

## Review Article

## Factors Involved in Missed Nursing Care: A Systematic Review



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**ABSTRACT**

**Background:** Missed nursing care (MNC) is experienced in nearly all healthcare facilities. Awareness of the aspects involved in the MNC can improve the quality of patient care. The objective of this systematic review is to provide insights into the factors that contribute to the occurrence of MNC.

**Methods:** The review will adhere to the 2020 preferred reporting items for systematic review and meta-analyses (PRISMA) statement and includes studies published in peer-reviewed journals from 2012 to 2022. The databases used in the literature search include ScienceDirect, Cochrane Library, PubMed, ProQuest, and the Wiley Online Library. The eligibility criteria were determined based on population, intervention, comparison, outcomes, and study (PICOS) guidelines. To evaluate the quality of the studies, the NIH quality assessment tool for observational cohort and cross-sectional studies was employed, while the risk of bias was assessed using the Cochrane collaboration's risk of bias tool. Three authors independently performed data extraction using qualitative analysis and reached a final agreement.

**Results:** A total of 3611 articles were found in the database search. After removing duplicates and ineligible articles, review studies, case reports, letters to editors, incomplete texts, dissertations, and book chapters, 16 articles were finally eligible for further analysis. In general, there were three categories of factors related to MNC, including labor resources (workload, staff adequacy, staff characteristics, nurse-patient ratio, shift work, and nurse job satisfaction), material sources (work environment, personal protective equipment, patient care equipment), and teamwork and communication (communication within nursing team, and communication with medical staff). The most common influencing factor seemed to be staffing adequacy.

**Conclusion:** The role of healthcare service management and leadership is central to mitigating the factors contributing to MNCs' emergence, especially labor resources. Meta-analytic studies are needed to find the most influential factors of MNC based on the results of all available studies.

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## Highlights

- Missed nursing care (MNC) happens in many hospitals worldwide and affects the quality of nursing services.
- Many studies have been conducted on the factors that contribute to the occurrence of MNC, but there is no clear conclusion about these factors.
- Problems with labor resources seem to be the most important aggravating factor for MNC.
- Staffing adequacy as a part of the labor resources factor seems to be the most influencing factor for the occurrence of MNC.

## Plain Language Summary

MNC in healthcare facilities greatly affects the quality of services and trust of service users. In general, the factors contributing to the occurrence of MNC fall into three categories: Labor resources, material resources, and teamwork and communication. The most influential category is labor resources—staffing adequacy seems the most influential.

### 1. Introduction

**M**issed nursing care (MNC) refers to unintentionally missing or not completing nursing care (Bragadóttir et al., 2017; Liu et al., 2019). The literature presents a range of definitions, conceptual frameworks, and measurement tools for unfinished, rationed, and missed care. Both the terms “missed care” and “unfinished care” have their origins in the United States (Kalisch et al., 2009; Uchmanowicz, 2017). Schubert et al. (2008) introduced the “rated care” term, and “care left undone” is another term in the literature (Ball et al., 2014). All terms refer to unfinished essential or routine nursing care (Recio-Saucedo et al., 2018). The “nursing care” scope encompasses all the emotional, clinical, and administrative tasks nurses are responsible for completing (Albsoul et al., 2019; Palese et al., 2015).

In the past few years, the frequency of MNC has been recognized as a quality indicator for nursing care and patient safety. It is often a warning sign (red flag) to indicate inadequate staffing levels (Kitson, 2018; Lewis et al., 2009). Nursing care includes activities carried out by nursing personnel, such as administering medication, ambulation and turning the patient, changing the position, bathing the patient, oral care, recording vital signs, documentation of input and output, nutrition, and education for discharge from the hospital. MNC or omission error occurs when this essential care is not provided to the patient (Kalisch, 2006).

MNC happens when standard, required nursing care is not delivered or is significantly delayed, indicating an error or omission. MNC is also referred to by various terms, such as implicitly rationed care, omitted nursing care, unmet patient needs, and unfinished nursing care. All these terms indicate that obligatory nursing care is delayed, uncompleted, or lacking in clinical, emotional, and administrative aspects for some reasons (Campagna et al., 2021; Putra et al., 2021; Scott et al., 2019). MNC has been associated with negative patient outcomes that result from various factors, including the work environment, patient care needs, and staffing problems (Hammad et al., 2021; Janatolmakan & Khatony, 2022; Schubert et al., 2008).

Previously, several studies have been conducted on factors or specific categories related to the incidence of MNC, but the information provided is still noncomprehensive, ungeneralizable, and inconclusive. This systematic review aims to find the factors involved in the incidence of missed nursing care.

### 2. Materials and Methods

#### Review protocol

This systematic review follows the preferred reporting items for systematic review and meta-analyses (PRISMA) statement 2020 (Page et al., 2021). It analyzes the factors influencing MNCs based on peer-reviewed studies published from 2012 to 2022.

## Eligibility criteria

We included all studies that reported evidence of MNC-related factors published from January 2012 to 2022, written in English and peer-reviewed journals. All studies using hospital nurses directly responsible for patient care were included in this review. Studies on the role of nurses and MNC-related factors, especially factors that focus on nursing activities such as competence, work environment, and teamwork, are also included in this review. Duplicate publications, systematic reviews, books, chapters, commentaries, letters to editors, editorial comments, not full texts, case reports, and dissertations were excluded from this review. Reference manager (Mendeley) was used to identify and remove duplicates.

The participant, intervention/exposure, comparison, outcome, and study design (population, intervention, comparison, outcomes, and study [PICOS]/population/problem/patient, exposure, outcome [PEO]) criteria outlined in [Table 1](#) were used to select studies for inclusion in this review.

## Search strategy

The databases used in the literature search include [ScienceDirect](#), [Cochrane Library](#), [PubMed](#), [ProQuest](#), and the [Wiley Online Library](#). Other databases could not be used due to inaccessibility. The specified keywords comply with the MeSH terms for health research. The keywords adapted vary according to the compatibility with the type of search engines. The structure of the search keyword arrangement using the Boolean operator “AND” or “OR” is as follows: (“missed nursing care” [title/abstract]) OR (“incomplete care” [title/abstract]) AND (“nurse workload” [title/abstract]) OR (“nurse-patient ratio” [title/abstract]) OR (“work satisfaction” [title/abstract]) OR (“shift schedule” [title/abstract]) OR (“work environment” [title/abstract]) OR (“teamwork” [title/abstract]) OR (team work [title/abstract])) AND (“nursing care quality” [title/abstract]). A summary of the keywords used in each database is shown in [Table 2](#).

## Selection process

Two authors independently screened each article (title/abstract), and the first author resolved disagreements. The screening was done by adjusting the title, objectives, and conclusions. Other necessary information was obtained from the main part of the study. The focus of the screening was on the inclusion criteria of the systematic review.

## Quality appraisal

We used the NIH Quality assessment tool for observational cohort and cross-sectional studies ([NIH, 2019](#)) for quality assessment. It consists of 14 questions regarding the completeness of the reviewed studies. The quality of the studies is categorized as good, fair, and poor. Articles with scores lower than 30% of the criteria were classified as “poor,” scores between 30% and 70% as “fair,” and scores more than 70% as “good” study quality. Articles classified as “fair” and “good” were chosen. Two authors independently assessed the risk of bias using the cochrane collaboration’s risk of bias (ROBINS-I) tool ([Higgins et al., 2008](#)). Disagreements were resolved by discussion or reference to a third author. Each potential source of bias was marked as “low risk of bias,” “some concerns,” and “high risk of bias.” Studies with low to moderate risk of bias were included.

## Data extraction and synthesis

Three authors (MN, YL, BE) independently performed data extraction. Differences between the authors were resolved by consensus after consulting with other researchers (supervising lecturers). The extraction items consisted of the first author/year, factors, and research design, including observational study (cross-sectional, cohort, retrospective), qualitative, sample size, assessment instrument, and outcomes.

## 3. Results

Based on the search results from the five databases, 3611 articles were obtained, 217 were duplicates, and 2109 were marked as ineligible by the reference manager (Mendeley). In the title and abstract screening process, 1196 articles were eliminated, leaving 89 articles for thorough screening of the article content. A total of 73 articles were eliminated because they did not meet the inclusion criteria of this review. Only 16 articles were ultimately eligible for further analysis. The search results are based on the PRISMA 2020 flow chart ([Figure 1](#)).

## Study characteristics

Based on the 16 studies in this review, it is clear that the studies were conducted in several countries, including 5 studies in the USA, 2 studies in Australia, and 1 study each in Iceland, Korea, Philippines, Mexico, Egypt, Jordan, Italy, Iran, and Brazil. The research design used in these 16 studies was descriptive correlational (cross-sectional), focusing on the factors related to or affecting the occurrence of MNCs in nursing services in hospitals.

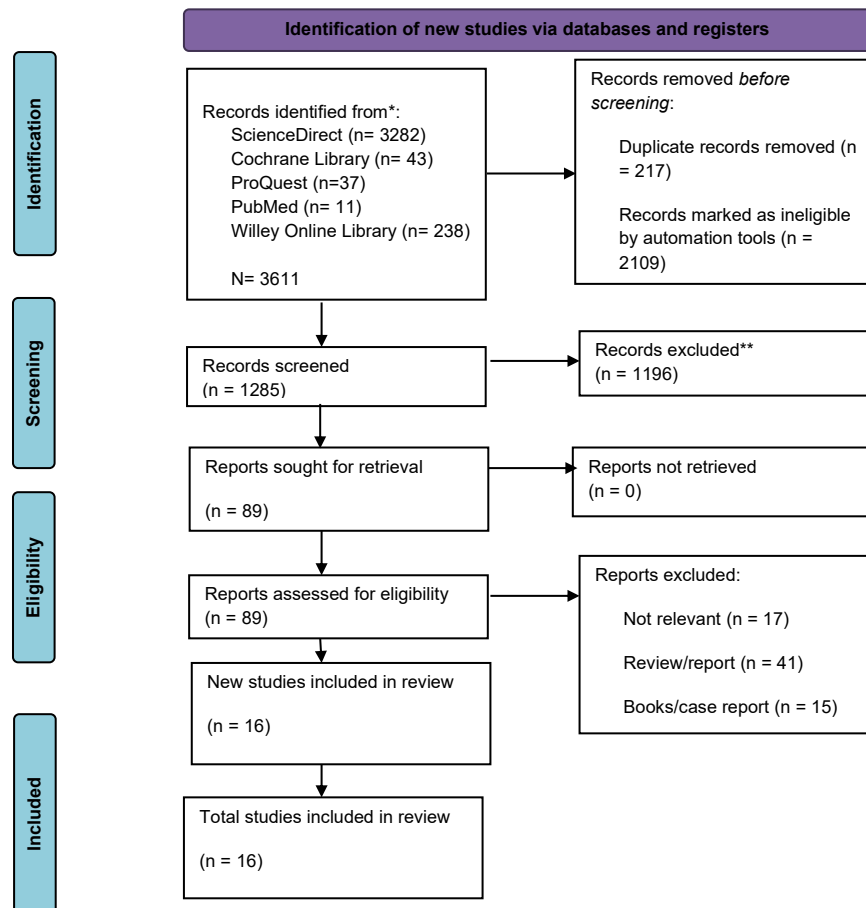


Figure 1. PRISMA Flowchart for literature search

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One study used a mixed-method design to explore the MNC phenomenon from a nurse’s perspective.

The number of participants used was 33–5, 861 nurses in different levels. The context of the studies included the intensive care unit (ICU), neonatal intensive care unit (NICU), medical, surgical, emergency, telemetry, mother-infant unit, COVID-19 unit, and oncology unit. A total of six studies did not specify the room or field in which the study was conducted (only mentioned treatment rooms) (Table 3).

### Study quality

Table 4 summarizes the study quality assessment process based on 14 question items from the NIH assessment tool for observational studies.

The factors associated with MNCs are categorized into three major parts based on Kalisch et al. study. These categories are as follows: Labor resources (number and type of nursing staff, the competence of nursing staff, education, and experience of staff; material resources

(availability of medicines and necessary equipment); and teamwork and communication (between the patient care team, nurses, physicians, and support staff) (Kalisch, 2006).

### Labor source factor

Among the included studies, a study conducted in the United States showed that nurses with a heavy workload have two to three times the potential for MNC problems compared to nurses with a low workload (Lake et al., 2018). Meanwhile, a study in Australia found that nurses’ retention is simultaneously associated with the workload experienced by them (Blackman et al., 2018). In a study in Italy, workload was mentioned as a protective factor against the incidence of MNC (Palese et al., 2015).

Several studies also mention that the number of nurses and the nursing staff are the factors associated with the incidence of MNC. A study in Iceland stated that unit and staff characteristics are significantly associated with the MNC (Bragadóttir et al., 2017). The same result was also found in a study in the US, where the characteristics

**Table 1.** Studies criteria based on PICOS

Criteria	Inclusion Criteria
Problem	Missed nursing care, incomplete care
Intervention/exposure	Factors related to MNC
Comparisons	None
Outcomes	Nursing care quality
Study design	An observational study (cross-sectional, cohort, retrospective), qualitative

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of the respondents, including age, position, education, years of experience, overtime hours in the last week, and the number of patients treated in the previous shift, had significant relationships with the total missed care score (Friese & Himes-Ferris, 2013). Among nurses' characteristics, the bivariate analysis showed that job roles are significantly correlated with MNC. In particular, staff nurses obtained significantly higher mean MNCs scores than nurse managers (Labrague, 2021). A study in Australia states that the presence of new nurses in the treatment room, unfamiliar with existing practices and patients, leads to the development of MNC, especially negligence in drug administration (Albsoul et al., 2019). Nurse shortages in the United States, Mexico, Jordan, and Egypt have led to high nurse-to-patient ratios that significantly support the emergence of MNCs (Campbell et al., 2020; Diab & Ebrahim, 2019; Hernández-Cruz et al., 2017; Saqer & AbuAlRub, 2018). Blackman et al. underlined that shift work is also associated with the incidence of MNC, where nurses on the afternoon shift experience MNC more often than nurses on the morning/afternoon shift (Blackman et al., 2018). Meanwhile, a study in Iran found that the prevalence of MNC was significantly higher among male nurses, older age,

and a higher number of patients treated (Chegini et al., 2020). A study in Brazil found no significant relationship between the MISSCARE-BRASIL domain and the variables of age, time since graduation, experience in the unit, and institution (Dutra et al., 2019).

Several studies also assessed the correlation between nurse job satisfaction and MNC. Duffy and colleagues used the PES-NWI (The Practice Environment Scale of the Nursing Work Index) to assess the association between nurse job satisfaction and MNC. They found a significant relationship (Duffy et al., 2018). The current level of job satisfaction of the participating qualified nurses directly influences MNC (Blackman et al., 2018; Palese et al., 2015; Saqer & AbuAlRub, 2018).

**Material source**

One category is the nurse's work environment. Several studies in this review have also underlined the existence of a significant relationship between the work environment and the MNC (Albsoul et al., 2019; Campbell et al., 2020; Diab & Ebrahim, 2019; Duffy et al., 2018; Hessels et al., 2015; Kim et al., 2018; Saqer & AbuAlRub, 2018;

Table 2 Adapted search syntax for different databases

Database	Keywords
ScienceDirect	"Missed nursing care" AND "job satisfaction" OR "patient number" OR "workload" OR "team work" AND "nursing care quality"
Cochrane Library	"Missed nursing care" AND "job satisfaction" OR "communication" OR "nurse schedule" OR "daily shift" OR "nursing documentation" OR "patient number" OR "workload" OR "team work" AND "nursing care quality"
PubMed	("Missed nursing care"[title/abstract]) OR ("incomplete care" [title/abstract]) AND ("nurse workload" [title/abstract]) OR ("nurse patient ratio" [title/abstract]) OR ("work satisfaction" [title/abstract]) OR ("shift schedule" [title/abstract]) OR ("work environment" [title/abstract]) OR ("team work" [title/abstract]) OR (team work [title/abstract]) AND ("nursing care quality" [title/abstract])
ProQuest	Missed nursing care AND job satisfaction OR patient number OR workload OR team work AND nursing care quality
Wiley Online Library	"Missed nursing care" AND "job satisfaction" OR "communication" OR "nurse schedule" OR "daily shift" OR "nursing documentation" OR "patient number" OR "workload" OR "team work" AND "nursing care quality"

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Lake et al., 2018). Another study reported that MNC was significantly lower in the ICU than in the medical ( $P < 0.001$ ) and surgical ( $P < 0.001$ ) wards (Bragadóttir et al., 2017). Labrague stated that nurses in large hospital facilities had significantly higher mean MNCs scores than small hospital facilities (Labrague, 2021).

Labrague and colleagues conducted their study during the peak period of the COVID-19 pandemic. The results of their research indicated that the availability of personal protective equipment (PPE) greatly influences the occurrence of MNCs (Labrague et al., 2022). Albsoul and colleagues emphasize the importance of mastering how to work with patient care equipment. The occurrence of MNC in several treatment rooms, especially those equipped with high-tech equipment, will greatly increase the incidence of MNC among nurses (Albsoul et al., 2019). In Mexico, nurses reported the unavailability of medication when needed (21.1%) as a significant reason for MNC, followed by supplies and equipment (16.9%) (Hernández-Cruz et al., 2017). Meanwhile, studies in Egypt and Jordan found that material resources associated with all domains of nursing care were missed, especially attending interdisciplinary care conferences (Diab & Ebrahim, 2019; Saqer & AbuAIRub, 2018). Chegini also found that equipment was closely related to MNC incidence (Chegini et al., 2020).

### Team work and communication

Several studies in this review analyzed the relationship between teamwork and the incidence of MNC. Overall, studies that discuss these factors show a significant relationship between teamwork, including communication, and the incidence of MNC in patient care in hospitals (Blackman et al., 2018; Duffy et al., 2018; Dutra et al., 2019; Saqer & AbuAIRub, 2018). Albsoul reported that the communication problems most frequently reported by nurses causing MNC were nurse-patient task inequity (38.6%), tension and damaged communication with medical staff (25%), and stress and distraction on the interaction within the nursing team (25%) (Albsoul et al., 2019). Whereas in a study in Mexico, nurses considered the nurse's absence when the patient called her (22.5%) as a significant reason, followed by tension or errors in communication with medical staff (21.1%) (Hernández-Cruz et al., 2017). According to Diab and Ibrahim, the communication factor is the second most influential factor in the incidence of MNCs in Egypt (Diab & Ebrahim, 2019). Chegini says communication protects against MNC events (Chegini et al., 2020).

## 4. Discussion

This systematic review provided a real picture of the most important factors affecting the occurrence of MNC in healthcare centers. It has summarized the findings of 16 studies involving 7834 participants. Most studies included in this review are correlational studies that have examined the relationship between different factors and MNC and sometimes have determined the impact of MNC on the quality of nursing care.

### Factors associated with MNC

Based on these 16 studies, the factors associated with the incidence of MNC include labor resources (age of staff, workload, job satisfaction, nurse-patient ratio, clinical career, level of nurse education) and material resource factors (work environment, infrastructure, characteristics of hospitals and units, PPE, mastery of technology, management), and teamwork and communication factors (teamwork communication, communication between teamwork members).

Age is an important factor contributing to the incidence of MNC, as shown by Bragadóttir and colleagues in their study. They found that younger nurses have reported significantly more MNCs than older or senior nurses (Bragadóttir et al., 2017). A correlation study also shows a close relationship between the age of nurses or staff and the quality of nursing services (Stalpers et al., 2017).

Lake et al. stated that the percentage of nurses who faced a heavy workload and experienced MNC was two to three times higher than that of nurses with a low workload (Lake et al., 2018). Meanwhile, Blackman and colleagues estimate that the workload will increase if nurses get continuous verbal and non-verbal pressure from managers or other team members (Blackman et al., 2018). Previous systematic reviews have stated that the excessive workload experienced by primary care nurses and the resulting possible burnout affect the nurses' health status. However, this also affects the patients because their safety is not guaranteed, care errors caused by the heavy workload and fatigue of nurses lead to an increase in patient mortality, and as stated in this review, the quality of received care decreases (Pérez-Francisco et al., 2020). Previous correlational studies have confirmed that heavy workloads cause burnout in nurses, thereby increasing the intention to leave or quit (Holland et al., 2019; Jourdain & Chênevert, 2010; Phillips, 2020).

**Table 3.** Characteristics and the extraction details of the included studies

Study Details and Characteristics					Extraction Details		
Author, year, [Country]	Aim	Methods	Context	Participants	The Factor of MNC	Instrument	Results
Lake et al., 2018 (US)	To estimate the contribution of patient acuity to MNC. To document the range of MNCs across the neonatal intensive care units (NICUs)	Cross-sectional	NICU	5861 NICU staff nurses (registered nurses)	Working environment (NICU), workload, and infant acuity	The practice environment scale of the nursing work index (PES-NWI)	Nurses with a high patient acuity workload have 2-3 times the experience of MNC compared to nurses with a low patient acuity workload (P<0.01). The number of NICU beds is significantly and positively related to the frequency and probability of MNC (P<0.01)
Bragadóttir et al., 2017 (Iceland)	To identify the contribution of hospitals, units, staff characteristics, staffing adequacy, and teamwork to MNCs in Icelandic hospitals.	Cross-sectional	Medical, surgical, and ICU	864 registered nurses and practical nurses	Hospital and unit characteristics, age, roles and perceptions of staff adequacy, and teamwork	The MIS-scare survey-icelandic and the nursing teamwork survey-icelandic (NTS-Icelandic)	Teamwork has a significant relationship with the MNC (P<0.001). Unit type, role, age, and staff adequacy contribute 16% of MNC's variance (P<0.001)
Duffy et al., 2018 (US)	To describe and evaluate the factors associated with MNC in an acute care community hospital.	Cross-sectional	Emergency department, medical-surgical, telemetry, critical care, and mother-infant unit	187 registered nurses	Teamwork, job satisfaction, and working environment	The MISSCARE survey, the PES-NWI	Intention to quit work, perception of adequate unit staff, satisfaction with the current unit, satisfaction with being a nurse, and satisfaction with the level of teamwork were significantly related to MNC (P<0.001). Work environment not related to MNC (r=0.477)
Kim et al., 2018 (Korea)	To explore the effect of nursing work environment and hospital patient safety culture on MNC cases in South Korea.	Cross-sectional	General ward, intensive care unit (ICU)	186 primary nurses	Clinical career, nursing work environment, patient safety culture	The Korean version of the practice environment scale of the Nursing Work Index (PES-NWI)	-Nurse manager ability, leadership, and support of nurses ( $\beta=-0.26$ , $P=0.004$ ), staff and resource adequacy ( $\beta=0.31$ , $P=0.001$ ), perception of patient safety culture within the unit ( $\beta=-0.19$ , $P=0.041$ ), and clinical career ( $\beta=0.21$ , $P=0.004$ ) were the influential factors of MNC.
Labrague et al., 2022 (Philippines)	To identify the factors contributing to MNCs and the quality of nursing care nurses assess during the coronavirus pandemic.	Cross-sectional (online survey)	CO-VID-19 unit	295 nurses on the front line against COVID-19	Working environment, personal protective equipment (PPE), staff nurses, and patient safety culture	The MNC scale, the safety climate scale, and a single-item MNC quality	MNC correlates significantly with staffing levels and safety culture. With regard to quality of care, completeness of PPE, level of staff, and safety culture are significantly and positively correlated with quality of care (P<0.001).

Study Details and Characteristics					Extraction Details		
Author, year, [Country]	Aim	Methods	Context	Participants	The Factor of MNC	Instrument	Results
Albsoul et al., 2019 (Australia)	To explore the MNC phenomenon in the context of an acute care hospital and to identify common factors and factors that influence its occurrence.	A convergent parallel mixed-methods design	Medical and surgical units	Enrolled nurses (ENs), registered nurses (RNs), and clinical nurses (CNs) (n=200)	Patient factors, task and technology factors, individual staff factors, team factors, work environment factors, organizational and management factors, and more complex institutional context factors	The MISS-CARE survey	Inadequate documentation of the patient's fall risk and history of falls was identified as one of the most frequent elements of MNC (P<0.001) Work environment factors, such as not having sufficient time to ambulate patients, also contributed to MNC (P<0.001)
Hernández-Cruz et al., 2017 (Mexico)	To determine the factors that influence MNC in hospitalized patients.	Correlational study	Emergency, Intensive Care and inpatient services	71 Baccalaureate nurses and auxiliary nurses	Human resource (HR), Communication, Infrastructure	The MISS-CARE	A significant and positive relationship was found between HRs and communication factors with individual needs, basic care interventions, and global indices (P<0.001). Factors related to material resources were not associated with any of the care dimensions.
Blackman et al., 2015 (Australia)	To explore which factors influence nursing care reported to be missed by nursing staff and to estimate and explain how large the differences between various factors may be to predict why nursing care may be missed.	Non-experimental exploratory approach	Hospital	289 Australian nurses and midwives	Type of shift, allocation of nursing resources, communication of health professionals, intensity of workload, predictability of workload, satisfaction with current job, and intention to remain employed.	The MISS-CARE	-Eight variables related to MNC, including shift type, nursing resource allocation, health professional communication, workload intensity, workload predictability, the nurses' satisfaction with their current job, and their intention to remain at work.
Diab & Ibrahim, 2019 (Egypt)	To assess MNC and the factors that cause MNC by nurses in hospitals	Cross-sectional	ICU	240 nurses; 55 nursing diplomas, 89 technical nurses, 85 bachelor's degrees, 11 master's degree	HR, equipment, communication	MNC activity questionnaire and factors of MNC questionnaire	The factors that most cause MNCs are labor resources, material resources, and communication factors (P<0.000)
Saqer & Abualrub, 2018 (Jordan)	To identify the types and reasons for MNC among hospital nurses; To identify MNC predictors; To examine the relationship between nurses' trust in delegation and MNC.	Cross-sectional	Inpatient	362 registered nurse	Communication, labor resources, material resources, job satisfaction, work environment	MISSCARE survey	The relationship between trust in delegation and MNC is not significant. The most common reason for MNCs to occur is labor resources, followed by material resources, and then communication (P<0.001)



Study Details and Characteristics					Extraction Details		
Author, year, [Country]	Aim	Methods	Context	Participants	The Factor of MNC	Instrument	Results
Palese et al., 2015 (Italy)	To identify the number, types, and reasons for MNCs in Italian medical care settings To explore the factors that influence the occurrence of MNC.	Mixed-method approach (longitudinal survey & Cross-sectional)	Acute medical units, medical unit	314 registered nurses and nurse's aides (NAs)	Job satisfaction, workload	The MISS-CARE	Age (OR: 0.378), daily care (OR: 0.950), and number of patients (OR 0.913) are MNC protective factors. Working in a full-time position (OR: 4.743), communication tension between RN (OR: 1.601) and NA, experience in medical units (OR: 1.564), and daily care in minutes offered by NAs (OR: 1.039) are significant risk factors for MNCs.
Chegini et al., 2020 (Iran)	To determine the prevalence, and reasons for MNC by nurses and related factors	Cross-sectional	Medical-surgical wards	215 nurses (associate degree, bachelor's degree, postgraduate)	HR, equipment, communication, number of patients, teamwork	the MISS-CARE	The prevalence of MNC was significantly higher in male participants (OR 2.83). Age (OR: 1.16) and number of patients treated (OR: 1.11) are other actors related to the occurrence of MNC. The number of discharged patients and satisfaction with teamwork are MNC's protective factors.
Dutra et al., 2019 (Brazil)	To evaluate the frequency and reasons for MNCs, and to verify whether the reasons for negligence differ between several professional categories.	Cross-sectional	Inpatient care	33 nursing technicians and 25 nurses	HR, tools, communication, ethical dimensions, leadership type	MISSCARE-BRASIL	HR (P<0.01), materials (P= 0.0379), and leadership style (P<0.001) are closely related to MNC events.
Hessels et al., 2015 (US)	To determine the relationship between the nursing practice environment and MNC in an acute care hospital.	Cross-sectional	Inpatient care	7.679 nurses (BSN)	Care environment	PES-NWI	The nursing practice environment was significantly associated with MNCs (P<0.01)
Campbell et al., 2020 (US)	To find out the extent and factors associated with MNCs in Alabama.	Cross-sectional	Inpatient ward	950 nurses (RN)	Work environment, nurse-patient ratio, job satisfaction	PES-NWI	Nurse job satisfaction and the domain of the nurse's perceived work environment are all significantly correlated with MNC (P>0.05). Adequacy of staff and resources is most correlated with MNCs (P<0.05).

Study Details and Characteristics					Extraction Details		
Author, year, [Country]	Aim	Methods	Context	Participants	The Factor of MNC	Instrument	Results
Friese et al., 2013 (US)	To measure the level of MNC in the oncology unit, compare the MNC between oncology and non-oncology medical-surgical units, and identify correlates of MNC in the oncology unit.	Cross-sectional	Oncology, non-oncology, medical/surgical units	352 nurses (registered nurses, licensed practical nurses and nursing assistants)	Unit staff, work schedule	The MISS-CARE	The number of patients admitted to the last shift has a significant relationship to the total MNC score (P<0.01) sufficient staff related to MNC incidents (P<0.05)

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The work environment is also an important contributing factor to the incidence of MNC, as described in several studies included in this review (Albsoul et al., 2019; Bragadóttir et al., 2017; Campbell et al., 2020; Duffy et al., 2018; Hessels et al., 2015; Kim et al., 2018; Saqer & AbuAlRub, 2018; Lake et al., 2018). A better practice environment is believed to reduce the incidence of MNCs. Improving the work environment will reduce the

likelihood that nurses will miss care by 32% and reduce the frequency of missed care by 0.3 activities (Lake et al., 2018). It is also known that the availability of facilities in the treatment room will greatly assist health services in a hospital (Douthit et al., 2015; Moons et al., 2019; Zangrillo et al., 2020).

Table 4. Study quality assessment results

Studies	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
Lake et al., 2018	Y	Y	Y	Y	Y	Y	NR	Y	Y	Y	Y	Y	Y	Y
Bragadottir et al., 2017	Y	Y	Y	Y	Y	NR	NR	Y	Y	Y	Y	Y	NR	Y
Duffy et al., 2018	Y	Y	Y	Y	Y	Y	NR	Y	Y	Y	Y	Y	Y	Y
Kim et al., 2018	Y	Y	Y	Y	Y	Y	NR	Y	Y	N	Y	Y	NR	Y
Labrague et al., 2021,	Y	Y	Y	Y	Y	Y	NR	Y	Y	Y	Y	Y	Y	Y
Albsoul et al., 2019	Y	Y	Y	Y	Y	NR	NR	Y	Y	Y	Y	Y	Y	Y
Hernández-Cruz et al., 2017	Y	Y	Y	Y	Y	NR	NR	Y	Y	Y	Y	Y	Y	Y
Blackman et al., 2018	Y	Y	Y	Y	Y	Y	NR	Y	Y	Y	Y	Y	Y	Y
Diab & Ibrahim, 2019	Y	Y	Y	Y	Y	NR	NR	Y	Y	Y	Y	Y	NR	Y
Saqer & Abualrub, 2018	Y	Y	Y	Y	Y	NR	NR	Y	Y	Y	Y	Y	CD	Y
Palese et al., 2015	Y	Y	Y	Y	Y	NR	NR	Y	Y	Y	Y	Y	Y	Y
Chegini et al., 2020	Y	Y	Y	Y	Y	NR	NR	Y	Y	Y	Y	Y	Y	Y
Dutra et al., 2019	Y	Y	Y	Y	Y	Y	NR	Y	Y	NR	Y	Y	Y	Y
Hessels et al., 2015	Y	Y	Y	Y	NR	Y	NR	Y	Y	Y	Y	Y	Y	Y
Campbell et al., 2019	Y	Y	Y	Y	Y	Y	NR	Y	Y	Y	Y	Y	Y	Y
Friese et al., 2013	Y	NR	NR	NR	NR	Y	NR	Y	Y	NR	Y	Y	Y	Y

Abbreviations: Y: Yes; N: No; CD: Cannot determine; NR: Not reported; Q: Question.

Client-Centered Nursing Care

Improving existing resource management and safety culture in units can reduce MNC levels. In addition, using benchmark data to identify weaknesses in the work environment can also be considered a kind of predictor (Lake et al., 2018). Previous studies have stated that the ability and effectiveness of nurse managers are related to MNC because nurse managers are responsible for managing the work environment/working conditions, assigning assignments, and coordinating available resources. In addition, more effective leadership will increase the work loyalty of nurses and so on will have implications for the quality of nursing services (Manning, 2016).

Improvements in system functionality, such as increasing skills and availability of effective information technology systems, are needed to address inadequate documentation in healthcare systems (Albsoul et al., 2019; Chaboyer et al., 2021; Du et al., 2020; Jarošová et al., 2021). Another factor that contributes greatly to the occurrence of MNC is teamwork and staff communication. Previous studies have shown that teamwork and collaboration between healthcare professionals can lead to better patient education and, thus, patient participation in decision-making and self-care (Morley & Cashell, 2017). Collaboration between doctors and nurses working in teams towards a shared objective is crucial for improving patient care. However, interdisciplinary collaboration is frequently inadequate (Fewster-Thuente, 2015). To enhance the quality and efficacy of clinical teamwork, it is necessary to consider social, cultural, and organizational factors (Gurková et al., 2021; Mahdizadeh et al., 2015). Healthcare professionals, including nurses, must be encouraged to collaborate through education and capacity building, particularly regarding communication (Eskin Bacaksiz et al., 2020; Labrague et al., 2022; Morley & Cashell, 2017).

### The impact of MNCs on the quality of nursing services

The finding that some hospitals have significantly more MNCs than others is a matter of safety and quality for the hospital and a concern for patients and families. In particular, patient comfort, parental counseling, and education are the most commonly overlooked activities. Lake et al. suggested that the level of MNC would pose problems for patient-centered care and optimal infant and family outcomes. Every instance of MNC implies that some infants may not receive their planned feeding, miss out on breast milk or timely medication, experience delayed or missed treatments and procedures, and may be subjected to unnecessary pain (Lake et al., 2018). Friese and Himes-ferrishis identified fewer MNCs in the oncology unit, which may explain why oncology nurs-

ing staff perceive their quality of care to be higher than that of their fellow nurses in the medico-surgical setting. This study also explains why hospital nursing staff are closely related to complications, failure to save lives, and death (Friese & Himes-Ferris, 2013).

A study conducted in the UK confirmed that MNC is linked to poorer patient outcomes, such as increased mortality and morbidity and lower levels of patient satisfaction with hospital services. MNC has also been associated with decreased staff satisfaction and a higher likelihood of quitting their jobs (Gibbon & Crane, 2018). A previous systematic review concluded that MNC predicts reduced nurse-reported quality of care, decreased patient satisfaction, increased side effects, decreased job satisfaction, and increased intention to leave (Jones et al., 2015).

We had limited access to several databases in our review, which made it impossible to obtain a wider range of relevant studies. This study could not proceed with a meta-analysis because we collected a few low to moderate-quality studies. However, our study is sufficient to provide an overview of factors involved in MNC in high-income and middle-income countries.

## 5. Conclusion

This systematic review indicated several factors contributing to the incidence of MNC. There were three categories of factors related to MNC: Labor resources (workload, staff adequacy, staff characteristics, nurse-patient ratio, shift work, and nurse job satisfaction), material sources (work environment, personal protective equipment, patient care equipment), and teamwork and communication (communication within nursing team, and communication with medical staff). The most common influencing factor among the reviewed articles seemed to be staffing adequacy. It is suggested that a meta-analysis be conducted using larger databases to determine the most dominant factors affecting the incidence of MNCs in healthcare services.

## Ethical Considerations

### Compliance with ethical guidelines

All the authors of this article have contributed usefully to the design and conduct of this study, and the final version is approved by all of them. All duplicate publications were removed. Data were extracted independently by three authors, and disagreement between them were resolved by consensus after consulting with other researchers (supervising lec-

urers). Decisions on which data to include are also agreed upon by all authors.

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### Authors' contributions

Study conception and design: Monalisa Monalisa and Mohd Syukri; Data collection: Yellyanda Yellyanda and Bettywati Eliezer T; Analysis and interpretation of results: Monalisa Monalisa, Yellyanda Yellyanda, and Bettywati Eliezer T; Draft manuscript preparation: Mohd Syukri; Reviewed the results and approved the final version of the manuscript: All authors.

### Conflict of interest

The authors declared no conflict of interest.

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