Original Article

Iranian Nurses' Self-Reported Mastery and Use of Musculoskeletal Assessment Skills

Tayebeh Moradi, Mohsen Adib-Hajbaghery[1], Azade Safa[1], Maryam Ahmadishad[2]

Department of Nursing, The Islamic Azad University, Kashan Branch, [1]Trauma Nursing Research Center, Kashan University of Medical Sciences, [2]Department of Social Medicine, Kashan University of Medical Sciences, Kashan, Iran

ORCID:

Tayebeh Moradi: 0000-0002-9427-3688
Mohsen Adib-Hajbaghery: 0000-0002-9518-4329
Azade Safa: 0000-0002-4438-8719
Maryam Ahmadishad: 0000-0002-5448-2629

ABSTRACT

Background: Nurses are the key members of the health-care team and play an important role in the assessment of the patients' problems. **Objectives:** This study aimed to investigate Iranian nurses' self-reported mastery and use of musculoskeletal assessment skills. **Methods:** This cross-sectional study was conducted from October 2018 to January 2019 on 200 nurses in Shahid Beheshti Hospital of Kashan, Iran. Data were collected using a two-part questionnaire including a demographic data form and 16 self-report items on nurses' mastery in the assessment of the musculoskeletal system. The levels of self-reported mastery and use of the musculoskeletal assessment skills in patient care were assessed. Data analysis was done using descriptive statistics, independent samples t-tests, analysis of variance, and the Pearson correlation analysis. **Results:** Nurses obtained 83.25% of the score in the area of using health history taking skills, while they obtained 86.94% of the score of mastery in this field. Furthermore, nurses gained 33.77% of the score in the area of using physical examination skills, while they gained 44.53% of the score of mastery in this area. The most commonly used musculoskeletal assessment skills were "checking the range of motion of the joints" and "checking muscle strength" that were used in 20.5% of cases. However, nurses rarely used specific tests such as the Patrick's, ballottement, and Lasègue tests. A significant direct correlation was found between nurses' self-reported mastery in musculoskeletal assessment skills and the use of these skills (r = 0.44, P = 0.001). **Conclusion:** Despite the desirable levels of nurses' self-reported mastery and use of history taking skills, the level of their self-reported mastery and use of musculoskeletal assessment skills are not satisfactory.

KEYWORDS: *Health assessment, Musculoskeletal system, Nurse, Self-report*

INTRODUCTION

Health assessment (HA) is among the essential skills needed for health-care professionals, especially nurses.[1,2] HA covers a wide range of clinical skills including physical examination and plays a major role in identifying a patient's condition and care needs. These skills help nurses reach a clinical decision and set an appropriate nursing care plan.[3-5] Precise physical examination provides about 20% of the data needed for the diagnosis and management of body systems disorders.[3,6]

The musculoskeletal system is the body's system that keeps the framework of the body and makes it possible to move. Disorders of this system might decrease the patient's mobility and affect their quality of life.[7] Musculoskeletal disorders are prevalent in different ages.[8-10] Drooping shoulders, scoliosis, arthritis, and lumbar disc herniation[10-12] are examples of musculoskeletal disorders. In addition to the patient's discomfort, musculoskeletal problems

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Address for correspondence: Ms. Azade Safa, Trauma Nursing Research Center, Kashan University of Medical Sciences, Kashan, Iran.
E-mail: azade.fazel@yahoo.com

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increase the costs of the health-care system.[13] Since musculoskeletal disorders involve individuals in different age groups, musculoskeletal examinations should not be limited to the orthopedic units and patients in different hospital wards should be assessed for musculoskeletal problems.[14] Therefore, all nurses should have an appropriate level of knowledge and skills needed for musculoskeletal examinations[15] to be able to screen their patients for musculoskeletal problems.[16] The more precise assessment, the better results would be obtained and the quality of patient care would be improved.

Despite the great importance of nurses' mastery in physical examinations, a study conducted in Iran reported that only 11.4% of the senior nursing students had good knowledge in HA.[17] Birks *et al*. argued that some issues, such as time pressure and lack of role clarity, may have an impact on nurses' knowledge and practice of HA.[2] Nonetheless, the nurses' knowledge and mastery in HA are also influenced by the frequency of using these skills. Some studies reported that only 25%–35% of the physical assessment skills learned by the nurses are routinely used in patient care.[2,16,18] A study on Korean nurses also showed that only 11% of clinical assessment skills were routinely used by nurses and 46% of these skills have rarely been used.[19] There are limited studies on the nurses' self-reported mastery in musculoskeletal examinations and also limited information is available on the extent to which Iranian nurses use these skills in patient care.

Objectives

This study aimed to evaluate Iranian nurses' self-reported mastery and use of musculoskeletal assessment skills.

Methods

Study design and population

This cross-sectional study was conducted from October 2018 to January 2019 on nurses working in medical, surgical, and critical care units of Shahid Beheshti Hospital of Kashan, Iran. Sampling was performed through a quota method. A list of nurses working in the aforementioned hospital was provided and the participants were selected randomly in proportion to the total number of nurses working in each unit.

The sample size was calculated using the results of a former study in which the mean nurses' knowledge of a musculoskeletal disorder (i.e., osteoporosis) was 14.57 ± 2.81 in a range of 0–20.[20] Then, using the formula for estimation of the mean of the population, and considering an α of. 05, a δ of 2.81, and a d of 0.5, the sample size was estimated at 122. However, we recruited 200 subjects to compensate for the possible dropouts. The inclusion criteria were as follows: having a bachelor's or master's degree in nursing, having at least 1 year of work experience, working in medical, surgical, or intensive care units, and consent to participate in the study. Participants were excluded if they did not fully respond to the study questionnaire.

To collect the data, the researcher referred to the hospital in the morning, evening, and night shifts, found the subjects, informed them about the study objectives, invited them to the study, and if agreed, passed the study questionnaire to them and instructed them to complete it in a calm and private setting and give it back to the researcher at their next shift.

Data collection instruments

Data collection was done using a two-part questionnaire made by the researcher. The first part was a demographic data form including questions on the nurses' age, gender, education level, work experience, and the unit in which they worked. The second part included six items about taking the health history and ten items about the musculoskeletal system examination skills. Each musculoskeletal assessment skill received two scores. The first score was related to the frequency of using the skills ranging from 0 (never), 1 (once in a few months), 2 (monthly), 3 (weekly), and 4 (daily). The second score was related to the nurses' self-reported mastery in the same skills ranging from 0 (I do not know) to 3 (I am fully mastered). Scores <50% of the total possible score were labeled as undesirable, while scores >50% were considered as desirable.

Ten faculty members affiliated with Kashan University of Medical Sciences — who were experienced in teaching orthopedic courses — evaluated the content validity of the instrument. The content validity index and the content validity ratio were 0.7–1 and 0.7, respectively. The reliability of the questionnaire was evaluated via test-retest. For this purpose, 20 randomly selected nurses completed the study questionnaire twice, with a 1-week interval. The correlation coefficient was 0.90. The time needed for completing the questionnaire was about 20 min.

Ethical considerations

This study was approved by the ethics committee of Kashan University of Medical Sciences (Ethics code: IR.KAUMS.NUHEPM.REC.1397.40). Permission from the authorities was obtained to start the data

collection. The participants provided informed consent and were assured about voluntary participation and the confidentiality of their personal data. A particular code was assigned to each nurse and all the questionnaires were completed anonymously. Nurses were guaranteed that acceptance or decline to participate in this study does not have any impact on their salary.

Data analysis

Statistical analysis was carried out using the SPSS version 11.5 (SPSS Inc., Chicago, IL, USA). Data were analyzed using descriptive statistics. To determine the relationship between nurses' characteristics and their self-reported mastery and use of the skills, the independent samples *t*-test and one-way analysis of variance were used. The Pearson correlation coefficient was used to assess the correlation between scores of mastery and the use of musculoskeletal assessment skills. $P < 0.05$ was regarded as statistically significant.

Results

All of the participants completed and returned the questionnaires. The participants were mostly female (68.5%), with a mean age of 30.95 ± 5.40 years, and a majority of them (58.5%) had more than 5 years of work experience. Respectively, 34.5%, 32%, and 23.5% of the participants were working in medical, surgical, and critical care units.

Nurses obtained 83.25% of the score in the area of using health history taking skills, while they obtained 86.94% of the score of self-reported mastery in this field. Furthermore, nurses gained 33.77% of the score in the area of using physical examination skills, while they gained 44.53% of the score of self-reported mastery in this area [Table 1].

The most commonly used musculoskeletal assessment skills were "checking the range of motion of the joints" and "checking muscle strength." Nurses stated that they use these skills in 20.5% of cases [Table 2]. However, nurses rarely used the Patrick's, Lasègue, and ballottement tests.

Nurses reported that they have the highest levels of mastery in "checking the range of motion of the joints" (37.5%), while they reported the lowest levels of mastery in the Patrick's (8%), Lasègue (9%), and ballottement (10%) tests, respectively [Table 3].

The *t*-test showed that nurses with work experience more than 5 years had significantly greater mean scores both in the mastery ($P = 0.009$) and the use of ($P = 0.09$) "health history taking" skills, than their counterparts with less work experience. In other words, nurses with more work experience were more mastered of history taking skills and used these skills more frequently.

Table 1: The mean and standard deviation of nurses' scores of self-reported mastery and use of musculoskeletal assessment skills

Variables	Minimum-maximum score	Mean ± SD	Percent of score
Self-reported mastery in musculoskeletal assessment skills			
Taking the health history	0-18	15.65 ± 3.19	86.94
Physical examination skills	0-30	13.36 ± 7.37	44.53
Frequency of using the musculoskeletal assessment skills			
Taking the health history	0-24	19.98 ± 4.52	83.25
Physical examination skills	0-40	13.51 ± 8.65	33.77

SD: Standard deviation

Table 2: The frequency of nurse's self-reported use of musculoskeletal system assessment skills[a]

Musculoskeletal assessment skills	Never	One in a few months	Monthly	Weekly	Daily
Observation of joints	94 (47)	28 (14)	12 (6)	28 (14)	38 (19)
Palpation of joints	113 (56.5)	26 (13)	12 (6)	19 (9.5)	30 (15)
Assessment of the symmetry of the upper and lower limbs	99 (49.5)	32 (16)	11 (5.5)	20 (10)	38 (19)
Assessment of spinal curvature	105 (52.5)	27 (13.5)	13 (6.5)	22 (11)	32 (16)
Checking the range of motion of the joints (ROM)	87 (43.5)	32 (16)	17 (8.5)	23 (11.5)	41 (20.5)
Checking muscle strength	86 (43)	36 (18)	14 (7)	23 (11.5)	41 (20.5)
Lasègue test	165 (82.5)	14 (7)	6 (3)	7 (3.5)	8 (4)
Patrick's test	170 (85)	10 (5)	5 (2.5)	6 (3)	9 (4.5)
Ballottement test	168 (84)	11 (5.5)	5 (2.5)	7 (3.5)	9 (4.5)
Checking knee stability	153 (76.5)	15 (7.5)	8 (4)	7 (3.5)	17 (8.5)

[a]Data presented as, *n* (%). ROM: Range of motion

Table 3: Nurse's self-reported mastery in musculoskeletal assessment skills[a]

Musculoskeletal assessment skills	I do not know	Very low mastery	Low mastery	Fully mastered
Observation of joints	62 (31)	37 (18.5)	37 (18.5)	64 (32)
Palpation of joints	66 (33)	46 (23)	34 (17)	54 (27)
Assessment of the symmetry of the upper and lower limbs	64 (32)	37 (18.5)	35 (17.5)	64 (32)
Assessment of spinal curvature	67 (33.5)	36 (18)	30 (15)	67 (33.5)
Checking the range of motion of the joints (ROM)	54 (27)	33 (16.5)	38 (19)	75 (37.5)
Checking muscle strength	64 (32)	28 (14)	44 (22)	64 (32)
Lasègue test	141 (70.5)	34 (12)	17 (8.5)	18 (9)
Patrick test	145 (72.5)	25 (12.5)	14 (7)	16 (8)
Ballottement test	137 (68.5)	24 (12)	19 (9.5)	20 (10)
Checking knee stability	117 (58.5)	27 (13.5)	25 (12.5)	31 (15.5)

[a]Data presented as, *n* (%). ROM: Range of motion

Table 4: The comparison of mean scores of self-reported mastery and use of musculoskeletal assessment skills according to the nurse's individual characteristics

Variables	The use of musculoskeletal assessment skills		Self-reported mastery in musculoskeletal assessment skills	
	Taking the health history	Physical examination skills	Taking the health history	Physical examination skills
Work setting				
Medical units	13.73 ± 7.71	15.36 ± 3.16	14.11 ± 8.90	19.50 ± 5.13
Surgical units	12.53 ± 6.87	15.79 ± 3.38	13.56 ± 8.82	19.78 ± 4.68
Intensive care units	13.76 ± 7.51	15.82 ± 3.05	12.85 ± 8.31	20.67 ± 3.59
P (ANOVA)	0.55	0.64	0.69	0.27
Education level				
Bachelor's degree	19.86 ± 4.52	13.51 ± 8.78	15.65 ± 3.14	11.90 ± 6.96
Master's degree	20.33 ± 4.55	13.50 ± 8.35	15.64 ± 3.36	13.85 ± 7.47
P (*t*-test)	0.52	0.99	0.98	0.05
Gender				
Male	20.66 ± 3.61	14.74 ± 8.38	15.82 ± 2.89	14.93 ± 7.41
Female	19.67 ± 4.87	12.94 ± 8.75	15.57 ± 3.32	12.63 ± 7.27
P (*t*-test)	0.10	0.16	0.59	0.051
Work experience (years)				
<5	19.36 ± 4.78	13.18 ± 9.14	14.91 ± 3.61	12.73 ± 6.59
>5	20.48 ± 4.27	13.75 ± 8.36	16.16 ± 2.75	13.76 ± 7.91
P (*t*-test)	0.09	0.64	0.009	0.31

Other individual characteristics of nurses (i.e., gender, education level, and work setting) did not have a significant effect on their mean scores of knowledge and the use of musculoskeletal assessment skills [Table 4].

The Pearson correlation coefficient showed a direct significant correlation between scores of mastery in musculoskeletal assessment skills and the use of these skills ($r = 0.44$, $P = 0.001$). However, no significant correlation was found between nurses' age and their scores of mastery in musculoskeletal assessment skills ($r = 0.08$, $P = 0.12$).

Discussion

The present study showed that nurses' self-reported mastery and use of musculoskeletal assessment skills are undesirable. In line with these findings, a study from Iran reported that nurses obtained only half of the score related to physical examination knowledge and skill, and specifically they reported lower levels of knowledge in some particular examinations such as examination of the spine.[21] Another study also found that Korean nurses did not have sufficient knowledge about skeletal disorders such as osteoporosis and its contributing factors.[22] Nurses have learned these skills during their academic training. However, as Bahreini *et al*. have reported, it seems that the health-care delivery system does not require them to examine patients' musculoskeletal systems.[23] Furthermore, barriers such as the inappropriate nurse–patient ratio, heavy workload, and ambiguity in the job description, have lead nurses to ignoring HA activities which

consequently has led to a decrease in their knowledge and mastery in this field.

In the present study, nurses obtained more than 83% of the score related to the use of history taking. This finding shows that they commonly use these skills in their clinical practice. However, in a study of senior nursing students, Madani *et al*. reported that a majority of nursing students had insufficient skill in taking the patients' health history.[17] Although the difference in the study subjects (i.e., nursing students vs. nurses) may significantly affect the results, it can be assumed that students are usually less skilled than nurses and also have less opportunity to put their own knowledge and skills into practice.

Checking the range of motion of the joints and assessment of muscular strength were the two HA skills that our nurses used commonly and also had the highest level of self-reported mastery in them. These two skills are important examinations in assessing the patients' mobility and ability to accomplish their daily living activities.[24,25] However, our nurses reported that they rarely use specific examinations such as the Patrick's, ballottement, and Lasègue tests. Although the Patrick test is a reliable diagnostic test for the diagnosis of femur disorders,[26,27] the ballottement test has a high sensitivity for the diagnosis of unstable joints,[28] and the Lasègue test is highly sensitive for the diagnosis of lumbar disc herniation,[29] the low rate of use and mastery in these skills show that nurses are not usually involved in the process of HA and consider HA as a medical task. Nonetheless, due to the popularity of musculoskeletal disorders, nurses should be knowledgeable and proficient in musculoskeletal HA. This would help them in the timely diagnosis of musculoskeletal disorders in their clients and prevent the intensification of the problems and irreversible injuries.[30,31]

Findings revealed a direct correlation between nurses' self-reported mastery and use of musculoskeletal assessment skills. Therefore, nurse managers should establish training programs to increase the nurses' mastery in musculoskeletal assessment. Then, the rate of using these skills might be increased, better care would be delivered, and better patient outcomes would be obtained.

This study showed that nurses' self-reported mastery and use of musculoskeletal HA skills were not significantly associated with their personal characteristics except for work experience. This finding shows that contrary to our expectation, nurses with higher academic degrees are not necessarily more knowledgeable and skilled in HA. This finding also signifies the role of clinical experience in the nurses' mastery in assessing the musculoskeletal system. Perhaps, nurses with more clinical experience have more opportunities to put their skills into practice and also become more proficient and knowledgeable in this regard. This finding was not consistent with the results of the study conducted by Bahreini *et al*. who examined the nurses' clinical competence.[32]

This is a single-center study that only examined the nurses working in a teaching hospital. Therefore, multicenter studies including both public and private hospitals are suggested. Moreover, the findings of this study are based on self-report, so we recommend observational studies to obtain more objective results. Further studies can help identify the contributing factors of nurses' insufficient mastery and use of musculoskeletal assessment skills.

Conclusion

Our study showed that despite the desirable levels of nurses' self-reported and use of history taking skills, the level of nurses' self-reported and use of musculoskeletal assessment skills are not satisfactory. Nurse managers are responsible to identify the barriers and promote the nurses' self-reported and use of HA skills including musculoskeletal assessment skills. Perhaps, reducing the nurses' workload, establishing in-service HA training courses for nurses, appropriate staffing, and decreasing the nurse–patient ratio would help nurses to update their own knowledge in this regard and then use their skills in patient care.

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Conflicts of interest

There are no conflicts of interest.

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