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ABSTRACT

Background: Missed nursing care (MNC) has gained increasing emphasis in nursing literature because of its association with nurse and patient outcomes in healthcare settings. While missed care has been widely studied, little evidence is available on the types and frequency of missed care, reasons for its occurrence, and predictors of missed care in Western Australia.

Aims: To determine nurses' perceptions of the types of MNC, reasons for missed care and to identify factors predicting missed care occurrence in Western Australian acute care settings.

Methods: A cross-sectional study in medical and surgical wards was performed. The nurse MISSCARE survey tool was used to capture self-reported types and reasons for missed care and level of nurse job satisfaction from a sample of 204 nurses working in 16 acute care wards. Data analyses were carried out in International Business Machines Corperation located in Armonk, New York United States (IBM SPSS Statistics) (v 29).

Findings: The most common perceived missed activities included ambulation (87%), patient teaching (79%), interdisciplinary conference attendance (78%), mouth care (78%), intake and output (77%), and patient turning (75%). Labour resources ranked highest for reasons for missed care followed by material resources and communication. Significant relationships were observed between missed care and job satisfaction, role satisfaction, and teamwork.

Discussion: Working overtime, job dissatisfaction, inadequate staffing, and heavy admissions and discharges were related to increased likelihood for missed care occurrence.

Conclusion: Although further studies examining the link between MNC and staffing methodologies are needed, this study provides evidence on nurse-reported missed care and the impact of missed care in Western Australia.

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Summary of relevance
Problem or Issue
Little is known about the types and reasons for missed nursing care in Western Australia.
What is already known
Evidence suggests that globally, patients do not receive complete nursing care during hospitalisation, which makes patients vulnerable to unsafe outcomes and at risk of illness and injury.
What this paper adds
This study extends knowledge on nurse-reported missed care and the impact of missed care on nurse-related outcomes in Western Australia.

1. Introduction

Nursing care demands have increased due to rise in chronic illnesses and multimorbidity that require nurses to provide complex and complete care to maintain safe patient outcomes (Pefoyo et al., 2015; Smith et al., 2022, 2018). Earlier studies have shown that frequent monitoring of nursing care activities in the healthcare setting is crucial for nurses and nurse managers due to situations such as rise in chronic illness, accumulation of comorbidities, complex treatment regimen, and increased patient acuity (Bail & Grealish, 2016; Jones, 2015; Mandal, Seethalakshmi, & Rajendrababu, 2020). This is because the omission of nursing care may result in reduced quality of care and leads to unsafe patient outcomes (Ball et al., 2018; Lucero, Lake, & Aiken, 2010; Schubert, Clarke, Aiken, & De Geest, 2012). This is in line with a recent rapid review advising that missed care is associated with increased adverse events amongst adult-hospitalised patients in several countries, including the United Kingdom, Europe, United States of America, and Oceania (Willis & Brady, 2021).

Despite the substantial evidence that nursing care is missed globally, scholars in this research domain have stated that the phenomenon of missed nursing care (MNC) is not well developed and lacks conceptual precision, hence the need for further research and conceptual clarity (Jones, Drach-Zahavy, Sermeus, Willis, & Zelenikova, 2021). This phenomenon has been used interchangeably with other terms such as unfinished nursing care, implicitly rationed care, and missed care (Jones, Hamilton, & Murry, 2015). However, the term 'MNC' currently remains the regularly used terminology in literature (Jones, Drach-Zahavy, Sermeus, Willis, & Zelenikova, 2021).

1.1. Literature review

The term 'MNC' first appeared in a qualitative study in 2006 (Kalisch, 2006). It was defined as any type of nursing activity that is delayed, left undone or partially completed (Kalisch & Williams, 2009). Nursing activities missed or delayed include ambulation, intake and output documentation, mouth care, emotional support, feeding, and discharge planning. The estimated worldwide prevalence of MNC activities ranges from 55% to 98% (Jones et al., 2015).

MNC is a substantial global problem that threatens safe patient outcomes (Jones, Drach-Zahavy, Sermeus, Willis, & Zelenikova, 2021; Recio-Saucedo et al., 2018) and influences nurse job satisfaction (Bragadóttir, Burmeister, Terzioglu, & Kalisch, 2020; Kalisch, Doumit, Lee, & El Zein, 2013). Many healthcare organisations need to find ways to overcome MNC due to the increasing cost of healthcare and the nursing shortage (World Health Organisation, 2020). Therefore, the extent of MNC was identified as a quality indicator that could be monitored in both acute and critical care units (Bragadóttir, Kalisch, & Tryggvadóttir, 2016). Variations in MNC have been associated with

several factors, including nurse skill mix (proportion of registered nurses to all nursing staff) and changes in patient acuity (Ball et al., 2016; Griffiths et al., 2018). Willis et al. (2015) have argued that MNC is an outcome of nurse work intensification.

In Australia, MNC is an under-researched area and there has been little empirical research published, which focuses on nurses' perceptions. Blackman et al. (2018) in a nonexperimental descriptive study involving hospitals in four states (New South Wales, Tasmania, Victoria, and South Australia) found that significant factors contributing to MNC were mainly related to differences in hospitals' clinical settings and nurse staffing levels. The authors concluded that healthcare organisational governance predicts types, extent, and reasons of missed care. Similarly, Albsoul, FitzGerald, Finucane, and Borkoles (2019) conducted a convergent mixed method study in a Queensland hospital and identified significant factors such as workflow interruption, absence of management support, poor nurse handover, and breakdown of communication. Likewise, the authors in conclusion emphasised that, to better understand the phenomenon of MNC, the context of the local clinical setting should be considered to assist nurse managers to identify the types of MNC and develop strategies to mitigate its risk.

Although research efforts in extant literature have progressed in Australia, few studies have been conducted in hospital environment, community care, aged care, and mental health settings and none in Western Australia (Mills & Duddle, 2021).

Western Australia is Australia's largest state covering a total land area of 2,646,000 km^2 with a population of about 2.7 million residents. Approximately 78% of Western Australia's population reside in the Perth Metropolitan area (Australian Bureau of Statistics, 2022). There are over 80 hospitals across Western Australia, with hospitals managed and funded publicly, privately or under private–public partnership. Public hospitals are funded and managed by the Western Australia Department of Health. Within the metropolitan area, there are six tertiary teaching hospitals managed under the state health service structure (Department of Health, 2019). Western Australia uses the nurse hour per patient day (NHPPD) staffing methodology that categorises wards into seven groups based on nurse workload attributes.

The current body of literature in Australia does not adequately address MNC from a tertiary teaching hospital, characterised by the NHPPD staffing methodology (Mills & Duddle, 2021). Also, surveys from the previous studies have mostly been drawn from nursing unions such as the Australian Nursing and Midwifery Federation, thus limiting knowledge on hospital types. In addition, self-reported MNC from previous Australian studies was mostly completed by both regulated and unregulated healthcare professionals although the MNC tool was originally designed to be completed by registered nurses (Kalisch & Williams, 2009; Mills & Duddle, 2021).

To the best of the researcher's knowledge, MNC has not been studied in the Western Australian healthcare context. To examine this knowledge gap, this study investigated the types, frequency, and reasons for the occurrence of MNC phenomenon and the relationship between MNC and nurse job satisfaction in a Western Australian metropolitan teaching hospital. The aim of this study is based on the following four research questions:

1. What are nurses' perceptions of the types and levels of MNC in Western Australian acute care settings?
2. What are nurses' perceptions of the reasons for MNC in Western Australian acute care settings?
3. Is there a relationship between nurses' perceptions of MNC, job satisfaction, and teamwork in Western Australian acute care settings?
4. Are there factors that predict the occurrence of MNC in Western Australian acute care settings?

2. Methods

2.1. Design

This research followed a cross-sectional, descriptive study design using a structured survey questionnaire (Kalisch & Williams, 2009). The authors followed Strengthening the Reporting of Observational Studies in Epidemiology Statement available in Appendix 1.

2.2. Participants

The data for this study were collected from registered nurses working in 16 acute care medical and surgical wards of a Western Australian metropolitan teaching hospital between July and December 2021. The sample selection was performed in consultation with the hospital's nurse informatics managers. Participants were drawn from medical and surgical divisions with a total of 423 in-patient beds and 799 regulated nurses. The study included all nurses working during the data collection period, irrespective of their status of employment such as agency, contract, full time or part time, who were invited to voluntarily participate in this study. Nurses working in intensive care, mental health, and maternal and newborn care areas were excluded. The overall sample population consisted of 799 nurses. Based on a 95% confidence interval (CI) and 5% error margin, an estimated sample size of 260 was deemed appropriate for this study (Krejcie & Morgan, 1970). To minimise errors and sampling bias, a convenient sampling method was used. This allowed the researchers to invite all regulated nurses (enrolled and registered nurses) on duty and providing direct patient care to participate in this study.

2.3. Ethical considerations

This study was conducted in accordance with the ethical principles of the National Statement on Ethical Conduct in Human Ethics, Australia, and ethical and study site approvals were obtained from the participating hospital (reference number: RGS0000004484) and researchers' university's institutional Review Boards (reference number: 2021-02580) before the commencement of data collection.

2.4. Recruitment

First, in June 2021, during the Covid-19 pandemic, an overview of the study was presented to clinical nurse specialists and nurse educators' groups (via face to face and virtually) with both groups expressing interest in the study. This was followed by an invitation email to all professional nurses (as per Australian standards of nursing certification) directly providing patient care within the selected medical and surgical units (based on the inclusion criteria). Envelopes containing the study packets consisting of participant information and consent form, paper-based surveys and flyers were distributed to nurses within the 16 wards. Each ward was allocated a locked survey collection box purposely designed for this study and conveniently located; respondents were informed to deposit the completed surveys in the data collection boxes.

To increase response rate, wards were visited weekly, throughout the period of data collection (except on special occasions due to Covid-19) by one researcher who was unfamiliar with the hospital. Additionally, after the first three weeks of data collection, a reminder email was sent to the staff to encourage completion of surveys.

2.5. Measure

MNC was assessed using the MISSCARE survey nurse version (with authors' permission), which consists of three sections (demographic and professional, part A and part B) (Kalisch & Williams, 2009). This tool has been tested and has proven validity and reliability (Cronbach alpha 0.86) (Blackman et al., 2018; Kalisch et al., 2013; Kalisch, Landstrom, & Williams, 2009; Nahasaram, Ramoo, & Lee, 2021; Zeleníková, Jarošová, Plevová, & Janíková, 2020b). The initial section (demographic and professional characteristics) of the survey included questions about participants' characteristics (such as age, gender, educational level, job title, and unit experience), work schedule (shift profile and hours worked), and nurse staffing (perceived staffing adequacy, level of teamwork, intention to leave, and number of patients cared for). In addition, three open-ended questions in this section, asked participants about the number of patients cared for during their current or latest shift, as well as patient admissions and discharges completed. Also, nurses' perception of the level of job satisfaction, being a nurse and level of teamwork was measured by three items in this section. Participants were asked to report how satisfied they were with their current position, and lastly how satisfied they were with the level of teamwork using a 5-point Likert scale ranging from 1 "very dissatisfied", 2 "dissatisfied", 3 "neutral", 4 "satisfied", and 5 "very satisfied".

The second section of the instrument referred to as "Part A", measured nurses' perception of the types and levels of MNC and consisted of 24 items that asked participants to indicate how frequently each type of nursing activity was missed by nursing staff using a five-point Likert scale ranging from 1 "never missed", 2 "rarely missed", 3 "occasionally missed", 4 "frequently missed", and 5 "always missed" (Kalisch et al., 2009).

Part B (section three) of the MISSCARE survey measured nurses' perception of the reasons for MNC using 17 items scored on a four-point Likert scale ranging from 1 "not a reason", 2 "minor reason", 3 "moderate reason", and 4 "significant reason" for MNC occurrence. The 17 items measuring reason for MNC are based on the following three-component structure: (1) labour resources (five items), (2) material resources (three items) and (3) communication (nine items) (Kalisch, Tschannen, Lee, & Friese, 2011a; Kalisch & Williams, 2009).

2.6. Data analysis

The data analysis was conducted using IBM SPSS (Version 28), which allowed verification of any missing data. Before the onset of data analysis, survey data were screened and cleaned from errors such as incomplete data. Missing data were not managed because they were less than 5% missing variables (Tabachnick & Fidell, 2014). Descriptive statistical analysis was performed in the first instance to describe demographic and staff characteristics, professional variables such as age, gender, type of unit, work hours, job experience, job satisfaction, intention to leave, satisfaction with nursing profession, and teamwork. The types and levels of MNC were calculated for all 24 items scored by each participant and presented as frequencies ranging from 0 to 100. The types of MNC were considered missed if scored occasionally, frequently or always (Kalisch et al., 2009). Higher scores represented more missed care. To identify differences in MNC scores in medical and surgical wards, independent t-test analysis was employed. The reasons for missed care occurrence were further computed using means and standard deviations and presented under subscales based on previous study by authors of the MISSCARE tool (Kalisch et al., 2011a). Nonparametric test of correlations, Spearman rho test, was conducted to identify the relationship between perceived MNC, work satisfaction and teamwork. In addition, descriptive statistical analysis (frequencies) of the three satisfaction items in the MISSCARE survey was conducted.

Ordinal logistic regression analysis was performed to explore the correlates of MNC in acute care settings using all items in

the background and professional characteristics, staff satisfaction profile and items under types and reasons for missed care (MISSC-ARE survey). The dependent variable was the overall mean score of MNC calculated for each participant ranking from never missed (1) to frequently missed (4). The independent variables included age, gender, experience in the current unit, shift profile, working hours per week (less or greater than 30 h per week), overtime hours worked, inadequate staffing and missed shifts in the last three months amongst others (Kalisch et al., 2011a, 2011b; Kalisch et al., 2009). Based on theoretical assumptions and existing studies, all variables were first entered separately in crude analysis. This was followed by entering variables that showed statistical significance in the first analysis. The logistic regression analysis examined correlates of MNC using six selected variables that showed statistical significance in univariate analysis. Crude and adjusted odds ratios (OR and 95% CI) from the regression analysis predicting the association between MNC and selected significant variables were illustrated.

3. Results

3.1. Background characteristics of nurses

A total of 204 nurses voluntarily completed the MISSCARE survey corresponding to a response rate of 78%. Majority of the participants were females (84%), mainly working in medical (58%) and surgical (42%) wards and less than 35 years (63%) in age. A greater proportion of the respondents practiced as registered nurses (97%) with only a few working as enrolled nurses. More than half of the nurses had five years or less professional work experience (53.4%) and approximately 41% had two or less years' experience in their current care unit. A smaller proportion (46%) had worked for five or more years' experience in the nursing profession. The majority (84%) worked 30 or more hours per week and most participants often worked on morning shifts (42%) compared with afternoon (19%) and evening shifts (2.9%). Approximately 74% of the participants worked overtime ranging from 1 h to 12 or more hours. In the assessment of adequate unit staffing, approximately 44% of nurses reported the highest-ranked item (at most 25% of the time) unit staffing was inadequate (Table 1).

3.2. Frequency of missed nursing care

The highest MNC activities (Fig. 1) reported by nurses included assisting with patient ambulation, patient teaching about illness, attendance of care conference, giving the patient mouth care, monitoring of intake and output, two-hourly turning of patient, assisting with toilet needs, and response to call bell. The least MNC activities reported were glucose monitoring at bedside, hand hygiene, assessment of vital signs, patient assessment at each shift, and intravenous line assessment. Of the 204 participants, the overall mean MNC score was 65.8 (SD, 12.8).

An independent sample t-test was conducted to compare the MNC scores for participants in medical and surgical units. No significant difference (p > 0.05) was found in the MNC scores for nurses working in medical (M = 64.91, SD = 12.73) and surgical (M = 67.01, SD = 12.90) units.

3.3. Reasons for missed nursing care

The most perceived reason for the occurrence of MNC was labour resources (M = 3.38, SD = 0.26), followed by material resources (M = 2.70, SD = 0.24), and communication (M = 2.31, SD = 0.25) (Table 2). Under labour resources, inadequate staffing was the highest contributing factor, followed by unexpected rise in patient volume or acuity, increased admissions and discharge duties,

Table 1
Background characteristics of nurses.
Source: MISSCARE survey (Kalisch & Williams, 2009).

Variable	N	%
Type of unit		
Medical	119	58.3
Surgical	85	41.7
Age		
34 years and under	128	62.7
35–44 years	29	14.2
45–54 years	29	14.2
55 years and above	18	8.8
Gender		
Female	171	83.8
Male	22	10.8
Transgender	2	1.0
Missing values	9	4.4
Role		
Enrolled nurse	6	2.9
Registered nurse	197	96.6
Missing value	1	0.5
Work experience		
2 years and under	73	35.8
Greater than 2–5 years	36	17.6
Greater than 5–10 years	41	20.1
Greater than 10 years	53	26.0
Missing	1	0.5
Experience in the current unit		
2 years and under	83	40.7
Greater than 2–5 years	32	15.7
Greater than 5–10 years	38	18.6
Greater than 10 years	51	25.0
Number of hours usually worked per week		
Less than 30 h	30	14.7
30 h or more	171	83.8
Missing		
Hours of overtime worked	353	1.526.0
None	82	40.2
1–12 h	69	33.8
More than 12 h		
Type of shift most often worked		
Morning	85	41.7
Afternoon	38	18.6
Evening	6	2.9
Other (morning, afternoon or evening)	75	36.8
Unit staffing is adequate		
100% of the time	4	2.00
75% of the time	46	22.5
50% of the time	62	30.4
25% of the time	68	33.3
0% of the time	21	10.3
Missing	3	1.5
Plan to leave current position		
In the next 6 months	28	13.7
In the next year	25	12.3
No plans of leave	144	70.6

inadequate assistive and/or clerical support staff, and sudden change in patient condition. In relation to material resources, participants scored nonavailability of equipment when in need as the highest reason for MNC occurrence followed by poor functioning equipment. The nonavailability of medications when needed was reported to be the least reason for missed care occurrence under this subdomain. Items under communication component scored least for reasons why MNC occurs. Unbalanced patient assignments scored the highest for this subdomain and the lowest score was nursing assistant not communicating care left undone (Table 2).

3.4. Job satisfaction, teamwork, and missed nursing care

Seventy-three percent of nurses were satisfied with their profession. Whereas 58% were satisfied with their current role and 80% indicated satisfaction with the level of teamwork in the unit
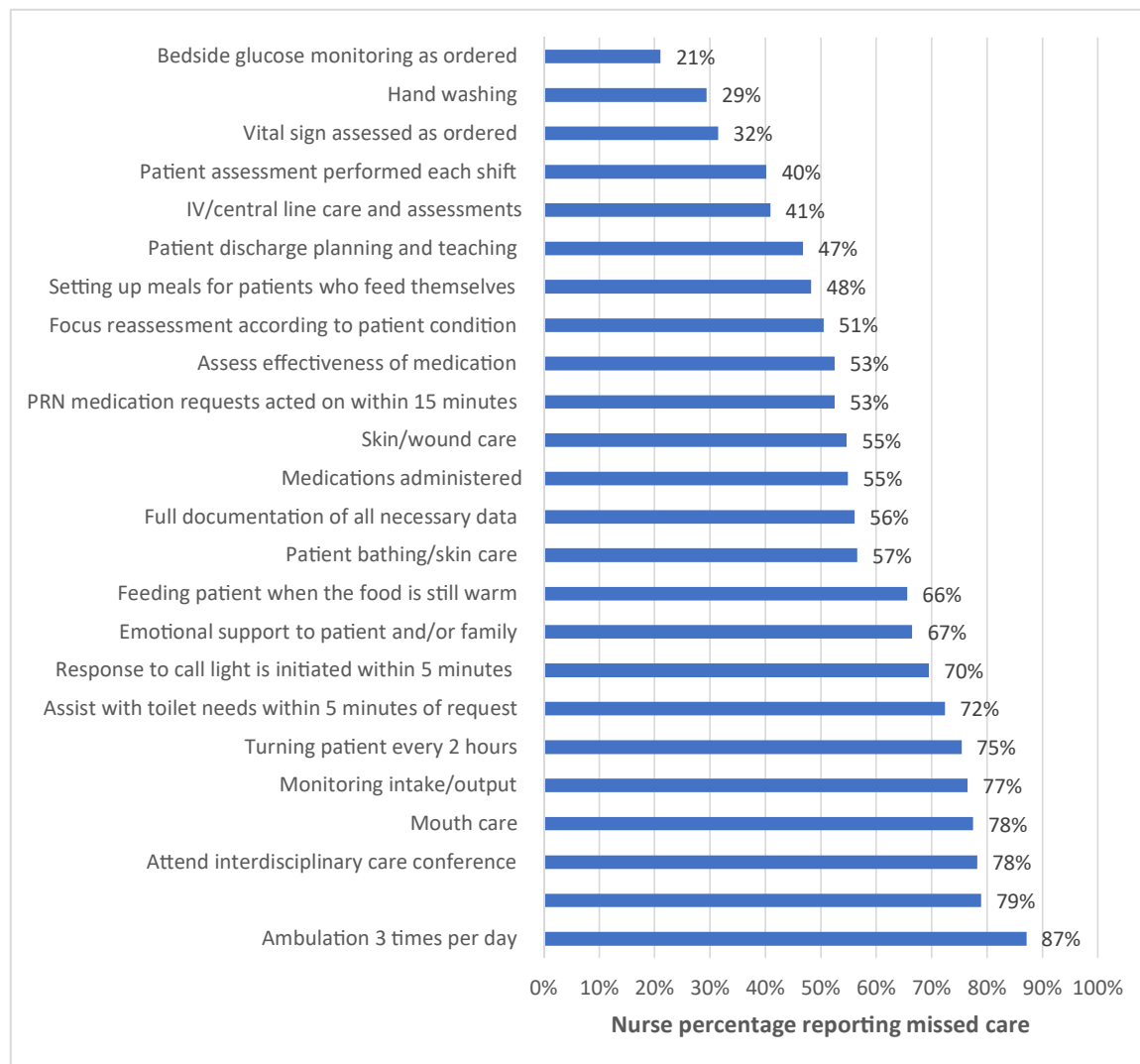
Fig. 1. Proportion of nurses reporting nursing care activities are occasionally, frequently or always missed.

Table 2
Reasons for missed nursing care (MNC) (N = 204).

Variables	n	%	Mean (SD)
Labour resources			**3.48 (0.26)**
Inadequate number of staff	203	99.5	3.74 (0.54)
Unexpected rise in patient volume and/or acuity on the unit	200	98.0	3.51 (0.72)
Heavy admission and discharge activity	200	98.0	3.41 (0.74)
Inadequate number of assistive and/or clerical personal (e.g., nursing assistant techs, unit secretaries etc.)	201	98.5	3.36 (0.81)
Urgent patient situations (e.g., a patient's condition worsening)	202	99.0	3.31 (0.76)
Material resources			**2.70 (0.24)**
Supplies/equipment not available when needed	200	98.0	2.99 (0.79)
Supplies/equipment not functioning properly when needed	199	97.5	2.82 (0.82)
Medications were not available when needed	201	98.5	2.79 (0.75)
Communication			**2.31 (0.25)**
Unbalanced patient assignments	201	98.5	2.94 (0.84)
Other departments did not provide the care needed (e.g., physical therapy did not ambulate)	199	97.5	2.54 (0.81)
Inadequate hand-off from previous shift or sending unit	200	98.0	2.47 (0.74)
Lack of back-up support from team members	200	98.0	2.40 (0.90)
Tension or communication breakdowns with other ancillary/support departments	199	97.5	2.32 (0.87)
Caregiver off unit or unavailable	199	97.5	2.26 (0.92)
Tension or communication breakdown within the nursing team	200	98.0	2.17 (0.88)
Tension or communication breakdown with the allied health team	199	97.5	2.15 (0.82)
Nursing assistant did not communicate that care was not provided	196	96.1	2.05 (0.92)

Note. Mean scores of reasons for missed care were computed for items in each subdomain. (Scores: 1 = not a reason for missed care, 1.1–2.0 = minor reason, 2.1–3.0 = moderate reason, 3.1–4.0 = major reason).

Table 3
Nurses' perception of job satisfaction and teamwork.

n (%)			
Variable	Satisfied/very satisfied	Neutral	Dissatisfied/very dissatisfied
Satisfaction with current position	120 (58.2%)	54 (26.5%)	27 (13%)
Satisfaction with being a nurse	149 (73.0%)	30 (14.7%)	22 (10.8%)
Satisfaction with the unit's level of teamwork	161 (80.0%)	31 (15.0%)	10 (4.9%)

(Table 3). A significant negative correlation was observed between MNC and perceived satisfaction with current position (r = −0.304, p < 0.01), satisfaction with being a nurse (r = −0.317, p < 0.01) and satisfaction with the level of units' teamwork (r = −0.213, p < 0.01). Increased satisfaction was associated with lower reports of MNC.

3.5. Factors predicting the occurrence of missed nursing care

Participants who did not work overtime were 66% less likely to identify MNC compared with those who worked overtime (OR 0.341; 95% CI 0.179–0.649). The findings that nurses who worked overtime are more likely to report MNC were confirmed when adjusted for in multivariable analysis (adjusted OR (AOR) 0.349; 95% CI 0.174–0.700).

The results showed that nurses who are less satisfied with the nursing profession were more likely to report MNC (AOR 2.054; 95% CI 0.988–4.273). Perceived nurse staffing adequacy was less likely to lead to reported MNC (AOR 0.499; 95% CI 0.084–2.981).

Heavy admissions and discharges were found to be statistically significantly related to MNC reporting (AOR 0.293; 95% CI 0.114–0.756).

However, availability of supplies and equipment (AOR 0.655; 95% CI 0.255–1.681) as well as properly functioning equipment (AOR 0.491; 95% CI 0.201–1.197), were both not significant predictors of reported MNC as indicated in the adjusted estimates (Table 4).

4. Discussion

Several studies globally have reported on MNC frequency, reasons for missed care occurrence, the relationship between MNC, job satisfaction and teamwork, and the factors predicting missed care

occurrence (Albsoul, FitzGerald, Finucane, & Borkoles, 2019; Blackman et al., 2015, 2018; Chapman, Rahman, Courtney, & Chalmers, 2016; Jones, Drach-Zahavy, Sermeus, Willis, & Zelenikova, 2021; Kalisch, Tschannen, & Lee, 2011; Kalisch, Tschannen, Lee, & Friese, 2011). However, there has been little research on MNC conducted in Australian hospitals and none in Western Australia (Mills & Duddle, 2021). Thus, the aim of this study was to conduct analysis of nurses' perceived frequency, types and reasons for MNC, the relationship between MNC, job satisfaction, and teamwork and to determine the factors predicting missed care occurrence in acute care settings in Western Australia in selected medical and surgical units.

The current findings revealed that most of the nurses surveyed self-reported missed relevant care activities in medical and surgical wards during patient hospitalisation. Of the 24 elements of MNC, nurses reported that nursing staff in their unit commonly missed patient ambulation, teaching the patient about illness, mouth care, attendance of care conference, turning of patient, monitoring intake and output, assisting with toileting needs, responding to call bell, and providing emotional support for patient and their family members. The observed findings are consistent with previous studies that have identified high prevalence of MNC activities (Albsoul et al., 2019; Blackman, Henderson, Willis, & Toffoli, 2015b; Cho, Kim, Yeon, You, & Lee, 2015; Kalisch et al., 2013; Kalisch et al., 2009; Lake, French, O'Rourke, Sanders, & Srinivas, 2020; Winsett et al., 2016; Zeleníková et al., 2020a). The least MNC activities included glucose monitoring, vital signs, and hand hygiene. Overall, these nursing activities represent time-sensitive patient care, which when missed or delayed, can lead to unsafe patient outcomes such as falls, pressure injuries, medication errors, and hospital-acquired infections. Although nurses may prioritise time-sensitive care such as

Table 4
Crude and adjusted odds ratio (and 95% confidence intervals) from logistic regression analysis predicting association between selected variables and missed nursing care.

Independent variable		Est (se)	Crude odds ratio	95% CI for crude odds ratio		Est (Se)	Adj. odds ratio	95% CI for Adj odds ratio	
				Lower	Upper			Lower	Upper
Overtime hours	Yes	Ref				Ref			
	No	−1.08 (0.328)***	0.341	0.179	0.649	−1.05 (0.355)**	0.349	0.174	0.700
Satisfaction with being a nurse	Yes	Ref				Ref			
	No	0.86 (0.354)***	2.361	1.180	4.725	0.72 (0.374)*	2.054	0.988	4.273
Inadequate number of staff	Yes	Ref				Ref			
	No	−2.17 (0.833)**	0.114	0.022	0.583	0.70(0.912)	0.499	0.084	2.981
Heavy admissions and discharge activity	Yes	Ref				Ref			
	No	−1.70 (0.441)***	0.182	0.077	0.433	−1.23 (0.484)**	0.293	0.114	0.756
Supplies/equipment not available	Yes	Ref				Ref			
	No	−1.14 (0.330)***	0.320	0.167	0.610	−0.42 (0.481)	0.655	0.255	1.681
Supplies/equipment not functioning properly	Yes	Ref				Ref			
	No	−1.21 (0.314)***	0.300	0.162	0.555	−0.71(0.455)	0.491	0.201	1.197

p ≤ 0.05. **p ≤ 0.01. ***p ≤ 0.001. Notes. Ref = reference group (1.00). Missed nursing care (dependent variable) ordinal scores: 1 = never missed; 2 = rarely missed, 3 = occasionally missed, 4 = frequently missed.

ambulation and patient turning, care prioritisation if not well addressed can potentially lead to care deprivation or failure to maintain patient care (Bail & Grealish, 2016; Jones, 2015). A comparison of MNC frequency in medical and surgical units found no significant differences in its occurrence supporting findings from studies conducted by Bragadóttir et al. (2016) and Duffy, Culp, and Padrutt (2018), adding weight to assertions that equal prevalence of MNC exists in acute care settings.

With regard to reasons for missed care occurrence, the results presented three components (communication, labour resources, and material resources) contributing to why nurses missed care consistent with previous studies (Kalisch et al., 2011a; Kalisch & Williams, 2009; Nahasaram et al., 2021). The most paramount reasons for MNC identified in this study were labour resources, especially in aspects of staffing inadequacy and sudden rise in patient volume or change in patient acuity. Similar findings were reported in studies conducted by Dutra, Salles, and Guirardello (2019) and Winsett et al. (2016). Adequate staffing is therefore essential to fully address patient needs. When insufficient staffing occurs, it directly impacts the results of nursing care because nurses are forced to miss, delay or leave patient care unfinished (Ball, Murrells, Rafferty, Morrow, & Griffiths, 2014; Twigg, Gelder, & Myers, 2015). The second most significant factor contributing to MNC in this study was material resources predominantly observed in nonavailability of medications, supplies, and equipment. Similar findings by Kalisch and colleagues have been reported; hence the need to plan and make resources available for safe patient care (Kalisch et al., 2011a). The third reported reason for MNC was communication among hospital staff. As communication is key in caring for the patient, the need to promote and strengthen effective communication within healthcare settings is necessary. Similar findings have been reported in recent studies (Nahasaram et al., 2021; Villamin, Anderson, Fellman, Urbauer, & Brassil, 2019). In another study of patient-reported MNC, it was uncovered that inadequate nurse–patient communication had the potential to contribution to errors and increase the length of hospital stay (Kalisch, Xie, & Dabney, 2014).

Inadequate staffing is a hallmark of MNC and a driver of unsafe patient outcomes internationally (Jones, Drach-Zahavy, Sermeus, Willis, & Zelenikova, 2021). The relationship between nurse staffing methodologies and MNC is underrepresented in MNC research. In Australia, findings from a large study, including 1195 nurses and midwives from Victoria, Tasmania, New South Wales, and South Australia, highlighted lower frequency of reported MNC in Victoria compared with the other states (Blackman et al., 2018). This may be because of the mandatory nurse-to-patient ratio's staffing methodology used in Victoria. Yet, the study further reported increased MNC levels on night shifts where patient-to-nurse ratios were almost doubled compared with morning and afternoon shifts (Blackman et al., 2018).

A staffing approach unique to Western Australia is the NHPPD. Following its implementation in 2002, Twigg and colleagues examined the impact of this approach on nurse-sensitive outcomes in tertiary hospitals and found significant reduction in mortality and unsafe patient outcomes (Twigg et al., 2011). However, the findings from this study highlight the limited ability of nurses to complete patient task within the domain of nursing practice. Further research on the nexus between staffing methodologies and MNC is needed in this jurisdiction before the results can be generalised.

The results of this study indicated that the direction of the correlation between MNC and satisfaction with being a nurse, current role and level of teamwork was significant across medical and surgical units. In contrast, decreased job and/or role satisfaction and teamwork tended to be associated with increased occurrence of MNC. Unit staffing levels were found to be inadequate, and some nurses intended to leave their current position in the next six

months or a year, but when all variables of satisfaction (satisfaction with being a nurse, satisfaction with current role, and satisfaction with level of teamwork) were computed, high levels of satisfaction were identified. This is consistent with research findings by Kalisch and colleagues, which explored differences in staff levels and job satisfaction between United States (US) and Lebanon. In their study, nurses in the US reported higher scores of satisfaction with current role, profession, and teamwork compared with Lebanese nurses (Kalisch et al., 2013).

The regression model explained six factors emerging as predictors of nurse-reported MNC. The statistical analysis significantly showed that increased hours of working overtime (1–12 h or more) increased the risk of higher levels of reported MNC in acute care settings. This presupposes that the more overtime hours taken by staff increased the risk of missing patient care activities as unsurprisingly working overtime can lead to burnout (Patrick & Lavery, 2007; Rabenu & Aharoni-Goldenberg, 2017). This finding is consistent with that reported in a previous MNC study (Kalisch et al., 2013). The researchers found that increased levels of MNC were associated with inadequate levels of nurse staffing. Similarly, in a recent MNC study by Zeleníková et al. (2020a) in four European countries, inadequate staffing was found to predict MNC. In addition, the increasing amount of admission and discharge activities increased the odds of MNC. Kalisch's study in addition to other Australian studies has identified heavy admissions and discharge in the nurse work environment, as contributing factors to MNC (Albsoul et al., 2019; Blackman et al., 2015a; Kalisch, 2006, 2009; Willis et al., 2015). Other important findings related to increased risk of MNC according to the crude analysis estimates were properly functioning equipment or supplies and the nonavailability of these equipment when needed. Previous studies have shown similar findings (Kalisch, Terzioglu, & Duygulu, 2012; Liu et al., 2018).

Satisfaction with being a nurse also emerged as a statistically significant predicting factor in the model highlighting the fact that as nurse satisfaction with profession increases, there is a decreased risk of MNC reporting. In other words, the more nurses are satisfied with their profession, the less likelihood for MNC to be reported. Unsurprisingly, published studies have shown that nurse job satisfaction contributes to safe patient outcomes and quality of care (McHugh, Kutney-Lee, Cimiotti, Sloane, & Aiken, 2011; Plevová, Zeleníková, Jarošová, & Janíková, 2021; Ogboenyiya, 2019).

In addition, despite the differences in study settings, staffing methodologies, differing populations surveyed, and differences in healthcare systems across Australia, the findings of reported MNC, mainly basic care, are similar to previous national and international studies (Jones, Drach-Zahavy, Sermeus, Willis, & Zelenikova, 2021; Mills & Duddle, 2021). Given the data collection period of this study, it is possible that reported levels of MNC may have increased due to Covid-19 pandemic. Future research is needed to improve knowledge on MNC and staffing methodologies, with emphasis on research design, objective measurement of MNC, nurse staffing, and nurse–patient outcomes.

4.1. Limitations

The authors of this study acknowledge that this study has some limitations. First, examining the relationship between each type, and reasons for each missed care element, has not been measured.

Second, the self-reported and retrospective survey is a limitation for making claims about causability. Digital health systems may offer insights into MNC and corroborate nurse self-reports. Third, despite the attempts to increase staff participation, the response rate of 78% was low and the inclusion of nurses from a single hospital's medical and surgical wards limits this study's precision and generalisability.

Future research will be conducted using larger nurse samples from different hospital settings within Western Australia.

4.2. Implication for future research

These omissions of MNC have potential for unsafe patient outcomes. Ambulation, patient teaching, mouth care, and turning are among the most frequently missed activities that can contribute to serious problems such as infection, poor nutrition, and increased length of hospital stay. The findings from this study may provide basis for further clinical research to investigate types, levels, and reasons for MNC in diverse Western Australian settings such as community health, mental health, maternal and newborn health, paediatric, and aged care residential settings. This could lead to broad knowledge of MNC phenomenon along with missed care predicting factors and generate discussion on policy directions to reduce MNC occurrence.

5. Conclusion

This study investigated nurse-reported types, levels and reasons for MNC. This study also examined factors predicting the occurrence of MNC in Western Australia. The outcomes of this study have demonstrated that nurses leave significant amount of patient care undone due to inadequate labour resources, material resources, and communication. Job satisfaction, role satisfaction, and satisfaction with level of teamwork, overtime worked and heavy admissions and discharges significantly influenced the occurrence of MNC. Further exploration of the MNC phenomenon is needed to elucidate the most appropriate measures to control individual missed care items taking into consideration the process of MNC for each specific element.

CRediT authorship contribution statement

Funding sources

Ethical statement

This study was approved by Human Research Ethics Committee in Sir Charles Gairdner Hospital AND Osborne Park Health Care Group and Edith Cowan University with approval numbers and dates of approval as follows: (1) Sir Charles Gairdner and Osborne Park Health Care Group Human Research Ethics Committee number: Number: RGS0000004484, Date: 21st April 2021, Sir Charles Gairdner Hospital Site Authorisation: 31st May 2021. (2) Edith Cowan University Human Research Ethics Committee: Number: 2021-02580-SARPONG, Date: 4th June 2021.

Conflict of interest

The authors have no conflict of interest to declare.

Acknowledgements

Appendix

	Item no	Recommendation	Page no
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	1
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	2, 3, 4
Objectives	3	State specific objectives, including any prespecified hypotheses	4, 5
Methods			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations and relevant dates, including periods of recruitment, exposure, follow-up and data collection	5
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders and effect modifiers. Give diagnostic criteria, if applicable	6, 7
Data sources/measurement	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	6, 7
Bias	9	Describe any efforts to address potential sources of bias	6
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6, 7
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7, 8
		(*b*) Describe any methods used to examine subgroups and interactions	8
		(*c*) Explain how missing data were addressed	7
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	
		(*e*) Describe any sensitivity analyses	
Results			
Participants	13	(a) Report numbers of individuals at each stage of study — for example, numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up and analysed	8
		(b) Give reasons for non-participation at each stage	
		(c) Consider use of a flow diagram	

Descriptive data	14	(a) Give characteristics of study participants (e.g., demographic, clinical and social) and information on exposures and potential confounders	9, 10, 11
		(b) Indicate the number of participants with missing data for each variable of interest	10, 11
Outcome data	15	Report numbers of outcome events or summary measures	10, 11
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included	10, 11, 12, 13, 14, 15
		(b) Report category boundaries when continuous variables were categorised	11, 12, 13, 14, 15
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done — for example, analyses of subgroups and interactions, and sensitivity analyses	12, 13
Discussion			
Key results	18	Summarise key results with reference to study objectives	16, 17, 18, 19, 20
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	19
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies and other relevant evidence	19
Generalisability	21	Discuss the generalisability (external validity) of the study results	
Other information			
Funding	22	Give the source of funding and the role of the funders for this study and, if applicable, for the original study on which the present article is based	20

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