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# Patient satisfaction with nursing care in Iran: a systematic review and meta-analysis

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**Introduction:** Patient satisfaction (PS) with nursing care is considered one of the most important predictors of satisfaction with hospital services. The current research was conducted to determine the level of PS with nursing care provided in hospitals in Iran.

**Methods:** A comprehensive systematic search was conducted in various international electronic databases, such as PubMed, Scopus, Web of Science, and Persian electronic databases such as Iranmedex, and the Scientific Information Database (SID) using keywords extracted from Medical Subject Headings such as 'Patient satisfaction', 'Satisfaction', 'Nursing care', and 'Nurse' from the earliest to 27 January 2023. The risk of bias was assessed using the Joanna Briggs Institute (JBI) scale, and the analysis was performed in Stata software version 14. Subgroup and sensitivity analyses were performed to clarify the source of heterogeneity.

**Results:** The results showed that the overall PS with nursing care in different hospitals was 0.83 (95% CI: 0.79–0.86). The proportions of complete satisfaction, partial satisfaction, and dissatisfaction were 0.38 (95% CI: 0.23–0.53), 0.45 (95% CI: 0.34–0.55), and 0.17 (95% CI: 0.12–0.21), respectively.

**Conclusion:** However, overall satisfaction was seen in four out of five patients admitted to hospitals in Iran, complete satisfaction with nursing care was 38%. Future studies should identify the effective factors related to PS with nursing care.

**Keywords:** meta-analysis, nurses, nursing care, patient satisfaction, satisfaction

## Introduction

Patient satisfaction (PS) is one of the most important indicators of the quality of care, and is considered an outcome of healthcare services[1]. The quality and adequacy of healthcare services can be measured based on the opinions and satisfaction of patients and their families[2]. Moreover, healthcare organizations strive to meet clients' needs and expectations to achieve their satisfaction[3]. Different definitions for PS have been proposed, including the degree of congruence between patients' ideal expectations and the care delivered, as well as the patient's

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### HIGHLIGHTS

- The results showed that the overall patient satisfaction with nursing care in different hospitals was 0.83 (95% CI: 0.79–0.86).
- Complete satisfaction, partial satisfaction, and dissatisfaction were 0.38 (95% CI: 0.23–0.53), 0.45 (95% CI: 0.34–0.55), and 0.17 (95% CI: 0.12–0.21), respectively.
- Although overall satisfaction was seen in four out of five patients referred to hospitals in Iran, complete satisfaction with nursing care was 38%.
- Future studies should identify the effective factors related to patient satisfaction in nursing care.

response to the environment, processes, and experiences while receiving healthcare services[4].

Patients who were more satisfied with their care were more likely to adhere to the prescribed medical recommendations. As a result, their health status improved, and the burden on their caregivers and healthcare providers decreased[1,4]. This satisfaction indicated the quality of care received by the patient and influenced the reputation of the department and the hospital[5].

Several factors can affect PS levels in hospitals, including admissions quality, diagnosis accuracy, treatment efficacy, equipment functionality, patient experience, safety provisions, and patient education levels[3]. Previous studies identified medical and nursing services, hospital equipment, and nutrition quality as the four main influential factors on the PS[3].

Nursing care was considered one of the key components of healthcare services[6]. The PS with nursing care was known as the most important predictor of overall satisfaction with hospital services[1]. Nurses play a central role in providing emotional and

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psychological support to patients and their families in various fields, such as assuring them that they receiving optimal care. Qualification requirements for nurses contain various factors such as knowledge, attitude, and practical skills[7,8]. In Iran, several cross-sectional studies have assessed PS with the hospital services. Additionally, nursing care was not separately evaluated in the meta-analysis research. The findings of most articles included in a systematic review (2019) in Iran indicated that patients had a high level of satisfaction with nursing care. However, some studies did not consider it at the desired level[9]. Also, one meta-analysis (2019) study showed the PS with the hospital services was 14.1% in Iran. In the subgroup analysis of this study, PS with the nursing care was reported at 32.1% based on five studies[10]. Although the results of this study were valuable, it did not provide a specialized view of nursing care. Additionally, our primary search in domestic and foreign databases indicated that more studies can be included in the meta-analysis study. On the other hand, cross-sectional studies have been performed after 2019 and during a COVID-19 outbreak on the PS in recent years. Identifying the level of PS with nursing care through a comprehensive meta-analysis can be essential. Such information can provide policymakers in this field with valuable insights to take appropriate corrective and supportive measures to improve nursing care.

## Aim

Nursing care was considered one of the key components of healthcare services and the predictors of PS with hospital services. Limited investigations have been conducted in Iran to evaluated PS with nursing care, particularly in recent years following the outbreak of the COVID-2019. As a result, the current systematic and meta-analysis aimed to provide the level of PS in nursing care in Iran. We used the PICO (Population, Intervention, Comparison, and Outcome) framework to formulate a specific clinical question. The population of interest included patients receiving nursing care in Iran. Intervention and comparison were not applicable in the present research, as it included observational studies. The outcome of interest was considered PS.

## Methods

### Study registration and reporting

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist was used to conduct this systematic review and meta-analysis (Supplementary Table S1, Supplemental Digital Content 1, http://links.lww.com/MS9/A254)[11]. Additionally, the current review was registered in the international prospective register of systematic reviews (PROSPERO) database.

### Search strategy

A comprehensive systematic search was conducted in the search engine of Google Scholar and various international electronic databases, such as PubMed, Scopus, Web of Science, and Persian electronic databases such as Iranmedex, and Scientific Information Database (SID) using keywords extracted from Medical Subject Headings such as 'Patient satisfaction', 'Satisfaction', 'Nursing care', 'Nurse', 'Iran', and 'Persian' from the earliest to 27 January 2023. The search strategy in the foreign databases is provided in the

Table 1. To combine the phrases, the Boolean operators 'OR' and 'AND' were employed. Persian keyword equivalents of Iranian electronic databases were also searched. Two researchers independently searched databases extensively. This systematic review and meta-analysis do not include gray literature, which includes expert opinions, conference presentations, theses, research and committee reports, and ongoing studies. Articles that have been published electronically but not evaluated by a for-profit publisher are referred to as 'grey literature'[12].

### Inclusion and exclusion criteria

The inclusion criteria consisted of studies conducted in Iranian hospitals that evaluated the PS, reported as a percentage in the article, and with full-text access available. Exclusion criteria included letters to the editor and review studies.

### Study selection

The steps of PRISMA (2020), namely identification, screening, and included, were taken into consideration in order to arrive at the final selection of articles. The initial search was conducted using the search strategy in databases. All articles were then imported into Endot 8X software, and duplicate articles were subsequently identified and removed during the identification step. Two researchers independently evaluated the study titles, abstracts, full texts of the publications, and the elimination of based on the inclusion and exclusion criteria in the screening step. The studies that provided quantitative data, such as the percentage of PS with nursing care, were included in the meta-analysis, while studies that did not provide such data were reported qualitatively. Any disagreements between the first two researchers were resolved by a third researcher during the study selection process. References were thoroughly examined last to prevent any data loss.

### Data extraction and risk of bias

We extracted information from articles included in this systematic review and meta-analysis, including the name of the first author, year of publication, city, type of study design, sex ratio, wards, sampling technique, sample size, and results. The risk of bias was assessed using the Joanna Briggs Institute (JBI) scale. Also, the AMSTAR 2 checklist was completed to evaluate the study quality (Supplementary File S2, Supplemental Digital Content 2, http://links.lww.com/MS9/A255)[13].

### Statistical analysis

The STATA version 14 software was used to perform the meta-analysis. A CI of 95% was considered to determine the significance level. Heterogeneity was evaluated with the $I^2$ value. Heterogeneity was provided based on the following ranges, 0–40%: might not be important; 30–60%: may represent moderate heterogeneity; 50–90%: may represent substantial heterogeneity, and 75–100%: considerable heterogeneity.

Due to the high heterogeneity in the present study, a random effect model with the inverse-variance method was used to report the overall effect size (ES). The ES of outcomes reported on the forest plot. The subgroup analysis based on the health system transformation plan (HSTP), COVID-19, the hospital (affiliated with the university of medical science and military), the geographical location (Tehran and the central provinces, west and the north-west, East, North, and other locations), department

**Table 1**

**Search strategy in foreign databases**

| Database | Advanced query |
|---|---|
| PubMed | (('Iran'[Title/Abstract] OR 'Persian' [Title/Abstract]) AND ('Nursing care' [Title/Abstract] OR care [Title/Abstract] OR Nurs*[Title/Abstract])) AND ('Patient satisfaction'[Title/Abstract] OR satisfaction[Title/Abstract]) |
| Web of Sciences | #1 TS = (Iran OR Persian), #2 TS = ('Nursing care' OR care OR Nurs*), #3 TS = ('Patient satisfaction' OR satisfaction), #4: #3 AND #2 AND #1 |
| Google scholar | (('Iran' OR 'Persian') AND ('Nursing care' OR care OR Nurs*)) AND ('Patient satisfaction' OR satisfaction) |
| Scopus | TITLE-ABS-KEY ( iran OR persian ) AND TITLE-ABS-KEY ('Patient satisfaction' OR satisfaction ) AND TITLE-ABS-KEY ('Nursing care' OR care OR Nurs*) |

(COVID, CCU and oncology, emergency, medical-surgery, and different) and sample size (less and more than 300) was done. Sensitivity analysis was performed to determine the effect of each study on the overall ES. The publication of bias was investigated using a funnel plot and the *P*-value obtained from Begg and Egger tests. The trim and fill method was used to find the studies required to eliminate publication bias.

## Results

### Study selection

After conducting the initial search, a total of 2919 articles were found. Following the elimination of 300 duplicate articles and screening based on inclusion and exclusion criteria, 21 articles were ultimately chosen for analysis. Additionally, by reviewing the references and citations of these final articles, four more articles were selected. Thus, 25 studies (30 127 patients) were included in the systematic review and meta-analysis (Fig. 1).

### Study characteristics

All of the studies had a cross-sectional design. Additionally, characteristics such as city, sample size, sampling technique, male-to-female ratio, ward, number of included hospital, and key results are presented in Table 2. The PS level was measured from 46 hospitals across Iran. However, five studies were conducted in hospitals affiliated to the university of medical sciences, number of hospital were not reported. Also, eight articles[22,24,25,27,30,32,33,35] used random sampling for data collection, while other included studies benefited from nonrandom sampling. The studies were conducted in wards including COVID ($n = 2$), medical and surgical ($n = 2$), CCU and oncology ($n = 2$), emergency ($n = 5$), and different or mixed ($n = 14$), as shown in Table 2.

### Risk of bias

The methodological quality assessment of the included studies was provided in Figure 2.
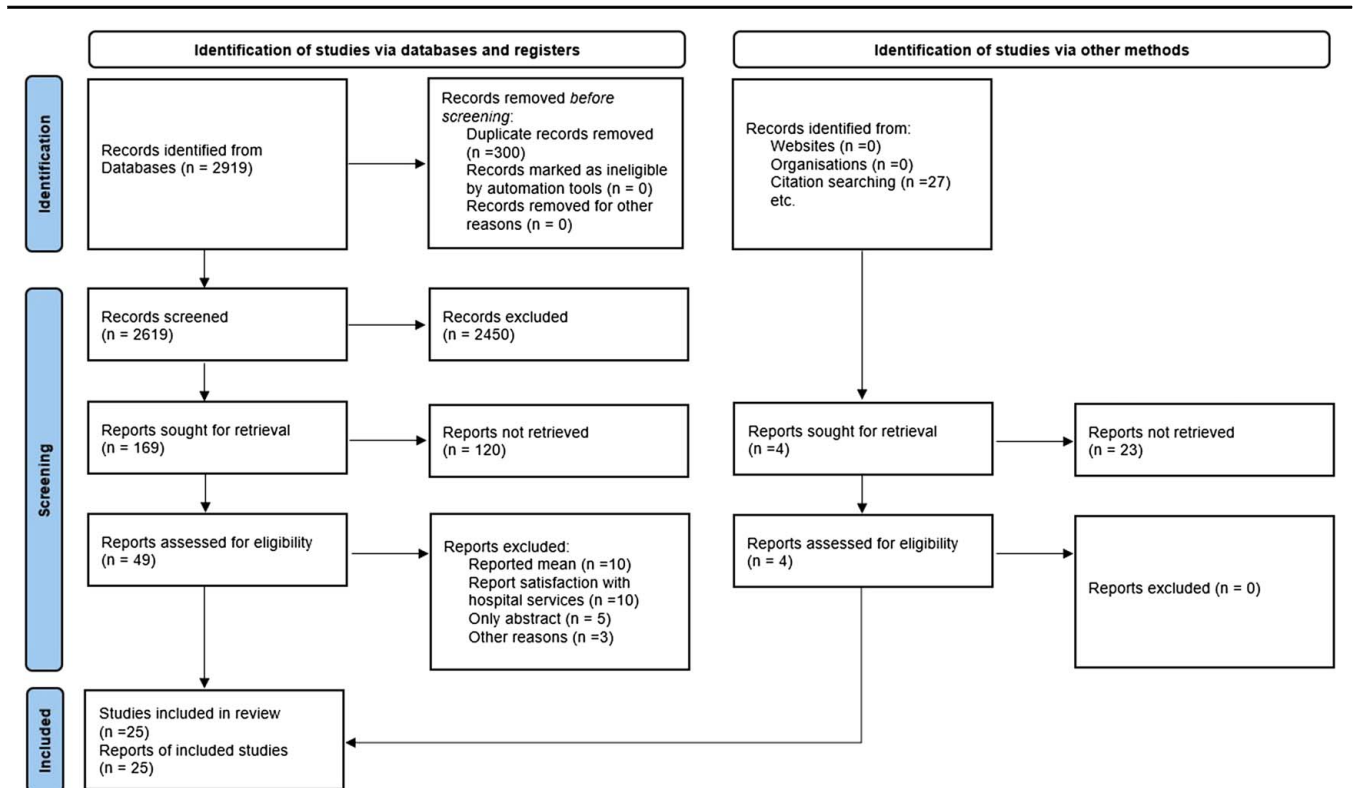


**Figure 1.** Flow diagram of selection study.

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**Basic characteristics and main results of the studies included in the systematic review and meta-analysis**

| References | City | Study characteristics<br>1-M/F<br>2-Ward<br>3-Sampling<br>4-Sample size<br>5-Number of hospitals | Results |
|---|---|---|---|
| Jannati et al.[14] | Mazandaran | 1-156/144 and 143/136<br>2-Different<br>3-Convenience<br>4-300 (stage1) and 279 (stage2)<br>5-Two | The PS with nursing care services after HSTP was increased |
| Parizad et al.[15] | Urmia | 1-115/81<br>2-COVID<br>3- Purposive<br>4-196<br>5-One | The PS with nursing care was mostly at a moderate level |
| Farajzadeh et al.[16] | Tehran | 1-57/16<br>2-COVID<br>3-Convenience<br>4-73<br>5-One | The PS with the medical aspect was 86% and in the non-therapeutic aspect was an excellent level (84.15%) |
| Shafiei et al.[17] | Lar | 1-110/80<br>2-Diff<br>3-Convenience<br>4-190<br>5-One | The findings of this study showed that the majority of patients had satisfaction with nursing services |
| Mafakheri et al.[18] | Kurdistan | 1-142/128<br>2-Intensive care unit<br>3-Quota<br>4-270<br>5-Hospitals affiliated to University of Medical Sciences | Patients are not sufficiently aware of the duties and responsibilities of the nurses |
| Pirooz et al.[19] | Tehran | 1-189/237<br>2-Diff<br>3-Convenience<br>4-426<br>5-One | Marital status, level of education, and age are related to the degree of satisfaction of hospitalized patients, but gender is not related to satisfaction |
| Makarem et al.[20] | Tehran | 1-9436/11981<br>2-Diff<br>3-Random<br>4- 21292<br>5-Hospitals affiliated to University of Medical Sciences | The lowest level of satisfaction with hospital staff was assigned to nurses |
| Jannati et al.[21] | Behshahr | 1-146/154<br>2-Diff<br>3-Convenience<br>4-300<br>5-Hospitals affiliated to the university of medical sciences | The highest level of satisfaction with nursing care was found to be in the cardiac intensive care unit and the lowest satisfaction level was observed in the internal medicine ward for women |
| Kolivand et al.[22] | Tehran | 1-237/344<br>2-Diff<br>3-Random<br>4-595<br>5-One | The highest level of satisfaction (100%) was reported by patients hospitalized in the obstetrics and gynecology department |
| Abdollahi et al.[23] | Alborz | 1-300/300<br>2-Emergency<br>3-Convenience<br>4-600<br>5-Two | Patients were relatively satisfied with the reception area and the physical space of the hospital and with the services of nurses and doctors |
| Imani and Abolfathi[24] | Hamadan | 1-87/35<br>2-Surgery<br>3-Random | |

## Table 2

(*Continued*)

| References | City | Study characteristics<br>1-M/F<br>2-Ward<br>3-Sampling<br>4-Sample size<br>5-Number of hospitals | Results |
|---|---|---|---|
| Zohrevandi and Tajik[25] | Rasht | 4-122<br>5-One<br>1-230/148<br>2-Emergency department<br>3-Random<br>4-378<br>5-One | The periodic and continuous assessment as well as the comparison of satisfaction and dissatisfaction parameters during the time, before and after performing the changes, could be effective |
| Farahani et al.[26] | Arak | 1-167/215<br>2-NR<br>3-Convenience<br>4-382<br>5-Five | PS was at an average level |
| Ameryoun et al.[27] | Tehran | 1-348 /348<br>2-Diff<br>3-Random<br>4-696<br>5-Six | Most respondents reported having favorable satisfaction with the clinic and hospital health services |
| Soleimanpour et al.[28] | Tabriz | 1-204/296<br>2-Emergency<br>3- Quota<br>4-500<br>5-One | Findings indicated the need for evidence-based interventions in emergency care services in areas such as medical care, nursing care, courtesy of staff, physical comfort, and waiting time |
| Joolaee et al.[29] | Tehran | 1-86/89<br>2-Diff<br>3-Multi stage cluster<br>4-175<br>5-Four | Patients were moderately satisfied with nursing care services |
| Fatemi et al.[30] | Ardabil | 1-31/69<br>2-Diff<br>3-Random<br>4-100<br>5-Hospitals affiliated to the university of medical sciences | The PS with nursing care is at a high level |
| Tabatabaei et al.[31] | Rafsanjan | 1- 565/435<br>2-Emergency<br>3-NR<br>4-1000<br>5-One | Paying proper attention to the ED patients' expectations is highly important to make them satisfied |
| Akhtari-Zavare et al.[8] | Tehran | 1-201/183<br>2-Oncology ward<br>3-Proportional stratified<br>4-384<br>5-Ten | Most of the respondents were satisfied with the nursing care |
| Ahmadi et al.[32] | Tehran | 1-45/73<br>2-Diff<br>3-Random<br>4-118<br>5-Three | The strong correlation between the index of the hospital environment and PS signifies further enhancements of the hospital environment which could potentially increase PS |
| Arefi and Talaei[33] | Tehran | 1-NR<br>2-Diff<br>3-Random<br>4-320<br>5-One | The Highest Level of PS was as follows: satisfaction with nurse time presence at the patient's bedside (58.6) |
| Ghaljeh and Ghaljae[34] | Zahedan | 1-66/75<br>2-Diff<br>3-Stratify<br>4-141 | Results showed 9.2%, 61%, and 29.8% of patients were dissatisfied, relatively satisfied, and completely satisfied with nursing care |

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Table 2

(*Continued*)

| References | City | Study characteristics<br>1-M/F<br>2-Ward<br>3-Sampling<br>4-Sample size<br>5-Number of hospitals | Results |
|---|---|---|---|
| Saadati[35] | Mashhad | 5- Hospitals affiliated to the<br>  university of medical sciences<br>1-406/326<br>2-Emergency<br>3-Random<br>4-732<br>5-One | The highest percentage of satisfaction (84.2%) was related to nursing care particularly therapeutic nursing skills |
| Seidi *et al.*[36] | Qom | 1-200/200<br>2-Medical-surgical<br>3-Convenience<br>4-400<br>5-Two | Findings revealed that 79% of patients were satisfied with services gained from physicians and 74% of them said that they were satisfied with nursing services |
| Mogharab and<br>Mahmoodi[37] | Birjand | 1-406/326<br>2-Diff<br>3-Purposeful<br>4-250<br>5-One | The level of satisfaction was higher in patients hospitalized in the surgical department, patients living in the city, patients with no history of hospitalization, and patients with respiratory problems |

Diff, different; HSTP, health system transformation plan; M/F, male/female; PS, patient satisfaction.

### PS with the nursing care

According to the results, the level of PS with nursing care in different hospitals in Iran was found to be (ES: 0.83, 95% CI: 0.79–0.86, Z = 44.98, $I^2$: 98.6%) (Fig. 3).

Eighteen studies evaluated PS across three levels – complete satisfaction, partial satisfaction, and dissatisfaction. The results showed that the rates of complete satisfaction, partial satisfaction, and dissatisfaction were 0.38 (ES: 0.38, 95% CI: 0.23–0.53,

| Author, Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| Jannati, 2022 | Y | N | Y | Y | Y | N | Y | Y | Y |
| Parizad, 2021 | Y | N | Y | Y | Y | N | Y | Y | Y |
| Farajzadeh, 2021 | Y | N | Y | Y | Y | N | Y | N | N |
| Shafiei1, 2020 | Y | N | Y | Y | N | N | U | N | Y |
| Mafakheri, 2020 | Y | N | Y | Y | Y | N | U | N | Y |
| Pirooz, 2018 | Y | N | Y | Y | Y | N | Y | N | Y |
| Makarem, 2016 | Y | Y | Y | Y | N | N | Y | N | Y |
| Jannati, 2016 | Y | N | Y | Y | Y | N | Y | N | Y |
| Kolivand, 2015 | Y | Y | Y | Y | N | N | Y | N | Y |
| Abdollahi, 2015 | N | N | Y | Y | N | N | U | Y | Y |
| Imani, 2015 | Y | Y | Y | Y | Y | N | U | N | Y |
| Zohrevandi, 2014 | Y | Y | Y | Y | N | N | U | N | Y |
| Farahani, 2013 | Y | N | Y | Y | N | N | U | N | Y |
| Ameryoun, 2013 | Y | Y | Y | Y | N | N | U | N | Y |
| Soleimanpour, 2011 | Y | N | Y | Y | N | N | Y | Y | Y |
| Joolaee, 2011 | Y | Y | Y | Y | Y | N | U | N | Y |
| Fatemi, 2011 | Y | Y | N | Y | N | N | U | N | Y |
| Zia, 2011 | Y | U | Y | Y | Y | N | Y | N | Y |
| Akhtari-Zavare, 2010 | Y | Y | Y | Y | Y | N | Y | N | Y |
| Ahmadi, 2010 | Y | Y | N | Y | N | N | Y | N | Y |
| Arefi, 2010 | Y | Y | Y | Y | N | N | Y | N | Y |
| Ghaljeh, 2009 | Y | Y | N | Y | N | N | Y | N | Y |
| Saadati, 2006 | Y | Y | Y | Y | Y | N | Y | N | Y |
| Seidi, 2004 | Y | N | Y | Y | N | N | U | N | Y |
| Mogharab, 2002 | Y | N | Y | Y | N | N | Y | N | Y |

1. Was the sample frame appropriate to address the target population? 2. Were study participants recruited in an appropriate way? 3.Was the sample size adequate? 4.Were the study subjects and setting described in detail? 5.Was data analysis conducted with sufficient coverage of the identified sample? 6. Were valid methods used for the identification of the condition? 7. Was the condition measured in a standard, reliable way for all participants? 8. Was there appropriate statistical analysis? 9. Was the response rate adequate, and if not, was the low response rate managed appropriately? // Y: yes, N:no, U: unclear, NA: not applicable

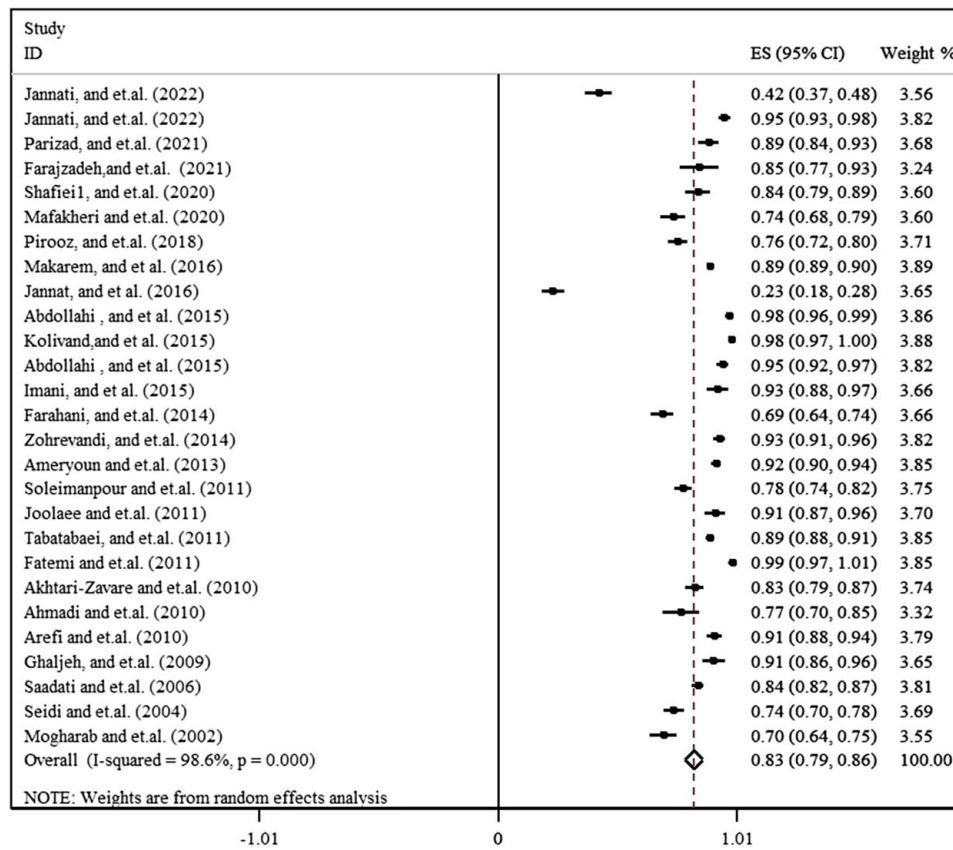**Figure 2.** Methodological quality assessment of included studies.

| Study ID | | ES (95% CI) | Weight % |
|---|---|---|---|
| Jannati, and et.al. (2022) | | 0.42 (0.37, 0.48) | 3.56 |
| Jannati, and et.al. (2022) | | 0.95 (0.93, 0.98) | 3.82 |
| Parizad, and et.al. (2021) | | 0.89 (0.84, 0.93) | 3.68 |
| Farajzadeh,and et.al. (2021) | | 0.85 (0.77, 0.93) | 3.24 |
| Shafiei1, and et.al. (2020) | | 0.84 (0.79, 0.89) | 3.60 |
| Mafakheri and et.al. (2020) | | 0.74 (0.68, 0.79) | 3.60 |
| Pirooz, and et.al. (2018) | | 0.76 (0.72, 0.80) | 3.71 |
| Makarem, and et al. (2016) | | 0.89 (0.89, 0.90) | 3.89 |
| Jannat, and et al. (2016) | | 0.23 (0.18, 0.28) | 3.65 |
| Abdollahi , and et.al. (2015) | | 0.98 (0.96, 0.99) | 3.86 |
| Kolivand,and et.al. (2015) | | 0.98 (0.97, 1.00) | 3.88 |
| Abdollahi , and et.al. (2015) | | 0.95 (0.92, 0.97) | 3.82 |
| Imani, and et al. (2015) | | 0.93 (0.88, 0.97) | 3.66 |
| Farahani, and et.al. (2014) | | 0.69 (0.64, 0.74) | 3.66 |
| Zohrevandi, and et.al. (2014) | | 0.93 (0.91, 0.96) | 3.82 |
| Ameryoun and et.al. (2013) | | 0.92 (0.90, 0.94) | 3.85 |
| Soleimanpour and et.al. (2011) | | 0.78 (0.74, 0.82) | 3.75 |
| Joolaee and et.al. (2011) | | 0.91 (0.87, 0.96) | 3.70 |
| Tabatabaei, and et.al. (2011) | | 0.89 (0.88, 0.91) | 3.85 |
| Fatemi and et.al. (2011) | | 0.99 (0.97, 1.01) | 3.85 |
| Akhtari-Zavare and et.al. (2010) | | 0.83 (0.79, 0.87) | 3.74 |
| Ahmadi and et.al. (2010) | | 0.77 (0.70, 0.85) | 3.32 |
| Arefi and et.al. (2010) | | 0.91 (0.88, 0.94) | 3.79 |
| Ghaljeh, and et.al. (2009) | | 0.91 (0.86, 0.96) | 3.65 |
| Saadati et.al. (2006) | | 0.84 (0.82, 0.87) | 3.81 |
| Seidi and et.al. (2004) | | 0.74 (0.70, 0.78) | 3.69 |
| Mogharab and et.al. (2002) | | 0.70 (0.64, 0.75) | 3.55 |
| Overall (I-squared = 98.6%, p = 0.000) | | 0.83 (0.79, 0.86) | 100.00 |

NOTE: Weights are from random effects analysis

-1.01  0  1.01

**Figure 3.** Prevalence of overall patient satisfaction with nursing care.

$Z = 4.82$, $I^2$:99.8%), 0.45 (ES: 0.45, 95% CI: 0.34–0.55, $Z = 8.43$, $I^2$:99.4%) and 0.17 (ES: 0.17, 95% CI: 0.12–0.21, $Z = 7.81$, $I^2$:99.0%), respectively.

Subgroup analysis was performed to detect the source of heterogeneity. Details were summarized in Table 3. Results showed that heterogeneity decreased in subgroups of the COVID ward ($I^2$: 0.0) and patients admitted in the hospitals of Lar and Rafsanjani ($I^2$: 76.6%). Also, the subgroup analysis findings highlighted that the level of PS in studies conducted after the implementation of the HSTP in Iran was 5% higher compared to before the implementation of it. Also, the level of PS has been higher in studies that were carried out before the COVID-19 pandemic, in public hospitals, emergency departments, and in studies that had more than 300 sample sizes. The lowest and the

## Table 3

**Subgroup analysis of the studies to detect the source of heterogeneity for overall satisfaction**

| Source | Subcategories | Number of studies | Effect size | Lower CI | Upper CI | Z | $I^2$ |
|---|---|---|---|---|---|---|---|
| Health service transformation plan | Before | 12 | 0.85 | 0.81 | 0.90 | 37.81 | 96.0% |
| | After | 15 | 0.80 | 0.75 | 0.86 | 28.17 | 99.1% |
| COVID-19 | Before | 21 | 0.84 | 0.80 | 0.88 | 42.70 | 98.7% |
| | After | 6 | 0.78 | 0.63 | 0.93 | 10.30 | 98.4% |
| Location | North | 4 | 0.64 | 0.33 | 0.94 | 4.08 | 99.7% |
| | West and north-west | 5 | 0.87 | 0.76 | 0.97 | 16.64 | 97.4% |
| | Tehran and central cities | 12 | 0.86 | 0.82 | 0.90 | 42.49 | 97.9% |
| | Others | 3 | 0.89 | 0.86 | 0.93 | 55.82 | 76.6% |
| | East | 3 | 0.82 | 0.72 | 0.92 | 16.23 | 93.7% |
| Hospital | Affiliated with the university of medical sciences | 24 | 0.82 | 0.78 | 0.86 | 41.19 | 98.7% |
| | Military | 3 | 0.84 | 0.72 | 0.96 | 13.98 | 95.9% |
| Ward | Different | 15 | 0.80 | 0.74 | 0.85 | 27.51 | 99.1% |
| | COVID | 2 | 0.88 | 0.84 | 0.92 | 44.28 | 0.0 |
| | CCU and oncology | 2 | 0.78 | 0.70 | 0.87 | 17.24 | 86.9% |
| | Emergency | 6 | 0.90 | 0.85 | 0.95 | 34.16 | 96.6% |
| | Medical-surgical | 2 | 0.83 | 0.65 | 1.0 | 8.94 | 97.0% |
| Sample size | Less than 300 patients | 11 | 0.86 | 0.81 | 0.92 | 31.44 | 94.1% |
| | More than 300 patients | 16 | 0.80 | 0.75 | 0.85 | 32.11 | 99.1% |

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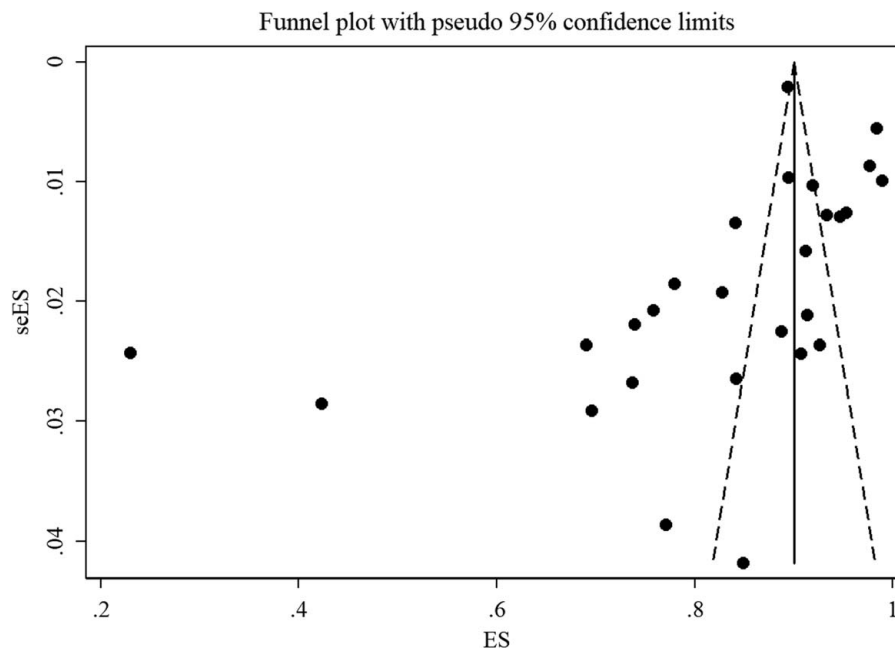
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**Figure 4.** Funnel plot of patient satisfaction with nursing care in hospitals in Iran.

highest satisfaction according to the geographical region or location were respectively related to the studies that were conducted in 'other cities' and 'Northern Iran'.

### Sensitivity analysis

Sensitivity analysis was done to detect the possible sources of heterogeneity. After excluding studies Jannati *et al.* 2022 ($I^2$: 98.4%), Makarem *et al.* 2016 ($I^2$: 98.6%), Jannati *et al.* 2016 ($I^2$: 97.7%), heterogeneity remained unchanged.

### Publication of bias

Based on the visual inspection of the funnel plot, asymmetry was detected (Fig. 4). The results of Begg's test were significant ($P = 0.002$), although the results of Egger's regression test ($P = 0.07$) did not show it. We did the trim-and-fill method and found that adding missing studies did not change the overall ES (overall ES: 0.83, 95% CI: 0.79–0.86).

### Discussion

The present study was conducted to determine the level of PS in the nursing care provided in Iranian hospitals. The results showed the overall level of PS was 83%.

Mulugeta *et al.*[38] conducted a meta-analysis study on nursing services in Ethiopia, reporting a level of PS at 55.1%, which was lower than our study. While our study analyzed 25 articles, theirs was based on 15 studies. Furthermore, both studies reported considerable heterogeneity ($I^2$: 97.7% for Ethiopia and 98.6% for our study). The levels of complete and partial PS were not cited in this study. However, our results found levels of complete and partial PS at 38 and 45%, respectively. Also, in the subgroup analysis conducted by Mulugeta *et al.*, the patients receiving nursing care who had no previous history of hospitalization, were cared for by one nurse, resided in an urban area, and did not have underlying diseases, reported higher rates than other groups.

Our results provided several interesting findings related to the subgroup analysis. Firstly, the level of PS was found to be 5% higher in studies performed after the implementation of the HTSP in Iran, compared to studies executed before its implementation. The HTSP had some benefit impacts such as reduction of treatment costs for patients[39]. Moreover, PS levels were higher in studies conducted before the COVID-19 pandemic, suggesting that the outbreak of the pandemic may have potentially influenced PS with nursing care. This finding aligns with previous investigation that has revealed the effect of the pandemic on healthcare systems and patient experiences[40–42]. Furthermore, PS was higher in public hospitals compared to military hospitals. This could be attributed to the differences in resources, staffing, and overall quality of care provided in these hospital settings[43]. Additionally, the analysis revealed that PS was higher in emergency departments compared to other wards. This might be due to the urgent and critical nature of services provided in emergency ward, which may increase PS. Studies have shown that PS in emergency ward is influenced by numerous factors, including waiting times, communication, and responsiveness of staffs[44]. Concerning regional or geographical location variations, the analysis suggested that the highest PS was reported in studies conducted in 'other cities', however, the lowest satisfaction was found in studies performed in 'Northern Iran'. This implies that there might be regional disparities in PS with nursing care in Iran. The varying levels of resources, structure, and healthcare systems across different regions can potentially contribute to these discrepancies.

In a review study in Turkey, the PS rate was reported to range from 14 and 90% based on the included studies. Since this study was not a meta-analysis, a quantitative comparison could not be made[45]. However, the lowest and highest levels of PS were

reported at 23%[21] and 99.4%[30] among different final studies include in this study, respectively.

In the current meta-analysis study, we sought to determine the level of PS with nursing care and did not focus on the effective factors. However, it is necessary to explain the concept of PS with nursing care to better understand it. In a concept analysis study based on Roger's model, antecedents, dimensions, and consequences of PS were investigated. The dimensions of PS with nursing care were specified including emotional support by nurses, exchange of health-related information, control of patients in decisions related to their condition, and clinical competency of nurses. However, antecedents the PS were considered to be the patient's condition, social position, previous experiences of the nurses, environmental resources, internal motivations, the patient's cognitive level, and the emotional response of patients. Finally, the consequences of satisfaction with nursing care were: increased adherence to the treatment regimens and utilization of treatment facilities[46].

In the review and meta-analysis studies conducted on the outcome of PS, the focus was not only on nursing care but also on different aspects such as medical facilities. It is necessary to evaluate the level of PS with nursing care in other countries during the meta-analysis to better can compare the results.

This article had some limitations. The heterogeneity between studies in this meta-analysis study was high, which was considered a common problem in prevalence meta-analysis studies. However, subgroup analysis was performed to determine the source of heterogeneity. Also, factors such as the level of welfare of Iranian hospitals, service facilities, the cultural level of nurses, and patients can be considered as a moderator variables and did not determine in the include studies. Although we performed the subgroup analysis based on geographical location, type of hospital, ward, and other factors.

## Conclusion

Although the overall PS (partial and complete satisfaction) was reported in four out of five patients who referred to the hospital in Iran, complete satisfaction as a final goal in providing nursing services was 38%. The result of the present study highlighted that the outbreak of COVID-19 was able to affect the level of PS, so more studies are needed in the field of measuring PS with nursing services. In the design for future studies, factors such as sufficient sample size, comparison of different departments with each other, the type (affiliated to the university of medical sciences, military, and private), and geographical location of the hospital should be taken into consideration. Also, it is suggested that effective factors that can improve PS be identified.

## Ethical approval and consent to participate

The proposal of present study has been approved by Mashhad University of Medical Sciences. Also, ethical code is IR.MUMS.NURSE.REC.1401.089 and provided in the 'Iran National committee for Ethics in Biomedical Research' website.

## Consent

This study is systematic review and meta-analysis, and does not require to written informed consent.

## Sources of funding

## Author contribution

S.J.H.: conceived and designed the analysis and wrote the paper; T.S.: collected the data and performed the analysis; A.H.: collected the data and performed the analysis.

## Conflicts of interest disclosure

The author(s) declares(s) that there is no conflicts of interest.

## Research registration unique identifying number (UIN)

Protocol of study has been registered in the PROSPERO database with number of CRD42023420675.

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## Data availability statement

The datasets generated and analyzed during the current study are available from corresponding author on reasonable request.

## Provenance and peer review

Not commissioned, externally peer reviewed.

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