the balance performance of individuals diagnosed with Parkinson's disease. Furthermore, the study also found that patients in the experimental group experienced a significant enhancement in their quality of life following the intervention period, indicating that yoga exercises can have a beneficial influence on the overall well-being of individuals with Parkinson's disease.

Yoga movements, which primarily focus on stretching muscles, have been found to improve both muscle strength and flexibility. Numerous studies have shown that practicing yoga exercises effectively supports and enhances the proper functioning of the skeletal-muscular system (Hazrati et al. 2022; Herrick & Ainsworth, 2003; Seyyedrezaei et al. 2021; Letvak et al. 2012; Masten, 2001; Shafaei et al. 2024). This includes improving joint flexibility, increasing spine mobility, enhancing muscle attributes, and strengthening the biomechanical connections among muscles, joints, glands, tissues, and vital organs. On the other hand, Hatayoga exercises specifically target muscle weakness associated with aging and help improve resistance to fatigue. Despite the natural decline in muscle strength that occurs with age, it is possible to make adjustments and rectify this issue in older individuals. Engaging in regular physical activities can counteract age-related functional changes and promote independence in old age for a longer period of time. Research findings suggest that maintaining a consistent physical activity routine can reduce body fat accumulation, enhance muscle strength and endurance, and improve the ability to perform daily tasks (Chaharbaghi, et al. 2022; Chris, et al. 2010; Conner & Davidson, 2003). Furthermore, muscle wasting commonly associated with aging can be delayed or even reversed through the implementation of strength training and aerobic exercises.

In explaining the impact of yoga exercises on dynamic and static balance, it is important to highlight that they place additional stress on the neuromuscular systems responsible for maintaining balance. Regardless of an individual's level of physical activity over the course of their life, aging inevitably brings about changes in various body systems that play a role in balance and physical fitness (Sadeghipor & Aghdam, 2021a, 2021b; Taso et al. 2014). These changes, although not always visible, can affect one's ability to perform balance-related tasks in different environments or in conjunction with conditions like diabetes or arthritis, as well as the strategies employed by older adults to carry out such tasks. Overall, age-related alterations in the peripheral and central components of sensory and motor systems, as well as cognitive functions, impact the quality (e.g., attention, memory, and executive function) and speed of tasks performed even by healthy older individuals. Numerous studies have demonstrated that engaging in a daily exercise routine of moderate intensity, for at least 30 minutes a day, can help older adults maintain adequate levels of strength, balance, agility, and flexibility (Ohler et al. 2010; Ramachandra et al. 2013; Taghva et al. 2020). Regular participation in activities like yoga can also influence balance and certain aspects of physical fitness. Given the growing population of older adults and the rise in age-related complications such as instability and falls, it is crucial to identify the most beneficial type of exercise for older individuals, taking into account factors like time and location.

It is crucial that the pricing remains within reach for them. As indicated in the research background, the impact of regular physical activity and sports on various body parts of the elderly is significant, leading to improved health outcomes for both the elderly individuals and the broader community. With the average age on the rise in our nation, it is imperative for society to delve into this area, exploring current and potential future challenges (Dana et al. 2021, 2023). Through further research, practical strategies, and the establishment of a solid foundation by relevant authorities and professionals, our country can progress towards a society that embraces healthy aging. The necessity of offering effective solutions motivates our researchers to pursue in-depth studies and investigations in this domain.

Conclusion

Parkinson's disease has been found to have detrimental effects on both the physical and mental well-being of the elderly. However, a recent study has indicated that practicing Hatha Yoga exercises can have a positive impact on improving balance and overall quality of life for elderly individuals with Parkinson's disease. This suggests that incorporating concentration exercises like yoga into their routine could serve as a significant external factor in enhancing their quality of life. It is important to note that this research has certain limitations, including the lack of control over factors such as nutrition, social interactions, economic status, and overall

health of the participants. Additionally, the study did not account for the potential impact of fatigue and scientific resources. Future research should aim to evaluate the effects of yoga on individuals with specific conditions like multiple sclerosis and age-related abnormalities.

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] [Publisher] 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., Elikae, 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., & Elikae, 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