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Clinical competence of Iranian nurses: A systematic review and meta-analysis

Amir Emami Zeydi, Mohammad Javad Ghazanfari¹, Ehsan Azizi², Hadi Darvishi-Khezri³, Hamed Mortazavi⁴, Joseph Osuji⁵, Samad Karkhah^{6,7}

Department of Medical-Surgical Nursing, Nasibeh School of Nursing and Midwifery, Mazandaran University of Medical Sciences, Sari, Iran, ¹Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Kashan University of Medical Sciences, Kashan, Iran, ²Student Research Committee, School of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht, Iran, ³Thalassemia Research Center, Hemoglobinopathy Institute, Mazandaran University of Medical Sciences, Sari, Iran, ⁴Geriatric Care Research Center, Department of Geriatric Nursing, School of Nursing and Midwifery, North Khorasan University of Medical Sciences, Bojnurd, Iran, ⁵School of Nursing and Midwifery, Faculty of Health, Community, and Education, Mount Royal University, Calgary, Alberta, Canada, ⁶Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht, Iran, ⁷Burn and Regenerative Medicine Research Center, Guilan University of Medical Sciences, Rasht, Iran

Address for correspondence:

Mr. Mohammad Javad Ghazanfari, Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Kashan University of Medical Sciences, Kashan, Iran.
E-mail: javad.ghazanfari12@gmail.com
Mr. Samad Karkhah, Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht, Iran.
E-mail: sami.karkhah@yahoo.com

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Abstract:

BACKGROUND: One of the most important steps in increasing the nurses' professional competence and consequently improving the quality of nursing care is to evaluate nurses' clinical competency and then take effective actions to enhance it. This study aimed at exploring the clinical competence of Iranian nurses and factors related to it.

MATERIALS AND METHODS: In this systematic review and meta-analysis, PubMed, Scopus, Web of Science, Scientific Information Database, and Iranmedex databases and Google Scholar search engine were searched to February 14, 2020.

RESULTS: After screening, a total of 25 articles were included. In general, the level of clinical competence of Iranian nurses was at a desirable level. After meta-analysis of the mean score of nurses' clinical competence, the combined mean was 161.13 (95% confidence interval [CI]: 137.78–184.48; $P < 0.001$; $I^2 = 99.8\%$; P value for heterogeneity = $P < 0.001$) by the Competency Inventory for Registered Nurses (CIRN) questionnaire. The summarized mean of clinical competency measured by the Nurse Competence Scale (NCS) questionnaire was 70.75 (95% CI: 60.80–80.70; $P < 0.001$; $I^2 = 99.9\%$; P value for heterogeneity = $P < 0.001$). Factors affecting nurses' clinical competence were age ≥ 33 years, nursing work experience ≥ 9 years, and a master's degree in nursing. However, the clinical competence of nurses had a significant negative relationship with job stress.

CONCLUSION: The level of clinical competence of Iranian nurses was desirable. Studies that used the CIRN, reported the highest and lowest clinical competence in clinical care and professional development dimensions, respectively. Studies that used the NCS, reported the highest and lowest clinical competence in dimensions of work role and ensuring quality, respectively.

Keywords:

Clinical competence, Iran, meta-analysis, nurses, systematic review

Introduction

Human resources are a crucial element, and the most prized assets of any organization.^[1] As the most critical and largest human resources of health-care systems, nurses have a significant role in providing professional, high-quality, and safe patient care.^[2] Considering the necessity of providing high-quality patient care by nurses' and a strong linkage between nurses' competency and the success of health organizations, nurses' clinical competency is a primary issue of concern in all health-care

settings.^[2,3] In this regard, the World Health Organization calls on all member states to report and implement their programs for strengthening the clinical competence of nurses.^[4] As primary care providers to patients, nurses should have the necessary professional competencies and continually strive to maintain patient safety and provide holistic patient care.^[2]

Although it is challenging to clearly define clinical competence in nursing,^[3] it is assumed that clinical competence will integrate skills, knowledge, attitudes, and capacities that are essential for all

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nurses to enable them to accomplish their tasks and roles pertaining directly to the patient/client care, in particular clinical situations/scenarios, in order to maintain, and enhance, the patients' health.^[3,5,6] It has been documented that various factors such as individual characteristics, work experience, work environment, motivation, use of opportunities, and theoretical knowledge can affect nurses' clinical competence.^[7] Achieving the expected clinical competency and its evaluation plays a vital role in improving and assuring high-quality and effective nursing care^[5,8] and has always been one of the main issues of clinical education in nursing.^[9] Clinical competence is the primary concern of nurse managers in clinical settings,^[5,8] therefore, assessing nurses' clinical competence is instrumental and crucial in determining nurses' educational needs and ensuring the provision of high-quality care to patients.

Various studies have examined Iranian nurses' clinical competence, but to our knowledge, there is no published study to comprehensively review and summarize the literature regarding Iranian nurses' clinical competence. Therefore, given the importance of the subject and the contradictory findings regarding the clinical competence of Iranian nurses, this systematic review and meta-analysis aimed to summarize the evidence regarding the clinical competence and its related factors among Iranian nurses.

Materials and Methods

Search strategy

This systematic review and meta-analysis were conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. An extensive search of online databases including PubMed, Web of Science, Scopus, Iranmedex, and Scientific Information Database (SID) was performed using a combination of related keywords such as "Competence," "Competency," "Clinical Competence," "Clinical Competency," "Clinical Skill," "Nurse," "Nursing," and "Iran" from the earliest records up to February 14, 2020. The languages of the studies included were restricted to Persian and English. For searching the Persian electronic databases, keyword equivalents in Farsi were used. The search was conducted by two of the authors. The gray literature was not actively searched because they usually do not portray the whole picture of the results, and when fully published, the results may change substantially.

Study selection

To manage the data, the results of the database search were imported into the EndNote X8 software. After removing the duplicate articles, two investigators

independently evaluated the title, abstracts, and then the full text of potentially eligible studies for inclusion in this review according to predefined inclusion/exclusion criteria. The reference list of included studies was manually checked for additional papers. Any disagreements between the investigators were resolved by discussion.

Inclusion and exclusion criteria

In this study, full-length, peer-reviewed published studies with a primary focus on evaluating Iranian nurses' clinical competence were included. Letters to the editor, opinions, case reports, conference abstracts, reviews, and articles that were conducted on nursing students or aimed at evaluating the efficacy of an intervention on nurses' clinical competence were excluded. The corresponding authors were contacted for articles with no access to their full text or for articles that were missing relevant data.

Data extraction and quality assessment

We designed a standardized data extraction form to collect the following information from included studies: the name of the first author, year of study, location, sample size, male/female ratio, age, work experience, questionnaire used for evaluation of clinical competence, and key findings. The appraisal tool for cross-sectional studies (AXIS tool) was used to assess the quality of included studies.^[10] Two independent reviewers carried out these procedures. Disagreements were resolved by discussion with the third author.

Statistical analysis

We conducted a current meta-analysis using STATA 13.0 software (Stata Corporation, College Station, TX, USA). A random model was used to estimate the pooled mean clinical competency among nurses. As the total score of Liu and Meretoja questionnaires used to measure the clinical competency among nurses was dissimilar, the meta-analysis of the mean score of clinical competencies, its areas, and entire subgroup analyses was autonomously performed. A fixed-effect model was only used to test the overall mean between the levels of each subgroup analysis. $P < 0.1$ was considered statistically significant. Publication bias was evaluated by Begg and Egger tests, and $P < 0.1$ test was indicative of the high risk of publication bias. Subgroup analyses were carried out based on the mean age of the studied population, female percentage, the mean of nursing work experience, and the percentage of a bachelor's degree, master's degree, and married nurses. Data distribution was assessed to categorize quantitative variables for performing subgroup analyses. In order to compare the pooled mean score between the levels in each subgroup, Cohen's d was estimated.

Results

Study selection

In the initial evaluation, a total of 593 articles were obtained following a search of databases. After removing duplicate publications and title and abstract screening, 554 studies were excluded. After reviewing the full text of 39 potentially eligible articles, 25 articles were included in the final analysis [Figure 1].

Study characteristics

Twenty-five studies were included for the final analysis. All the included studies had a cross-sectional design. Among a total of 4294 nurses, 21% were male, and 79% were female. The age range of all nurses was 25–35 years, with a mean age of 32 (standard deviation [SD] = 2.35), ranging from 25 to 35 years. Seventeen studies reported nurses' educational level (91.34% of nurses have a bachelor's degree). In 19 studies, the work experience of nurses was reported (total mean of 101.79 [SD = 16.50] months). In 17 studies, the marital status of nurses was reported and 65.61% of nurses were married. For assessing the nurses' clinical competency, 18 studies used

the Nurse Competence Scale (NCS) that was developed by Meretoja *et al.*,^[11] and 7 studies used the Competency Inventory for Registered Nurses (CIRN) that were developed by Liu *et al.*^[12] The basic characteristics of the 25 included studies are summarized in Table 1.

Methodological quality of included studies

The results of the quality assessment of included studies indicated that 2 studies had no justification for the sample size, and 11 articles did not mention the limitations of that study. In 9 studies, there was no mention of obtaining consent from nurses to participate in the study [Figure 2].

Publication bias

There was evidence of publication bias in the meta-analysis of eight nursing-related clinical competencies measured by CIRN questionnaire ($P = 0.02$ for the Egger's test: regression intercept = 40.10; 95% CI = 7.45–72.76, $P = 0.54$ for the Begg's test). The results for clinical competency measured by NCS questionnaire indicated a low risk of publication bias (Egger's test, $P = 0.64$: regression intercept = -5.24; 95% CI = -28.48–17.99, and Begg's test, $P = 0.51$).

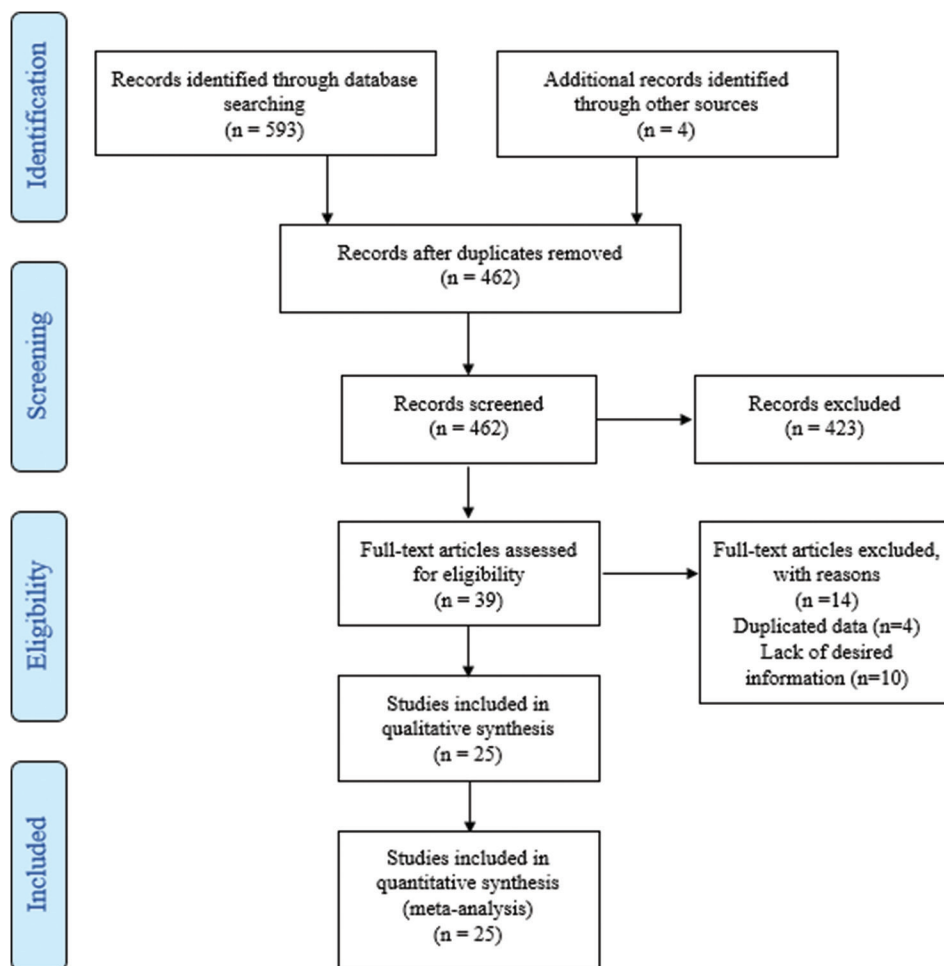


Figure 1: Flow diagram of study selection

Table 1: Basic characteristics of the studies included in the systematic review and meta-analysis

First author/ year	Location	Sample size	Male/female ratio	Age (mean±SD)	Work experience (mean±SD)	Questionnaire	Key results
Bahraini <i>et al.</i> , 2011	Shiraz and Bushehr	266	13/87	31.80±7.32	7.98±7.02	NCS	There was no significant relationship between clinical competence and variables such as age, general work experience, and recent experience
Karimi <i>et al.</i> ,2012	Mashhad	146	29.7/70.3	34.15±6.8	9	CIRN	The level of clinical competence of the majority of nurses (53.8%) and head nurses (48.2%) was at a good and moderate level, respectively. There was a significant relationship between spiritual intelligence and clinical competence
Habibzadeh <i>et al.</i> , 2013	Orumieh	136	8.8/91.2	32.31±5.6	8.4	NCS	The majority of nurses' (63.2%) clinical competency was at a good and high level. There was a positive correlation between the quality of life associated with occupation and clinical competence. The quality of the work-life of most nurses (67.6%) was at a moderate level
Abdi <i>et al.</i> ,2015	Kermanshah	204	29.9/70.1	33.55±6.17	9.31±5.74	NCS	There was a significant positive correlation between rational and intuitive decision-making styles with clinical competence
Komeily Sani <i>et al.</i> , 2015	Ahvaz	80	2.5/97.5	28.6±4.40	5.94±3.43	NCS	Overall clinical competency level of nurses was good. There was a significant negative correlation between job stress and nurses' clinical competency in all its domains. The job stress of most nurses (81.3%) was moderate
Naji <i>et al.</i> ,2015	Najafabad	123	4.06/95.94	31.07±7.74	7.40±0.62	NCS	The mean clinical competence of nurses was good. There was no significant relationship between clinical competence and nurses' job satisfaction
Heydari <i>et al.</i> , 2016	Mashhad	204	23/77	33.96±6.73	9.27±6.07	NCS	Emotional intelligence and personality were significantly associated with the clinical competence of nurses
Mahdavisaeab <i>et al.</i> , 2016	Zanjan	148	10.8/89.2	32.2±5.07	8.63±4.75	NCS	The clinical competence of nurses was excellent. The highest score was for "diagnostic functions" and the lowest for "ensuring quality"
Mazlum <i>et al.</i> , 2016	Zahedan	231	81.8/18.2	N/A	N/A	CIRN	The majority of nurses' clinical competency was at a good level. There is a positive and significant relationship between self-efficacy and the clinical competency of nurses
Soheilipour <i>et al.</i> , 2016	Birjand	90	27.8/72.2	24.53±2.51	N/A	CIRN	Nurses' clinical competence was not significantly related to gender, marital status, age, work experience, workplace, type of job, and overtime hours
Hassani <i>et al.</i> , 2017	Tehran	88	26.1/73.9	32.29±6.75	7.40±5.68	NCS	There was no significant relationship between the use of intuition and clinical competence in critical care nurses
Abbasi <i>et al.</i> ,2017	Bushehr	257	21/79	33.2±6.5	9.4±6.4	NCS	The majority of nurses' clinical competency and job satisfaction were at a good level. There is a significant and positive relationship between clinical competency and job satisfaction of nurses
Kalantari <i>et al.</i> , 2017	Gorgan	205	17.8/82.2	N/A	N/A	NCS	Nurses' clinical competence was at a high level. The lowest and highest clinical competence scores, respectively, were in "quality assurance" and "job organizational tasks"

Contd...

Table 1: Contd...

First author/ year	Location	Sample size	Male/female ratio	Age (mean±SD)	Work experience (mean±SD)	Questionnaire	Key results
Karami <i>et al.</i> ,2017	Rafsanjan	230	34.3/65.7	N/A	N/A	CIRN	There was no statistically significant correlation between professional competency and organizational commitment. Furthermore, there were significant differences in professional competency based on marital status and work experience
Adib Haji Bagheri <i>et al.</i> , 2018	Kashan	145	11.7/88.3	30.35±5.41	6.75±5.03	NCS	The clinical competence of nurses' majority, in terms of self, was at a level good, but far more head nurses reported excellent levels. The level of clinical competence and the level of skills utilization were high from the point of view of both nurses and head nurses
Elhami <i>et al.</i> ,2018	Abadan	83	4.8/95.2	32.71±6.56	8.3±7.1	NCS	The highest and lowest clinical competencies were in nurses in the pediatric and CCU ward, respectively
Goli Roshan <i>et al.</i> , 2018	Babol	157	12.7/87.3	N/A	N/A	NCS	The level of clinical competence of nurses and the use of clinical skills is excellent. There was no significant difference between the clinical competency of the two groups of general and specialty nurses
Hassankhani <i>et al.</i> , 2018	Tabriz	319	28.5/71.5	N/A	N/A	NCS	The clinical competence of emergency nurses was at a desirable level. The highest level of clinical competence was related to the areas of work role, diagnostic functions, and helping role
Imani <i>et al.</i> ,2018	Hamadan	123	33/67	29.6	6.1	CIRN	The majority of nurses' (57.5%) clinical competency was at a good level. The lowest and highest clinical competence scores, respectively, were in "coaching education" and "critical thinking." There was a significant positive correlation between emotional intelligence and clinical competence
Khodadadi <i>et al.</i> , 2018	Najafabad	135	7.4/92.6	32.25±7.44	8.75±7.2	NCS	Nurses' clinical competency was at a good level. Overall organizational commitment was directly correlated with clinical competence in the areas of quality assurance, training, and guidance
Saadati <i>et al.</i> , 2018	Rasht	165	N/A	33.04±6.66	8.48	CIRN	The clinical competence of majority of nurses (61.7%), in terms of self-theirs, was at level high, but far more head nurses (62.5%) were at average levels. There was a significant relationship between nurses' clinical competence and variables such as age, sex, and marital status
Amini <i>et al.</i> ,2019	Rasht	230	8.3/91.7	32.02±7.11	9.0±6.1	CIRN	Nurses' clinical competence was at a good level. Nurses are least qualified in the field of "critical thinking/research ability"
Faraji <i>et al.</i> ,2019	Kermanshah	155	23.2/76.8	34.52±5.07	11.27±12.57	NCS	Clinical competence of intensive care nurses was at an "excellent" level and clinical competency in practice was at a "good" level. There was no statistically significant difference between nurses' clinical competency scores with sex, age, academic degree, and work experience
Faraji <i>et al.</i> ,2019	Kermanshah	204	29.9/70.1	33.55±6.17	9.31±5.74	NCS	Nurses' clinical competency was at a good level

Contd...

Table 1: Contd...

First author/ year	Location	Sample size	Male/female ratio	Age (mean±SD)	Work experience (mean±SD)	Questionnaire	Key results
Jafari et al.,2019	Tehran	170	14.1/85.9	34.38±7.06	10.82±6.83	CIRN	A significant positive correlation was observed between the total mean score of clinical competence and critical thinking. However, no significant associations were observed between the demographic variables with clinical competence, while the nurses' critical thinking ability in critical care wards was significantly higher compared to those employed in general wards

NCS=Nurse Competence Scale, CIRN=Competency Inventory for Registered Nurses, SD=Standard deviation, CCU=Cardiac care unit, NA=Not applicable

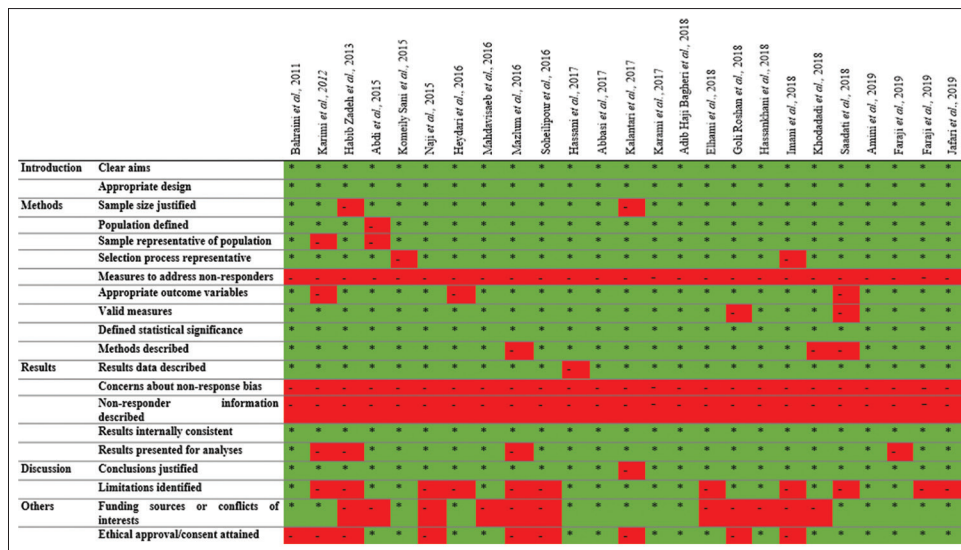


Figure 2: Methodological quality assessment of included studies

Level of clinical competence

According to the included studies results, the overall level of clinical competence of Iranian nurses was desirable. Most studies evaluated the categories of clinical competence. In studies that used the CIRN questionnaire, the average clinical competence scores in dimensions of clinical care, leadership, interpersonal relationships, critical thinking and research aptitude, ethical/legal practice, teaching-coaching, and professional development were 27.74, 25.10, 22.84, 22.72, 22.62, 16.78, and 15.94, respectively [Table 2].

In the studies that used the NCS questionnaire, the average clinical competence scores in the dimensions of the work role, diagnostic functions, teaching-coaching, managing situations, therapeutic interventions, helping role, and ensuring quality were 73.19, 71.06, 70.92, 70.10, 70.06, 69.22, and 64.53, respectively [Table 3].

A meta-analysis of the clinical competency measured by the Competency Inventory for Registered Nurses

Eight studies^[2,13-18] (n = 1385) measured and reported the mean of clinical competency among

nurses by CIRN. After meta-analysis of the mean score of nurses' clinical competence, the pooled mean was 161.13 (95% confidence interval [CI]: 137.78–184.48; P < 0.001; I² = 99.8%; P value for heterogeneity = P < 0.001) [Figure 3]. The results of meta-analyses for all dimensions of clinical competency measured by the CIRN are presented in Table 2. The clinical competency of Iranian nurses was moderate, according to the CIRN questionnaire.

A reduced statistical heterogeneity was found following meta-analysis of the clinical competency measured through CIRN according to the female percentage of the study population^[2,13-15,17-19] [Table 4 and Figure 4].

Six studies^[2,13,15-18] reported nursing work experience in their studies in which the CIRN questionnaire had assessed clinical competency. The pooled mean of clinical competency in nurses who had nursing work experience ≥ 9 years was 169.16 (95% CI: 164.35–173.97) compared with 139.57 (89.42–189.71) in nurses with work experience < 9 years. The estimated Cohen's d for nursing work experience between these overall averages of subgroup's levels was 1.50 (95% CI: 1.38–1.618).

Table 2: The results of meta-analyses of clinical competency areas measured by the Competency Inventory for Registered Nurses (number of studies=5)

Area	Mean (95% CI)	P	I ² (%)	P value for heterogeneity
Clinical care	27.74 (25.08-30.39)	<0.001	98.1	<0.001
Leadership	25.10 (22.87-27.13)	<0.001	97.5	<0.001
Interpersonal relationships	22.84 (20.61-25.07)	<0.001	98.7	<0.001
Ethical/legal practice	22.62 (19.81-25.43)	<0.001	99.0	<0.001
Professional development	15.94 (13.88-18.00)	<0.001	98.7	<0.001
Teaching-coaching	16.78 (14.35-19.20)	<0.001	99.2	<0.001
Critical thinking and research aptitude	22.72 (21.58-23.86)	<0.001	92.7	<0.001

P<0.15 was considered significant. CI=Confidence interval

Table 3: The results of meta-analyses of clinical competency areas measured of the Nurse Competence Scale

Area	Number of studies	Mean (95% CI)	P	I ² (%)	P value for heterogeneity
Helping role	14	69.22 (53.13-85.31)	<0.001	100	<0.001
Teaching-coaching	13	70.92 (62.19-79.65)	<0.001	99.8	<0.001
Diagnostic functions	14	71.06 (55.17-86.94)	<0.001	99.9	<0.001
Managing situation	15	70.10 (55.29-86.71)	<0.001	100	<0.001
Therapeutic intervention	14	70.06 (56.37-83.74)	<0.001	99.9	<0.001
Ensuring quality	13	64.53 (45.16-83.91)	<0.001	99.9	<0.001
Work role	15	73.19 (67.97-78.41)	<0.001	99.4	<0.001

P<0.1 was considered significant. CI=Confidence interval

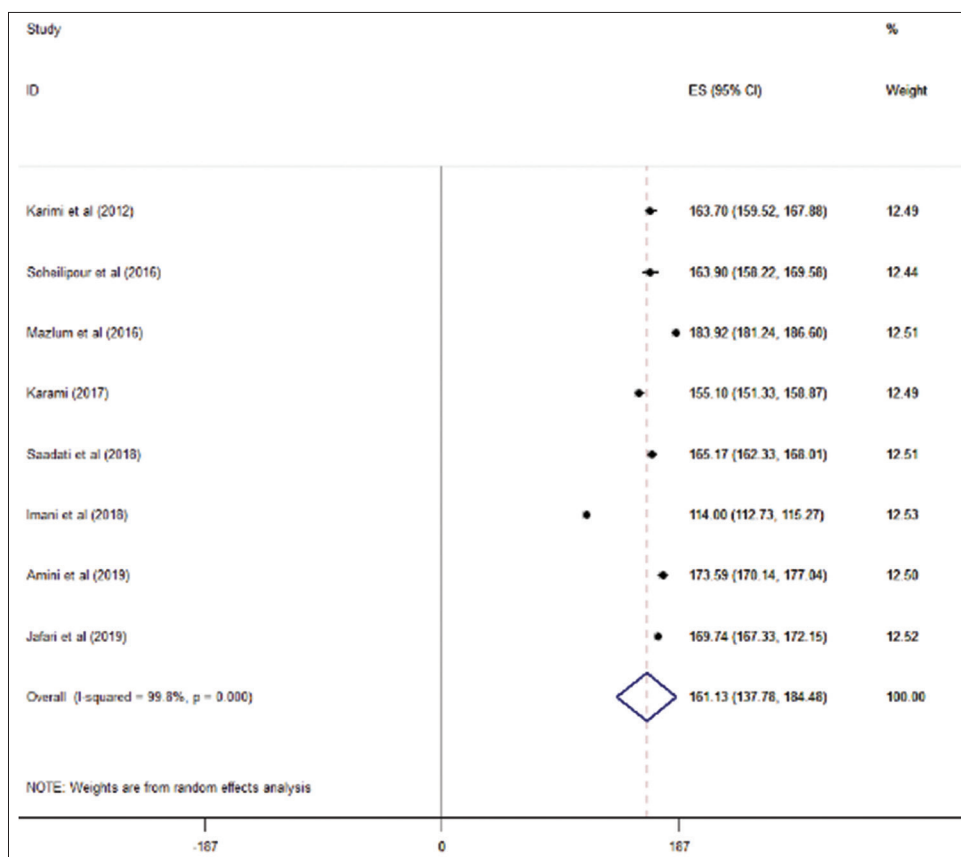


Figure 3: The forest plot of the mean of clinical competency measured by the Competency Inventory for Registered Nurses questionnaire

Five studies^[2,14,15,18,19] reported the married percentage for nurses who participated in studies in which the CIRN questionnaire had assessed clinical competency. The summarized mean of clinical competency in nurses' population with the married percentage of $\geq 66\%$

was 170.91 (95% CI: 154.57–187.25) compared with 138.87 (95% CI: 89.97–187.77) in the population with a married percentage $<66\%$, Cohen's d: 1.42, 95% CI 1.31–1.54. The results of all subgroup analyses are shown in Table 4.

Table 4: The results of subgroup analyses of potentially influential factors and clinical competency measured by the Competency Inventory for Registered Nurses questionnaire

Potential	Subgroup analysis					
	Levels (%)	Number of studies	Mean (95% CI)	P	I ² residual (%)	Interaction P
Age	<33	3	150.46 (105.51-195.41)	<0.001	99.8	<0.001
	≥ 33	3	166.44 (162.71-170.18)	<0.001	77.6	
Female	<88	5	156.11 (122.12-190.10)	<0.001	99.9	<0.001
	≥ 88	2	171.46 (167.71-175.21)	<0.001	68.8	
Nursing work experience (years)	<9	2	139.57 (89.42–189.71)	<0.001	99.9	<0.001
	≥ 9	3	169.16 (164.35-173.97)	<0.001	84.3	
Bachelor’s degree	<94	4	158.20 (120.84-195.56)	<0.001	99.9	<0.001
	≥ 94	2	164.36 (146.24-182.48)	<0.001	98.0	
Master’s degree	<7	4	155.68 (117.83-193.53)	<0.001	99.2	<0.001
	≥ 7	2	169.32 (161.07-177.57)	<0.001	99.7	
Married	<66	2	138.87 (89.97-187.77)	<0.001	99.6	<0.001
	≥ 66	3	170.91 (154.57-187.25)	<0.001	98.7	

P<0.1 was considered significant. CI=Confidence interval

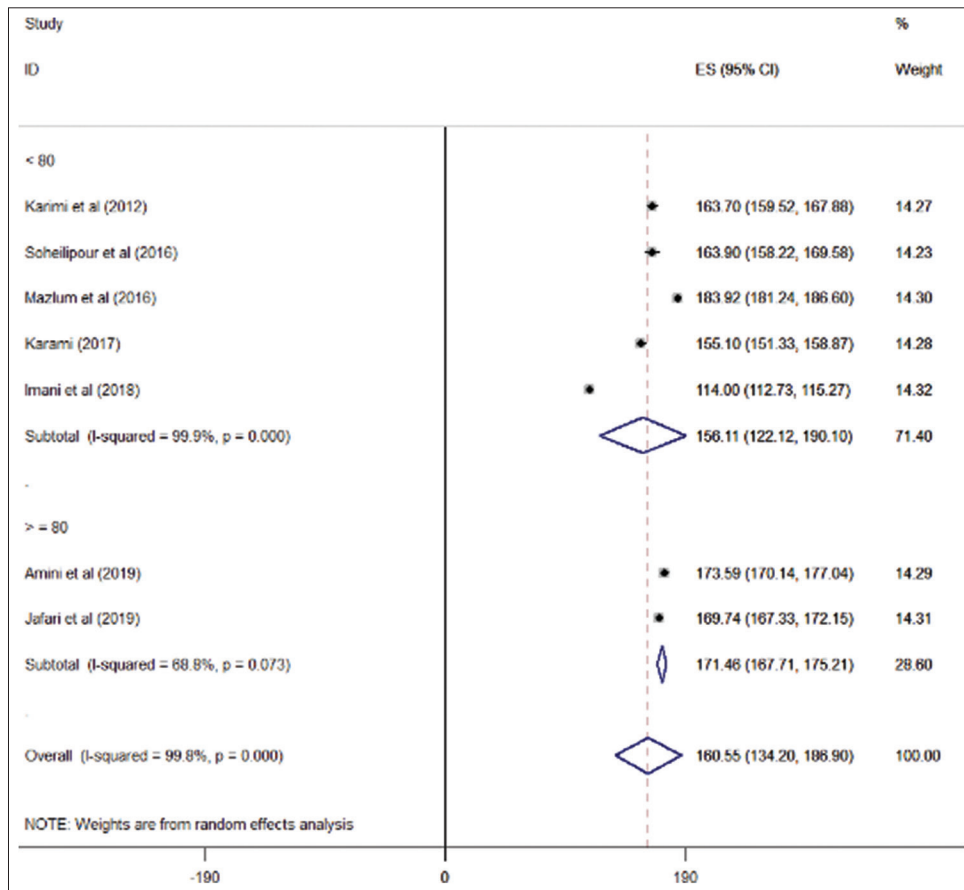


Figure 4: A meta-analysis of the clinical competency measured by the Competency Inventory for Registered Nurses questionnaire according to female percentage

A meta-analysis of the clinical competency measured by the Nurse Competence Scale questionnaire

Seventeen studies^[5,20-35] (n = 2909) measured and reported the mean of clinical competency among nurses by the NCS tool. The summarized mean of clinical competency measured by this tool was 70.75 (95% CI: 60.80–80.70; P < 0.001; I² = 99.9%; P value for

heterogeneity = P < 0.001) [Figure 5]. The results of meta-analyses for all clinical competency areas of NCS are presented in Table 3. The clinical competency of Iranian nurses was good, according to the NCS questionnaire.

Across all subgroup analyses, statistical heterogeneity remained high. Twelve studies reported the married percentage for nurses recruited in studies in which the

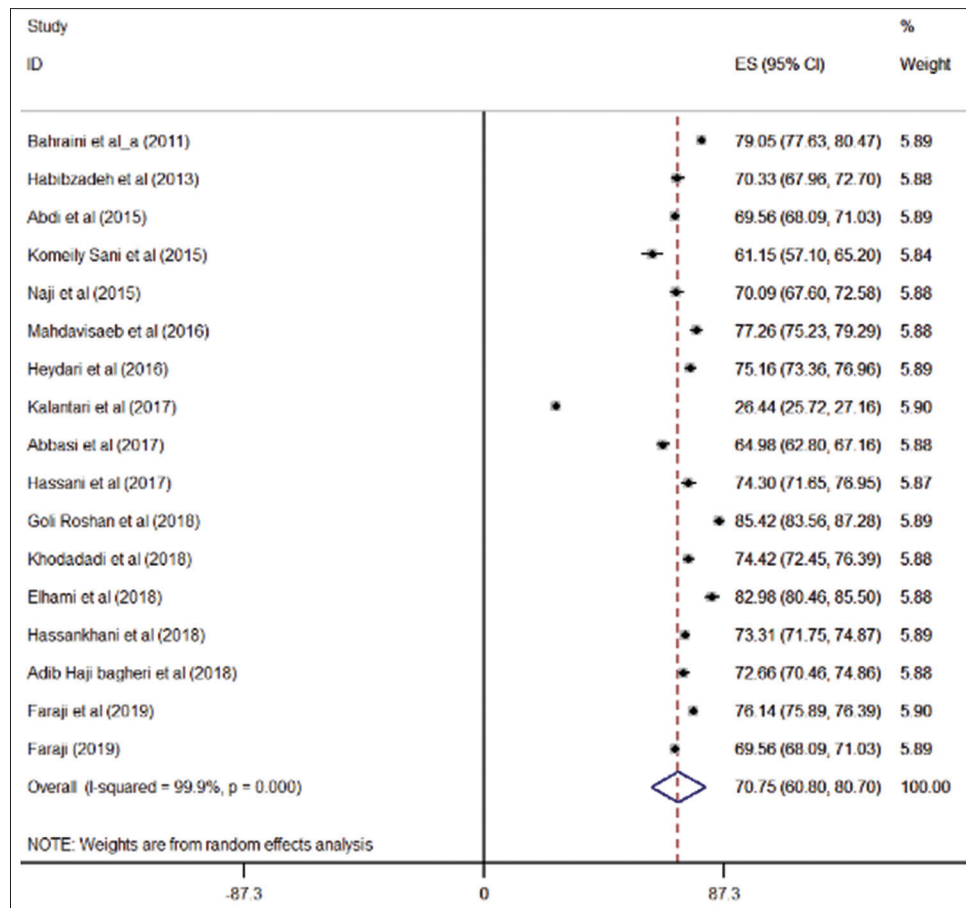


Figure 5: The forest plot of the mean of clinical competency measured by the Nurse Competence Scale questionnaire

NCS questionnaire had assessed clinical competency. The pooled mean of clinical competency in nurses' population with a married percentage of $\geq 66\%$ was 65.34 (95% CI: 41.71–88.96) compared with 73.06 (95% CI: 68.54–77.58) in the population with a married percentage of $<66\%$, Cohen's d: -0.60 , 95% CI: -0.68 – -0.51 . The results of all subgroup analyses are shown in Table 5.

After a subgroup analysis, according to the female percentage, the estimated Cohen's d was 0.53 (95% CI: 0.45–0.60). The overall mean of the clinical competency in the population with a female percentage of $\geq 88\%$ was 74.40 (95% CI: 69.69–79.11) compared with 67.61 (95% CI: 52.08–83.13) in the population with a female percentage of $<88\%$. The results of all subgroup analyses are also shown in Table 5.

Factors related to nurses' clinical competence

Factors such as spiritual intelligence,^[13] quality of working life,^[36] emotional intelligence,^[15] self-efficacy,^[19] job satisfaction,^[26] rational and intuitive decision-making styles,^[21] critical thinking,^[17] and organizational commitment^[33] had a significant positive relationship with nurses' clinical competence. However, the clinical competence of nurses had a significant negative relationship with job stress.^[22]

Discussion

This systematic review and meta-analysis of 25 studies that involved 4294 Iranian nurses, showed that Iranian nurses have the desired clinical competence levels. Studies that used the CIRN, indicated the highest and lowest competence in clinical care and professional development dimensions, respectively. Studies that used the NCS, showed the highest and lowest clinical competence in dimensions of work role and ensuring quality, respectively. Based on the results of the present study, factors affecting the clinical competence of nurses were age ≥ 33 years, nursing work experience ≥ 9 years, and master's degree.

The average clinical competence of Iranian nurses in this study was desirable, consistent with the results of studies from Taiwan,^[37] the USA,^[38] China,^[39] Finland,^[40] Saudi Arabia,^[41] and Australia.^[42] Evaluation of nurses' clinical competence in studies conducted in Iran has often been performed in educational hospitals. Given that educational hospitals, in accordance with continuing education strategies and the emphasis on providing standard medical services, are continually emphasizing the achievement of a desirable level of clinical competence, this result is to be expected. According to the results of

Table 5: The results of subgroup analyses of potentially influential factors and clinical competency measured by the Nurse Competence Scale questionnaire

Potential	Subgroup analysis					
	Levels (%)	Number of studies	Mean (95% CI)	P	f residual (%)	Interaction P
Age	<33	8	72.63 (69.47-75.79)	<0.001	93.9	<0.001
	≥33	6	73.04 (69.14-76.93)	<0.001	98.1	
Female	<88	9	67.61 (52.08-83.13)	<0.001	100	<0.001
	≥88	8	74.40 (69.69-79.11)	<0.001	97.0	
Nursing work experience (years)	<9	7	73.08 (68.70-77.46)	<0.001	96.0	<0.001
	≥9	7	72.46 (69.35-75.58)	<0.001	97.6	
Bachelor's degree	<94	4	72.39 (68.11-76.66)	<0.001	97.9	<0.001
	≥94	7	75.86 (70.97-80.74)	<0.001	97.6	
Master's degree	<7	4	72.39 (68.11-76.66)	<0.001	97.9	<0.001
	≥7	7	75.86 (70.97-80.74)	<0.001	97.6	
Married	<66	6	73.06 (68.54-77.58)	<0.001	96.9	<0.001
	≥66	6	65.34 (41.71-88.96)	<0.001	99.9	

P<0.1 was considered significant. CI=Confidence interval

the present review, the highest level of Iranian nurses' clinical competence was in dimensions of organizational job tasks, clinical care, leadership, training and guidance. On the other hand, they had the lowest level of clinical competence in dimensions of quality guarantee and helping patients, coaching, and professional training, which are consistent with the results of studies from Saudi Arabia,^[41] Finland,^[43] and Scotland.^[44] In contrast, the results of studies in Australia and Finland^[42,45] found that the highest area of clinical competence of nurses was a quality guarantee; one of the reasons for this difference is the lack of a clear definition of the concept of quality guarantee skills in nursing.^[5] Another study found that the reason for the low level of quality guarantee was poor management of nursing.^[43] Nursing managers create opportunities in work environments such as evidence-based training and continuing education, giving nurses a broader understanding of their impact on patients' health. On the other hand, these measures can improve nurses' motivation for the future of their careers and ultimately improve their clinical competence.^[43] A qualified nurse is a person who can show acceptable ability in all areas of clinical competence. Considering the sensitive duty of nurses and their close relationship with clients' health and lives, they must be empowered in all areas of clinical competence, especially quality guarantee. Another low-level dimension in the areas of research and critical thinking, is consistent with the results of studies from Finland,^[11] Scotland,^[44] and South Korea.^[46] In a study in South Korea,^[46] clinical nurses scored low on research abilities, such as data quality management and the use of scientific evidence in clinical care. The low level of this field can be considered due to differences in various cultural levels, for example, differences in the educational content and mother tongue of nurses.^[11] Nurses need research-based performance to apply research findings to informed decision-making, clinical practice, and interaction with clients.^[47] Another requirement for research-based nursing performance

is to increase health-care costs if left unattended.^[48] In general, considering that most of the nurses in the present study had a bachelor's degree, the impact of higher education on Iranian nurses' level of clinical competence cannot be assessed. However, nurses' low level of clinical competence in aspects such as the role of patient education, critical thinking, and research can be due to the lack of nurses in senior and higher levels of management.^[49] The results of a study conducted in several European countries (Iceland, The Netherlands, Sweden, Norway, and the United Kingdom) on the competence of nurses, showed that senior nurses evaluated their competence in terms of responsibility and cooperation with other specialists at a significantly higher level than bachelors.^[50] In addition, it has been found that nurses with a master's degree provide better nursing care^[51] which can be an important determining factor to improve clinical care.^[52]

The results of a study in Iran showed that there was a significant positive relationship between spiritual intelligence,^[13] quality of working life,^[36] emotional intelligence,^[15] self-efficacy,^[19] job satisfaction,^[26] and the average level of clinical competence of nurses. Obviously, with principled intervention and planning to improve on these variables, the level of clinical competence of nurses can be improved. Job stress had a significant negative relationship with nurses' clinical competence and is an intervening factor in the emergence and presentation of necessary nursing skills and clinical competence.^[22] In general, head nurses, as vital members of the treatment team who has the appropriate knowledge and skills, have an essential role in guiding nurses and improving their clinical competence.^[53] To create a common language in different areas of clinical skills, nurses, each of whom may have graduated from different universities and levels, are expected to provide appropriate training programs.^[54] On the other hand, motivation has a significant relationship with clinical competence, so

head nurses must pay more attention to nurses' needs and have the appropriate feedback to motivate nurses to improve the quality of clinical care. Head nurses can improve nurses' job satisfaction and ultimately improve the quality of health care by better understanding nurses and being aware of individual motivational needs.^[55]

Study limitation

More studies may need to find other potential factors related to the clinical competency among nurses. Most existing studies were conducted in educational hospitals, making it impossible to compare clinical competence with private hospitals. We recommend that researchers conduct longitudinal studies with a broader range, larger sample size, and in educational and private hospitals to compare nurses' clinical competence in different therapeutic settings.

Implications for nursing policy and health policy

Health managers and policymakers can play a significant role in improving nurses' clinical competence, especially in some aspects such as quality guarantee, professional training, helping patients, and coaching training, by taking advantage of the results of this study and making appropriate decisions.

Conclusion

The level of clinical competence of Iranian nurses in most studies was desirable. Studies that used the CIRN, reported the highest and lowest clinical competence in clinical care and professional development dimensions, respectively. Studies that used the NCS, reported the highest and lowest clinical competence in dimensions of work role and ensuring quality, respectively.

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Conflicts of interest

There are no conflicts of interest.

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