Original Article

Effects of Pilates Exercises on Professional Self-concept in Nurses Working in Intensive Care Units and Emergency Departments

Halimohammad Parang[1], GholamReza Mahmoodi-Shan[2], Mahnaz Modanloo[2], Naser Behnampour[3]

[1]Department of Emergency, Golestan University of Medical Sciences, Gorgan, Iran, [2]Nursing Research Center, Faculty of Nursing and Midwifery, Golestan University of Medical Sciences, Gorgan, Iran, [3]Department of Biostatistics, Health Management and Social Development Research, Golestan University of Medical Sciences, Gorgan, Iran

Abstract

Background: Professional Self-Concept (PSC) affects one's way of thinking, role evolution, professional behavior, and performance. The present study aimed to determine the effect of Pilates exercises on PSC in nurses working in Intensive Care Units (ICU) and emergency departments. **Materials and Methods:** This quantitative study was a randomized controlled field trial. The study population consisted of all nurses working in ICUs and emergency departments from 2016 to 2017. Based on the inclusion and exclusion criteria, 110 nurses were assigned to intervention and control groups using a permuted block randomization method. The Nurses' Self-Concept Questionnaire (NSCQ) was completed by both groups. The intervention group performed Pilates 30 min each session at home for 8 weeks. The Chi-squared test, Mann–Whitney U, Kruskal–Wallis test, and *t*-test were employed to analyze the collected data. **Results:** Mean and standard deviation of the PSC score was 223.73 (23.35) in the intervention group and 215.75 (34.54) in the control group at baseline; it reached 229.17 (23.36) in the intervention group and 217.77 (34.44) in the control group at the end of the study. The difference was not significant. The paired-samples *t*-test showed that the score of PSC was increased by 5.45 points on average in the intervention group after the Pilates exercises, which was statistically significant ($t_{54} = 25.80$, $p < 0.001$). **Conclusions:** Pilates enhances the score of PSC in nurses working in ICUs and emergency departments. The designing and implementation of these easy and safe exercises may prove beneficial for nurses.

Keywords: *Emergency, exercise movement techniques, intensive care units, Iran, nurses, self-concept*

Introduction

Professional Self-Concept (PSC) refers to an individual's perception of himself/herself, affecting his/her way of thinking, role evolution, professional behavior and performance, and self-confidence.[1] Nurses with a healthy self-concept positively affect the care provided for patients while those with a low self-concept negatively affect.[2] A low PSC increases the rate of leaving the job and care errors and decreases the quality and quantity of nursing care.[3] PSC in nurses increases professional success and reduces professional burnout.[2,4] PSC refers to the professional knowledge, attitude, and skills that nurses use in the professional team and are internalized based on their beliefs.[4] Nurses' PSC is categorized into 6 domains including self-esteem, communication, knowledge, care, leadership, and staff relations. Low self-concept affects nurses' perceived ability to provide high-quality patient care. Very few studies have been conducted on nurses' PSC.[5]

Nurses with a low PSC consider their clinical qualifications as low and experience more occupational stress, job dissatisfaction, and tendency toward leaving their job.[6] Working in Intensive Care Units (ICUs) has various mental, physical, and professional consequence for nurses such as poor sleep quality, increased fatigue, and rotating shifts that affect nurses' level of PSC.[7-9] Nurses' PSC is developed based on the physical, professional, and psychological conditions of their work. Nurses who work in ICUs and emergency departments are exposed to multiple stressors in their work environment. They are confronted with demanding routines and sophisticated and noisy equipment, mostly without natural light and high chances of patients' death and pain.[7,10]

How to cite this article: Parang H, Mahmoodi-Shan GR, Modanloo M, Behnampour N. Effects of Pilates exercises on professional self-concept in nurses working in intensive care units and emergency departments. Iranian J Nursing Midwifery Res 2020;25:175-80.

Submitted: 30-Dec-2018. **Revised:** 02-Jan-2019. **Accepted:** 21-Jan-2020. **Published:** 24-Feb-2020.

Address for correspondence:
Dr. GholamReza Mahmoodi-Shan, Nursing Research Center, Faculty of Nursing and Midwifery, Golestan University of Medical Sciences, Hirkan Boulevare, Gorgan, P.O. Box 4934174515, Golestan, Iran.
E-mail: mahmoodigh@yahoo.com

Access this article online

Website: www.ijnmrjournal.net

DOI: 10.4103/ijnmr.IJNMR_231_18

Quick Response Code:

These pressures affect both the subjective aspects of the PSC such as nurses' knowledge, attitude, and self-esteem, and the objective aspects of the self-concept such as care, relationships with staff, communication, and management of nurses. Numerous factors may impact nurses' self-concept.[11,12] Some interventions that have promoted the physical and mental health of individuals have had a positive impact on the subjective and objective aspects of self-concept. The effect of exercise or physical activity, as an intervention, on self-concept has been confirmed in the previous studies.[13,14]

Pilates is a structured and purposeful exercise system that improves the physical and mental health of individuals, improves their negative thoughts,[15] and raises their morale, vitality, and happiness. Moreover, it reduces lethargy and boredom, and in turn, enhances people's self-esteem and positive thoughts, and is applicable to the nurses' daily routines.[16,17] Pilates is a type of exercise with emphasis on alignment, breathing, and improving coordination and balance. Over time and through repetition of the exercises, the brain conceives the body better, making it stronger and more balanced.[15]

Pilates target muscles and joints which are involved in daily activities such as sitting, walking, carrying loads, and bending.[5] The advantage of Pilates is being practical for everyone in any conditions.[18] Nurses' PSC may be improved through different ways and Pilates is a simple way that may improve self-concept.[18] As no study has been conducted on this topic in Iran, the present study aimed to determine the effects of Pilates on PSC in nurses working in ICUs and emergency departments.

Materials and Methods

This quantitative study was a field trial (IRCT2016022517237N7) with two groups (intervention and control) and was conducted in 2016–2017. The study setting was hospitals affiliated with Golestan University of Medical Sciences in Gonbad-e Kavous, Iran. The study population comprised all nurses working in ICUs and emergency departments in Gonbad-e Kavous. Based on the results reported by Salesi and Jokar (2011), the sample size was determined as 55 individuals in each group at the Confidence Interval (CI) of 95% and power of 80%, and considering the probability of attrition.[19]

In this study, 110 nurses met the inclusion criteria. Participants were homogenized in terms of sex and working ward. For randomization, participants were allocated to intervention and control groups using a permuted block randomization method considering gender and working ward. Therefore, researchers created a sequence of 55 double blocks, which comprised AB or BA using a random production process. The process generated two groups of equal size (each group: 55 participants) [Figure 1].

The inclusion criteria were willingness to participate in the study, having at least a Bachelor of Science (B.S.) in nursing, and at least 1 year of work experience in ICUs and emergency departments. Any individuals who were participating in similar studies, had a history of accidents or life crises in the past 6 months, regular professional exercise in gyms, exercise restriction, acute or chronic cardiovascular, respiratory, or other physical diseases with exercise restriction, and known psychological diseases were excluded from the study. Accordingly, 110 nurses met the inclusion criteria.

The intervention in this study was performing Pilates exercises. To this end, some basic level and elementary Pilates exercises were selected upon consulting with a physical education expert.[20] Exercises were selected from among the simplest and easiest ones to minimize the risk of injury in the participants. The intervention group participants practiced the exercises based on the principles of Pilates in a 3-hour workshop at a gym supervised by a professional coach. The workshop was held in 3 sessions considering the number of participants in the intervention group (n = 55). If a participant failed to learn the correct way of performing exercises in 1 session, he/she would have to participate in the next sessions until his/her accurate performance of exercises was confirmed by the coach. The practical training was offered by a female coach for female participants and by a male coach for male participants. To keep the quality of training offered by coaches constant and homogeneous, the exercises were homogenized in 1 session with the presence of the researcher and coaches prior to the workshop. In the end, an educational film of the Pilates exercises recorded on a CD and an educational poster depicting the cycle and order of exercises were given to the intervention group. This CD contained two parts, a warming-up of the whole body (11 min) and a set of Pilates exercises performed lying down without any tools (19 min). Each exercise was repeated 12 times. Therefore, it took 30 min to perform all exercises.[20,21] The intervention group performed these exercises at home using the poster and educational film in three 30-min sessions for 8 weeks. After each session, they recorded the exercises in a checklist they were provided with. To ensure the regular performance of exercises, the researcher contacted the participants (once every 2 weeks) and visited them on their working shift (once every 4 weeks) to follow the performance of exercises regularly. Participants recorded the date and duration of exercises after each session in a checklist provided to them. If a participant did not perform the exercises for more than 3 consecutive sessions or 6 non-consecutive sessions, he/she was excluded.

Data on nurses' self-concept were gathered in hospital wards using a demographic characteristics form and the Nurses' Self-Concept Questionnaire (NSCQ). The NSCQ was designed by Cowin and Hengstberger (2006)

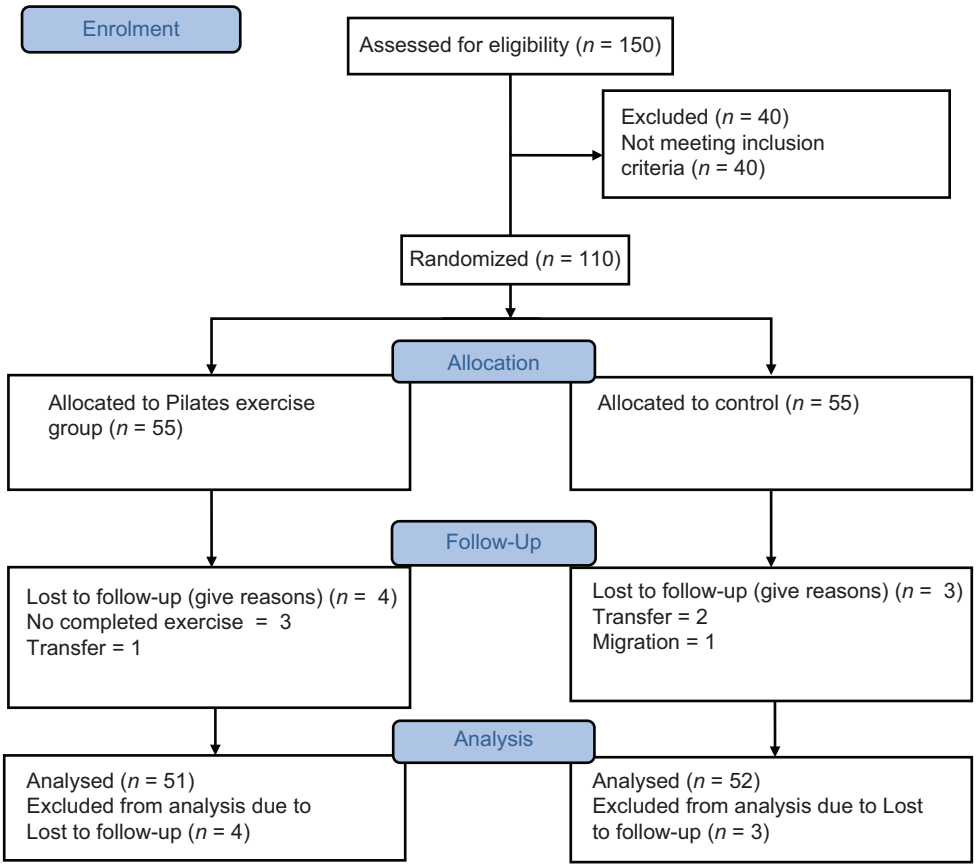

Figure 1: Flow chart of sample allocation in Pilates and control groups according to CONSORT 2010

and consists of 36 items in the 6 dimensions of general nursing self-concept, care, knowledge, staff relations, communication, and leadership, each with 6 items. Each item is scored on an 8-point Likert scale ranging from 1 (definitely false) to 8 (definitely true). The total score ranges from 36 to 288. Cowin and Hengstberger (2006); Cowin *et al*. (2008) reported the high Cronbach's alpha of 0.90 and the reliability of 0.86–0.95 for this instrument.[5,22] This questionnaire was validated in Iran by Mahmoodi-Shan *et al*.; the reliability of the NSCQ was reported as 0.905 using Cronbach's alpha.[23] Data were gathered twice, before and 8 weeks after the intervention. Blinding was not possible in this study.

The collected data were analyzed using Chi-squared test (χ^2), Mann–Whitney U, Kruskal-Wallis, and *t*-test in SPSS software (version 16, SPSS Inc., Chicago, IL, USA). In the present text, qualitative variables are described using frequency distribution, and quantitative variables are represented by means and Standard Deviation (SD). The Chi-squared test was used to determine the relationship between qualitative variables, and Mann–Whitney U and Kruskal–Wallis tests were employed to measure the relationship between ordinal quantitative variables. T-test was utilized to assess the relationship between quantitative variables in case of normal distribution. The level of significance was considered at $p < 0.05$.

Ethical considerations

This article was extracted from an MSc thesis in nursing, which was approved by the Regional Research Ethics Committee of Golestan University of Medical Sciences (code number: ir.goums.rec. 1395.5). After obtaining the legal approval of the university and hospital officials, and written informed consent from the participants, the researcher started sampling. Numerical codes were used for participants in order to maintain the confidentiality of data. Nurses were free to withdraw from the study at any time.

Results

The results showed that most of the nurses (70.90%) were women and within the age range of 23–56 years. The majority of nurses (53.40%) were below 30 years of age, had a BSc degree (94.20%), were married (72.80%), and worked in ICUs (41.70%). More than 88.30% of nurses worked on rotating shifts, and 48.50% had less than 5 years of work experience [Table 1]. The use of *t*-test for age and Chi-squared test for qualitative variables showed no significant difference between the two groups in terms of demographic variables.

Assessment of PSC before the intervention showed that most nurses (68%) had a good level of self-concept and only 2.90% had a low self-concept. The Shapiro–Wilk test showed

that the scores of PSC in both groups before and after the intervention were not normally distributed. Therefore, the two groups were compared using the Mann–Whitney U test. The mean rank of the level of PSC did not significantly differ across groups at the beginning of the study with the Mann–Whitney U test (1400.50, $p = 0.442$) [Table 2].

Moreover, no significant difference was observed in the mean rank of the level of self-concept across groups after 2 months with the Mann–Whitney U test (1291.50, $p > 0.154$) [Table 2]. Nevertheless, the Shapiro–Wilk test indicated that the differences in the scores of PSC at the beginning and end of the study were normally distributed in the intervention group ($p > 0.750$). The paired-samples *t*-test showed that Pilates increased the score of PSC by 5.45 points on average in the intervention group, an increase which was statistically significant ($t_{54} = 25.80$, $p < 0.001$).

Table 1: Demographic characteristics of nurses in the intervention and control groups

Variable	Intervention *N* (%)	Control *N* (%)	χ^2 test	df	*p*
Marriage					
Single	16 (55.20)	13 (44.80)	0.42	1	0.516
Married	39 (48.10)	42 (51.90)			
Education					
BSc	53 (51.00)	51 (49.00)	0.70	1	0.401
MSc	2 (33.30)	4 (66.70)			
Work experience (year)					
Under 5	26 (48.10)	28 (51.90)	0.18	3	0.978
10-15	10 (50.00)	10 (50.00)			
Over 15	7 (53.80)	6 (46.20)			
Shift work					
Morning	2 (50.00)	2 (50.00)	0.15	3	0.985
Evening	3 (42.90)	4 (57.10)			
Night	1 (50.00)	1 (50.00)			
Rotating	49 (50.50)	48 (49.50)			

Moreover, the Wilcoxon test showed a significant increase of 2 points in the control group ($Z = 6.47$, $p < 0.001$).

Furthermore, based on the McNemar-Bowker test, PSC did not significantly increase in the intervention group ($p > 0.250$). Despite the 5.45-point increase in the mean score of nurses' PSC in the intervention group, the PSC subcategories did not significantly increase.

In the intervention group, there were significant differences between self-concept subcategories after Pilates exercises compared to before Pilates exercises such as general self-concept ($Z = -3.40$, $p = 0.001$), staff relationship ($Z = -5.63$, $p \leq 0.001$), communication ($z = -5.26$, $p \leq 0.001$), and leadership ($z = -3.04$, $p = 0.002$) [Tables 2 and 3].

Discussion

In this study, the level of nurses' PSC in the intervention group showed a 5.45-point increase compared to the beginning of the study, while a 2-point increase was observed in the control group. The reasons for the increase in the PSC score of the control group may be short-term changes in personnel's work environment conditions, communication between the two groups at work, or the motivation and efforts of the control group. Evidently, the intervention group was recommended not to share the educational data and tools with others at the beginning and during the course of the study. Still, communication was possible and out of the researchers' control. At any rate, the increase in nurses' PSC compared to the beginning of the study suggests the positive effects of Pilates.

Results of other studies that have employed interventions for enhancing nurses' PSC confirm the results of the present study, indicating that the level of nurses' PSC can be promoted using educational or exercise programs. Legrand examined the effects of exercise on physical self-concept,

Table 2: Mean and Standard Deviation (SD) of nurses' scores in Professional Self-Concept (PSC) and its subcategories before and after Pilates exercise in the two groups

Variable	Time Group	Before Mean (SD)	After Mean (SD)	Wilcoxon test, *t*-test, *p*	df	*p*
PSC	Intervention	223.73 (23.35)	229.17 (23.36)	*t*=25.80, *Z*=6.47	54	<0.001
	Control	215.75 (34.54)	217.77 (34.44)			
	Mann-Whitney U *P*	1400.50 ≥ 0.44	1291.50 ≥ 0.15	*Wilcoxon test		0.001
General	Intervention	33.60 (8.16)	33.85 (9.18)	*Z*=0.82		<0.415
Self-Concept	Control	32.85 (8.96)	34.00 (9.98)	*Z*=4.03		<0.001
Caring	Intervention	38.94 (3.88)	39.00 (3.90)	*Z* = -0.62		0.533
	Control	38.52 (5.48)	38.12 (5.77)	*Z* =-2.04		0.041
Staff Relationship	Intervention	36.85 (4.90)	39.56 (4.82)	*Z* = -5.82		0.001
	Control	35.29 (6.71)	35.60 (6.18)	*Z* = -0.07		0.938
Communication	Intervention	39.12 (4.13)	41.85 (4.58)	*Z* = -5.56		0.001
	Control	37.80 (6.31)	37.83 (6.26)	*Z* = -0.05		0.958
Knowledge	Intervention	38.36 (4.42)	38.00 (4.46)	*Z* = -2.18		0.029
	Control	37.74 (5.39)	37.61 (5.70)	*Z* = -0.48		0.628
Leadership	Intervention	35.58 (5.13)	35.61 (4.96)	*Z*=0.32		0.752
	Control	32.76 (8.97)	33.78 (8.29)	*Z* = -3.15		0.002

Table 3: Wilcoxon test between preintervention and postintervention scores of professional self-concept subcategories' nurses in the Pilates exercise group

Wilcoxon test	General self-concept	Caring	Staff relationship	Communication	Knowledge	Leadership
	-3.40, 0.001	-1.27, 0.203	-5.63, 0.0001	-5.26, 0.0001	-1.54, 0.123	-3.04, 0.002

self-esteem, and depression in women, concluding that 7 weeks of exercise positively affects self-esteem and physical self-concept, which was in line with the present study results.[24] The results of the present study are also consistent with those reported by Garcia-Martinez *et al*.[25] In the mentioned study, 12 weeks of educational program and stretching exercises considerably improved self-concept and self-esteem. Participants in the noted study were patients, but the type of intervention was similar to Pilates exercises used in the present study. The difference between the two studies is that Garcia-Martinez *et al*. employed 12 weeks of exercise.[25] In the intervention group, there were significant differences between self-concept subcategories, such as general self-concept, staff relationship, and communication, after the intervention compared to before the intervention. Staff relationship and communication are essential parts of professional nursing.[3] Very few studies on exercise, and self-concept and self-concept subcategories exist to compare the results with. The previous studies have indicated that a low self-concept score is related to dissatisfaction and nurses leave work.[3,26] However, the study indicated that Pilates exercise has increased staff relationship and communication scores. Barry *et al*. (2019) found that the university students who were physically active had higher levels of physical and emotional self-concept. They also found that the university students who perform physical activity have a greater emotional self-concept in comparison with those who are not active.[27] The mentioned study is congruent with this study but differs from the present study in terms of activity, exercise, and components of self-concept.

Edwin found that the nurses' self-concept scores in the subcategories of care, staff relations, communication, and knowledge were high, but their scores in the subcategory of leadership were low.[26] Another study showed that the lowest and highest scores were related to self-esteem and communication subcategories, respectively.[28] In this study, the mean total score of PSC in nurses equalled 219.70 (29.66) (total score: 288). Golestan *et al*. reported a mean total PSC score of 197.20 (23.67) among nurses which was lower than the score reported in the present study.[29] In the noted study, only nurses working in ICUs were evaluated, while, in the present study, nurses working in emergency departments were also included. Heydari and Elaheh reported the nurses' mean total score of PSC to be 169.9 (26.48), which is also lower than the mean reported in the present study.[2] Barry *et al*. reported the total score of PSC among students to be 210.80 (37.41), which is relatively lower than the value reported in the present study.[27] Moreover, Hensel and Stoelting-Gettelfinger reported the nurses' mean score of PSC to be 245.3 (26.39), which greatly differs from the score reported in the present study.[30] Cowin and Hengstberger reported a higher PSC score among nurses compared to the present study.[5] This difference may be due to the difference in study settings and the educational and managerial systems governing the two societies' healthcare systems since these factors can affect nurses' PSC.[5,22] In addition, in the noted studies, nurses had been selected from all wards, while in the present study, only those working in ICUs and emergency department were evaluated. Nevertheless, this may indicate the conditions of the educational and managerial system in nursing in Iran. Edwin found that the nurses' self-concept scores were higher in the subcategories of care, staff relations, communication, and knowledge but were lower in the component of leadership.[26] Jahromi *et al*. showed that the nursing students had low PSC.[28] There are no other studies about Pilates exercise and self-concept among professional nurses in ICUs and emergency wards. The existing studies were conducted on nursing students or nurses who were working in general wards.

The study also has limitations. In the present study, to ensure the homogeneity of nurses, ICUs and emergency departments in the same setting were selected which probably increased the risk of information sharing between the two groups. Therefore, it is recommended that in future studies the participants in intervention and control groups be selected from different settings. Doing Pilates exercise in a right way is a key point in determining the effectiveness of the intervention. In the present study, the nurses were trained at how to do Pilates exercises, and then asked to do it at home considering instructions. As a result, there is no guarantee that the recommended Pilates exercises were completed by nurses. An intervention for doing Pilates exercises in the gym could determine exercises completion in future research. Moreover, the researcher did not investigate the amount of doing other group activities simultaneously with Pilates exercises, which may have had an impact on self-concept. Therefore, it is suggested that in future studies the amount of physical activity and other exercises be considered. Furthermore, in order to change the self-concept, a longer period of time for intervention may be needed; hence, it is suggested that Pilates be performed for 4 to 6 months.

Conclusion

The results revealed that the performance of Pilates has enhanced nurses' total score of PSC and some PSC subcategories such as staff relationship and communication.

In addition, it can be said that Pilates cannot equally influence all of the aspects of the self-concept. Some components of self-concept did not change in the present study; they may require a longer time to change as a result of Pilates. In the present study, nurses performed Pilates at their home; therefore, in future studies, it is recommended that they perform Pilates with their colleagues. This may increase the effect of Pilates.

Acknowledgements

The authors would like to thank the Nursing Research Center, Vice Chancellor for Department of Research and Technology at Golestan University of Medical Sciences, and all nurses who participated in conducting this study in Gonbad Kavous hospitals. This article was extracted from a Master sciences' thesis nursing in Golestan University of Medical Sciences.

Financial support and sponsorship

Nursing Research Center of Golestan University of Medical Sciences

Conflicts of interest

Nothing to declare.

References

1. Jahromi ZB, Kargar M, Ramezanli S. Study of the relationship between nurse self-concept and clinical performance among nursing students. Jentashapir J Health Res 2015;6:e28108.
2. Heydari AST, Elaheh A. The effect of an educational-orientation program upon professional self-concept of undergraduate nursing students. Iran J Med Educ 2014;14:438-94.
3. Sabanciogullari S, Dogan S. Professional self-concept in nurses and related factors: A sample from Turkey. IJCS 2017;10:1676-84.
4. Nwafor EC, Immanel EU, Obi-Nwosu H. Does nurses' self-concept mediate the relationship between job satisfaction and burnout among Nigerian nurses. IJANS 2015;3:71-5.
5. Cowin LS, Hengstberger-Sims C. New graduate nurse self-concept and retention: A longitudinal survey. IJNS 2006;43:59-70.
6. Mlinar S, Tušak M, Karpljuk D. Self-concept in intensive care nurses and control group women. Nurs Ethics 2009;16:328-39.
7. Rodrigues VMCP, Ferreira ASS. Stressors in nurses working in intensive care units. RLAE 2011;19:1025-32.
8. Inoue KC, Versa GL, Matsuda lM. Stress level among intensive care nurses in the municipality of Paraná (Brazil). Invest Educ Enferm 2014;32:69-77.
9. Rodrigues VM, Ferreira AS. Stressors in nurses working in intensive care units. RLAE 2011;19:1025-32.
10. Kilic SP, Aytac SO, Korkmaz M, Ozer S. Occupational health problems of nurses working at emergency departments. IJCS 2016;9:1008.
11. Gunawan J, Aungsuroch Y, Sukarna A, Nazliansyah, Efendi F. The image of nursing as perceived by nurses: A phenomenological study. Nurs Midwifery Stud 2018;7:180-5.
12. Montazeralfaraj R, Ahmadi E, Tafti AD, Barati O, Bahrami MA. Measuring the nurses' professional self-concept and its correlation with working stress in Iranian educational hospitals. Bali Med J 2018;7:521-5.
13. Liu M, Wu L, Ming Q. How does physical activity intervention improve self-esteem and self-concept in children and adolescents? Evidence from a meta-analysis. PLoS One 2015;10:e0134804.
14. Fernández-Bustos JG, Infantes-Paniagua Á, Cuevas R, Contreras OR. Effect of physical activity on self-concept: Theoretical model on the mediation of body image and physical self-concept in adolescents. Front Psychol 2019;10:1537.
15. Rahimimoghadam Z, Rahemi Z, Mirbagher-Ajorpaz N, Sadat Z. Effects of Pilates exercise on general health of hemodialysis patients. J Bodyw Mov Ther 2017;21:86-92.
16. Kovách MV, Plachy JK, József B, Balogh ZO. Effects of Pilates and aqua fitness training on older adults' physical functioning and quality of life. J Hum Kinet 2013;4:22-7.
17. Saberi Y, Ghorbanian B, Ghorbanzadeh B, Iranpour A. Effects of training Pilates and Aerobic on happiness and desire for physical in inactive women. SJNMP 2018;4:52-61 (persian).
18. Rashidi Z, Daneshfar A, Shojaei M, Sararoudi RB, Rouzbahani R, Marandi SM, *et al*. Scrutiny effects of eight-weeks Pilates exercise on women's postmenopausal depressive symptom. IUMS 2013;31:408-15.
19. Salesi M, Jowkar B. Effects of exercise and physical activity on happiness of postmenopausal female. Iran J Ageing 2011;6:1-8.
20. Kamali A, Mahdavi-Nezhad R, Norouzi K. The effect of selected pilates exercises on thigh muscle strength and depression in elderly women. JPSR 2015;5:67-75 (full text persian).
21. Araújo ME, Silva EB, Mello DB, Cader SA, Salgado AS, Dantas EH. The effectiveness of the Pilates method: Reducing the degree of non-structural scoliosis, and improving flexibility and pain in female college students. J Bodyw Mov Ther 2012;16:191-8.
22. Cowin LS, Johnson M, Craven R, Marsh H. Causal modeling of self-concept, job satisfaction, and retention of nurses. IJNS 2008;45:1449-59.
23. Mahmoodi-Shan GR, Rahmani H, Rouhi G, Vakili MA, Hosseini SA. Psychometry of professional nueses' self-concept J Urmia Nurs Midwifery Fac 2015;13:302-10 (persian).
24. Legrand FD. Effects of exercise on physical self-concept, global self-esteem, and depression in women of low socioeconomic status with elevated depressive symptoms. J Sport Exerc Psychol 2014;36:357-65.
25. Garcia-Martinez AM, Paz JAD, Marquez S. Effects of an exercise programme on self-esteem, self-concept and quality of life in women with fibromyalgia: A randomized controlled trial. Rheumatol Int 2012;32:1869-76.
26. Edwin V. Influence of personal characteristics on self-concept and job satisfaction of registered nurses working in cross-cultural settings in the United Arab Emirates. Hamdan Med J 2018;11:22-8.
27. Barry A, Parvan K, Jabbarzadeh-Tabrizi F, Sarbakhsh P, Safa B. Is professional self-concept associated with stress among nursing students in clinical setting: A descriptive correlational research. CJMB 2019;6:191-5.
28. Jahromi ZB, Keshavarzi S, Jahanbin I. Determination of the reliability and validity of the Persian version of nurses' self-concept questionnaire (NSCQ). JNE 2014;2:63-71.
29. Golestan F, Ashktorab T, Anboohi S, Mohtashami J, Salmani F. Professional self-concept in Nurses working in intensive cares unit in hospitals affiliated to medical sciences universities of Tehran in 2014. Faculty Nurs Midwifery Quartery 2016;25:39-46.
30. Hensel D, Stoelting-Gettelfinger W. Changes in stress and nurse self-concept among baccalaureate nursing students. J Nurs Educ 2011;50:290-3.