Science of Nursing and Health Practices

Science infirmière et pratiques en santé

Article de protocole de recherche | Research protocol article

The Characteristics of Working Overtime and Their Associations With Nurse and Patient Outcomes: A Systematic Review Protocol

Les caractéristiques des heures supplémentaires et leurs associations avec les résultats chez les infirmières et les patients : un protocole de revue systématique

Raouaa Braiki https://orcid.org/0000-0002-7765-9589 School of Nursing, Université de Sherbrooke, Quebec, Canada

Christian Rochefort https://orcid.org/0000-0002-0035-8382 School of Nursing, Université de Sherbrooke, Centre hospitalier universitaire de Sherbrooke, Centre de recherche de l'Hôpital Charles-Le Moyne, Quebec, Canada

Correspondance | Correspondence:
Raouaa Braiki
raouaa.braiki@usherbrooke.ca

ISSN 2561-7516

Keywords

overtime work; nurse outcomes; patient outcomes; systematic review; protocol

Abstract

Introduction: Healthcare systems often use overtime to manage nursing shortage and to provide continuous and required nursing care. Studies have examined the impact of working overtime on both nurse and patient outcomes with conflicting results. **Objectives**: We aim to summarize existing evidence on the association between overtime work and nurse and patient outcomes; and to identify avenues for future research. **Method**: A systematic search of MEDLINE, CINAHL, PsycINFO, Scopus, Campbell, and Cochrane Library will be conducted to identify relevant studies on the association between overtime and nurse and patient outcomes. The period covered will be from April 2013 to May 2025. Two independent reviewers will perform screening, study selection, and data extraction. A qualitative synthesis of the available evidence will be performed. The results will be reported in tables. **Discussion and Research Spin-offs**: This systematic review will inform nursing research and practice and provide valuable recommendations that can be used to guide policies and managers' decisions regarding working overtime in nursing settings.

Mots-clés

heures supplémentaires; résultats chez les infirmières; résultats chez les patients; revue systématique; protocole

Résumé

Introduction : Les infirmières travaillent souvent des heures supplémentaires pour combler la pénurie d'infirmières et pour répondre aux besoins des patients. Des études ont examiné les associations entre les heures supplémentaires et leurs conséquences chez les infirmières et les patients, mais leurs résultats sont contradictoires. **Objectifs** : Cette étude vise à synthétiser systématiquement les écrits empiriques sur les caractéristiques des heures supplémentaires, ainsi que leurs associations avec les résultats chez les infirmières et les patients, et à identifier des avenues pour des recherches futures. **Méthode** : Les bases de données MEDLINE, CINAHL, PsycINFO, Scopus, Campbell et Cochrane Library seront interrogées systématiquement pour identifier les études pertinentes sur l'association entre les heures supplémentaires et leurs résultats chez l'infirmière et le patient. La période couverte s'étendra d'avril 2013 à mai 2025. Deux évaluateurs indépendants effectueront la sélection des articles et l'extraction des données. Une synthèse narrative des données sera réalisée. Les résultats seront rapportés dans des tableaux. **Discussion et retombées anticipées** : Cette revue systématique informera la recherche et la pratique infirmière et fournira des recommandations précieuses pouvant être utilisées pour orienter les politiques et les décisions des gestionnaires concernant les heures supplémentaires en milieu de soins infirmiers.

INTRODUCTION

Overtime is defined as "any hours worked in excess of the standard hours of work'' (Government of Canada, 2024). Worldwide, working overtime is a serious issue (Bae & Fabry, 2014). For example, in 2022, 40% of Canadian nurses reported working overtime at least once a week (Canadian Federation of Nurses Unions, 2022). In the United States, 42% of nurses reported working overtime (Stokowski et al., 2018), whereas more than 22% of French nurses reported working overtime multiple times per week (Dickason & Dumas, 2021).

Studies have examined the impact of working overtime on both nurse and patient outcomes with conflicting results. For example, some studies suggested that working overtime is associated with adverse nurse outcomes (e.g., job dissatisfaction, occupational injuries, and fatigue) (Bae & Fabry, 2014; Carrière et al., 2020; Härmä et al., 2020), whereas other studies found no significant associations (Bannai & Tamakoshi, 2014; Watanabe, Imamura, & Kawakami, 2016). Interestingly, some studies reported the benefits of working overtime for nurses (e.g., improved work engagement and motivation, and increased income levels) (Watanabe & Yamauchi, 2018; 2019). Similar patterns have also been reported for the studies examining the associations between overtime and patient outcomes. For instance, according to some studies, working overtime may increase medication errors and infection rates (Bae & Fabry; Caruso et al., 2019; Geiger-Brown et al., 2011; Trinkoff et al., 2011), while other studies revealed beneficial outcomes of working overtime for patients (e.g., lower mortality and infection rates) (Bae & Fabry; Berney & Needleman, 2006; Stone et al., 2007).

Nurses may provide various types of overtime (e.g., mandatory, voluntary, paid, unpaid, on call hours). From this perspective, some authors postulate that the conflicting findings presented in the literature could be explained by the type of overtime performed by nurses (Watanabe & Yamauchi, 2016; Watanabe & Yamauchi, 2018; 2019). For instance, working voluntary overtime (i.e., an independent decision made by the nurse) could likely be associated with more positive nurse outcomes (e.g., increased work engagement and motivation) (Watanabe & Yamauchi, 2016; Watanabe & Yamauchi, 2018; 2019), whereas working mandatory overtime (i.e., a decision imposed on a nurse by managers) could correlate with adverse nurse outcomes (e.g., higher job dissatisfaction or increased turnover) (Medvec et al., 2023). A preliminary search of the literature was performed to identify any systematic reviews on the topic. Given the absence of recent systematic reviews since the publication of Bae and Fabry (2014), the existing evidence remains fragmented across the literature. A comprehensive synthesis is therefore needed to consolidate current knowledge, identify consistent patterns, and guide future research and practice. This systematic review aims to address this gap by providing an updated and structured overview of the available evidence.

OBJECTIVES

The objectives of this systematic review are to: 1) summarize existing evidence on the associations between overtime work and nurse and patient outcomes; 2) identify knowledge gaps to inform future research, clinical practice, and policy development.

METHOD

PROTOCOL DESIGN AND REGISTRATION

The proposed systematic review will be conducted in accordance with the Joanna Briggs Institute (JBI) methodology for systematic reviews of etiology and risk (Moola et al., 2020). Then, the findings will be reported according to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines (Page et al., 2021). The review protocol was registered in the international prospective register of systematic reviews (PROSPERO, Registration ID: CRD42024529966).

SEARCH STRATEGY AND INCLUSION CRITERIA

Two nurse researchers will independently search six electronic databases to identify studies

examining the association between nurse overtime work and nurse and patient outcomes: 1) MEDLINE, 2) CINAHL, 3) PscyINFO, 4) Scopus, 5) Campbell and 6) Cochrane Library. All literature searches will be performed with the assistance of a specialized health sciences librarian. Our search strategy will proceed in three successive steps.

First, several queries of the selected electronic databases will be performed by combining our selected keywords along with relevant MeSh terms (Table 1, see Appendix). Second, the same nurse researchers will independently read the titles and abstracts of the retrieved articles (and, as needed, the full manuscript) to determine whether they should be included in this review. Studies will be included if they: 1) were published between April 2013 (the latest date covered by the systematic review of Bae & Fabry, 2014) and May 2025 in a peer-reviewed journal; 2) were based on a quantitative research design; 3) examined the association between at least one independent variable and at least one dependent variable of interest (Table 2, see Appendix); and 4) were conducted in any clinical setting. No linguistic restrictions will be applied. Any retrieved manuscript written in a foreign language will be translated into English using an artificial intelligence translation tool (ChatGPT) (Li & Tian, 2024).

Final decisions about whether to include a given study or not will be made through consensus among research team members. Third, the reference lists of the included studies will be manually searched for any additional eligible studies. In addition, we will search the selected electronic databases to identify any subsequent or prior studies published by the authors of the retrieved articles that could also meet our inclusion criteria (Table 3, see Appendix).

STUDY SELECTION

Results of database searches will be compiled and uploaded into Endnote (The EndNote Team, 2013). All identified citations will be imported into the Covidence systematic review software (Veritas Health Innovation, 2023) and duplicates removed. Then, titles and abstracts will be assessed against the eligibility criteria of the review by two independent reviewers. Relevant texts will be retrieved in full and assessed by the same reviewers. The full-text studies that do not meet our eligibility criteria will be excluded from this review. The reasons for exclusion will be presented in the systematic review. Disagreements between the reviewers will be resolved through discussion. Findings will be presented in full in the systematic review and illustrated in a PRISMA flow diagram (Page et al., 2021).

DATA EXTRACTION

The extraction will be done in duplicate by the two independent reviewers (the same who will perform the database searches and study selection). These reviewers will extract all relevant data from papers included in this systematic review. Based on the data extraction tool developed by the JBI (Moola et al., 2020), an Excel extraction grid will be developed for the purpose of this systematic review. All extracted data will be compiled in the grid. The following information will be extracted from each included study:

- General information: 1) authors, 2) publication year, 3) data collection year, 4) study location (country), 5) aims, 6) study design, 7) quality appraisal score, 8) data sources.
- Population: Sample characteristics.
- Outcomes measured: Independent variables (overtime; e.g., hours/week, mandatory/voluntary, shift length), dependent variables (nurse outcomes; e.g., burnout, job satisfaction, intent to leave; patient outcomes; e.g., adverse events, satisfaction), and confounding variables (e.g., sociodemographic variables).
- Key findings (Table 4, see Appendix).

Disagreements will be resolved through consensus. When data are not retrievable from the selected articles, the authors will be contacted directly.

DATA SYNTHESIS

We will first provide descriptive statistics on the characteristics of the reviewed studies (Table 4, see Appendix). The associations between overtime work and nurse and patient outcomes will be presented in tables (Table 5, Table 6, see

Appendix). We will then provide a qualitative synthesis of the available evidence. We will use $p < 0.05$ as the threshold to determine the statistical significance of the findings. Since this field is marked by significant methodological heterogeneity, no meta-analysis will be attempted.

Assessment of Methodological Quality

Relevant studies will be critically appraised by two independent reviewers (the same as for the previous steps) using the JBI Critical Appraisal Checklist tool (Moola et al., 2020). JBI provides a specific checklist for each type of observational study design: Cross-sectional (8 items), case-control (10 items), and cohort studies (11 items). Each item will be rated as follows: Criterion satisfied = 1, criterion not satisfied = 0, criterion partially satisfied or unclear = 0.5. For each type of observational study, scores on each item will be summed and divided by the total number of items and converted to a percentage: Low score (score = less than 60%); moderate (score = 60-80%); high (score = > 80%). Studies of low methodological quality will not be excluded from this systematic review, as identifying such studies is an important result in itself. Therefore, we plan on reporting the percentage of retrieved studies that fall within our three categories of methodological quality (low, medium, high). Then, the literature will be summarized while considering the methodological quality of the retrieved studies (e.g., stratified by quality levels), and the risk of bias.

The results of the critical appraisal will be reported in a narrative form and in a table. Disagreements between the reviewers will be resolved through discussion.

Discussion and Research Spin-offs

Working overtime is a common issue worldwide. Evidence shows inconsistent results on the associations between overtime work and both nurse and patient outcomes. Some studies reported adverse outcomes of working overtime for both nurses and patients (Bae & Fabry, 2014; Härmä et al., 2020), whereas other studies suggested no significant associations (Bannai & Tamakoshi, 2014; Watanabe, Imamura, & Kawakami, 2016) or reported some benefits of overtime work for patients and nurses (Stone et al., 2007; Watanabe & Yamauchi, 2016; Watanabe & Yamauchi, 2018; 2019). The prevailing hypothesis is that these inconsistencies could be explained by the type of overtime work performed (e.g., voluntary vs. mandatory vs. on call).

The proposed systematic review aims to explore this hypothesis through a synthesis of recent evidence. We hope that our results will inform future nursing research in the field. In addition, it is expected that this review will likely result in valuable recommendations for decision-makers. Indeed, we aim to stratify existing evidence according to the type of overtime performed. We therefore hope that such summary will assist managers in improving their use of overtime in different clinical settings.

Dissemination

Findings from this review will be disseminated through a peer-reviewed publication and conferences.

Timeline

- Literature search: May 2025.
- Study selection: June 2025.
- Data extraction: July 2025.
- Data synthesis and report: August-October 2025.

Authors' contribution: RB and CR designed the study and the search strategy. RB wrote the first draft of this systematic review protocol. CR revised and approved the final version of the manuscript.

Acknowledgments: None.

Funding: The authors received no funding to conduct the project reported in this article nor to draft this article.

Statement of conflict of interest: The authors declare no conflict of interest.

Ethical considerations: No ethics certificate number is necessary for this systematic review.

Reçu/Received: 3 Oct/Oct 2024 **Publié/Published:** 20 Mai/May 2025

REFERENCES

Bae, S. H., & Fabry, D. (2014). Assessing the relationships between nurse work hours/overtime and nurse and patient outcomes: systematic literature review. *Nursing outlook*, *62*(2), 138–156. https://doi.org/10.1016/j.outlook.2013.10.009

Bannai, A., & Tamakoshi, A. (2014). The association between long working hours and health: a systematic review of epidemiological evidence. *Scandinavian journal of work, environment & health*, *40*(1), 5–18. https://doi.org/10.5271/sjweh.3388

Berney, B., & Needleman, J. (2006). Impact of nursing overtime on nurse-sensitive patient outcomes in New York hospitals, 1995-2000. *Policy, politics & nursing practice*, *7*(2), 87–100. https://doi.org/10.1177/1527154406291132

Canadian Federation of Nurses Unions. (2022). *Member Survey Summary Report January 2022*. https://nursesunions.ca/wp-content/uploads/2022/02/Viewpoints_Survey_Results_2022_January_EN_FINAL-1.pdf

Carrière, G., Park, J., Deng, Z., & and Kohen, D. (2020, September 1). *Overtime work among professional nurses during the COVID-19 Pandemic (Catalogue no. 45280001)*. Statistics Canada. https://publications.gc.ca/collections/collection_2020/statcan/45-28/CS45-28-1-2020-72-eng.pdf

Caruso, C. C., Baldwin, C. M., Berger, A., Chasens, E. R., Edmonson, J. C., Gobel, B. H., Landis, C. A., Patrician, P. A., Redeker, N. S., Scott, L. D., Todero, C., Trinkoff, A., & Tucker, S. (2019). Policy brief: Nurse fatigue, sleep, and health, and ensuring patient and public safety. *Nursing outlook*, *67*(5), 615–619. https://doi.org/10.1016/j.outlook.2019.08.004

Dickason, R., & Dumas, M. (2021). Working hours and overtime: insights from the perspective of affects. *Management & Avenir - Santé, 1*(8), 73–102. https://doi.org/10.3917/mavs.008.0073

Geiger-Brown, J., Trinkoff, A., & Rogers, V. E. (2011). The impact of work schedules, home, and work demands on self-reported sleep in registered nurses. *Journal of occupational and environmental medicine*, *53*(3), 303–307. https://doi.org/10.1097/JOM.0b013e31820c3f87

Government of Canada. (2024, June 3). *Hours of work - Federally regulated workplaces*. https://www.canada.ca/en/services/jobs/workplace/federal-labour-standards/work-hours.html#h3.01.01

Härmä, M., Koskinen, A., Sallinen, M., Kubo, T., Ropponen, A., & Lombardi, D. A. (2020). Characteristics of working hours and the risk of occupational injuries among hospital employees: a case-crossover study. *Scandinavian journal of work, environment & health*, *46*(6), 570–578. https://doi.org/10.5271/sjweh.3905

Li, F., & Tian, L. (2024). Translation Practice and Competence Enhancement in the Age of AI: Applying ChatGPT to Translation Education. In Kubincová, Z., et al. (Eds.), *Emerging Technologies for Education. SETE 2023*. Lecture Notes in Computer Science, vol 14606. Springer. https://doi.org/10.1007/978-981-97-4243-1_17

Moola, S., Munn, Z., Tufanaru, C., Aromataris, E., Sears, K., Sfetcu, R., Currie, M., Lisy, K., Qureshi, R., Mattis, P., & Mu, P. (2020). Systematic reviews of etiology and risk. In Aromataris E., Lockwood C., Porritt K., Pilla B., Jordan Z. (Eds.), *JBI Manual for Evidence Synthesis*. JBI; 2024. https://synthesismanual.jbi.global. https://doi.org/10.46658/JBIMES-24-06

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., McGuinness, L. A., … Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ (Clinical research ed.)*, *372*, n71. https://doi.org/10.1136/bmj.n71

Stokowski, L. A., McBride, M., & Berry, E. (2018). *Medscape RN/LPN Compensation Report, 2018*.

Stone, P. W., Mooney-Kane, C., Larson, E. L., Horan, T., Glance, L. G., Zwanziger, J., & Dick, A. W. (2007). Nurse working conditions and patient safety outcomes. *Medical care*, *45*(6), 571–578. https://doi.org/10.1097/MLR.0b013e3180383667

The EndNote Team. (2013). *EndNote* (version EndNote X9) [64 bit]. Clarivate Analytics. https://endnote.com/

Trinkoff, A. M., Johantgen, M., Storr, C. L., Gurses, A. P., Liang, Y., & Han, K. (2011). Nurses' work schedule characteristics, nurse staffing, and patient mortality. *Nursing research*, *60*(1), 1–8. https://doi.org/10.1097/NNR.0b013e3181fff15d

Veritas Health Innovation. (2023). *Covidence [Computer software]*. https://www.covidence.org/

Watanabe, M., & Yamauchi, K. (2016). Psychosocial Factors of Overtime Work in Relation to Work-Nonwork Balance: a Multilevel Structural Equation Modeling Analysis of Nurses Working in Hospitals. *International Journal of Behavioral Medicine, 23*(4), 492–500. https://doi.org/10.1007/s12529-016-9563-x

Watanabe, M., & Yamauchi, K. (2018). The effect of quality of overtime work on nurses' mental health and work engagement. *Journal of nursing management*, *26*(6), 679–688. https://doi.org/10.1111/jonm.12595

Watanabe, M., & Yamauchi, K. (2019). Subtypes of overtime work and nurses' fatigue, mental status, and work engagement: A latent class analysis of Japanese hospital nurses. *Journal of advanced nursing*, *75*(10), 2122–2132. https://doi.org/10.1111/jan.13991

Appendix

Table 1

Keywords Used for the Search Strategy

Participants and population	Exposure of interest	Outcomes
(nurse* OR "nursing staff")	(overtime OR "extra hours" OR "long hours" OR "extendedshif*" OR "shift* length" OR "extended work*" OR "long shift*" OR "consecutive shift*" OR "double shift*" OR "dutyduration")	("Outcomes (HealthCare)") OR (MH "QualityofNursing Care") OR (MH"Mortality") OR (MH"Absenteeism") OR ("Fatigue") OR ("Burnout, Professional") OR ("Stress") OR ("Patient Safety") OR ("Health Care Errors") OR ("Adverse HealthCare Event") OR ("Income") OR ("Motivation") OR ("Work Engagement") OR ("Job Satisfaction") OR ("PatientSatisfaction") OR ("Occupational Diseases") OR ("NeedlestickInjuries") OR ("BackInjuries") OR "HeartInjuries") OR ("HeadInjuries") OR ("Personnel Turnover")

Table 2

Independent and Dependent Variables of Interest

Independent variables	Dependent variables
Any type of overtime: ▪ Mandatory ▪ Voluntary ▪ Paid ▪ Unpaid ▪ On Call hours ▪ Others (to be found and characterized)	Nurse outcomes: ▪ Adverse outcomes: e.g., job dissatisfaction, fatigue, burnout, stress, intention to leave, occupational injuries. ▪ Beneficial outcomes: e.g., motivation, work engagement, increase income. Patient outcomes: ▪ Adverse outcomes: e.g., mortality, medication errors, infections, missed care, poor quality of care. ▪ Beneficial outcomes: e.g., low rates of mortality and infections.

Table 3

Inclusion and Exclusion Criteria

Inclusion criteria	Exclusion criteria
▪ Published between April 2013 and May 2025 ▪ Quantitative research design ▪ Examined the association between at least one independent variable and at least one dependent variable of interest Conducted in any clinical setting ▪ Published in a peer-reviewed journal	▪ Opinion papers ▪ Letters to the editor ▪ Grey literature

Table 4

Anticipated Matrix for Data Extraction

Authors (publication year) Country (data collection years)	Aims	Study design Quality appraisal score	Data sources	Sample characteristics	Study variables			Main findings
					Independent variables	Dependent variables	Confounders	
Authors 1								
Authors 2								
Authors n								

Table 5

Associations of Overtime With Nurse Outcomes

Type of overtime	Nurse outcomes (number od studies)	Significant associations	Non-significant associations	Mixed associations
Overtime (unspecified)		Adverse outcomes		
	Adverse outcome 1			
	Adverse outcome 2			
	Adverse outcomes n			
		Beneficial outcomes		
	Beneficial outcome 1			
	Beneficial outcome 2			
	Beneficial outcome n			
Mandatory overtime		Adverse outcomes		
	Adverse outcome 1			
	Adverse outcome 2			
	Adverse outcome n			
		Beneficial outcomes		
	Beneficial outcome 1			
	Beneficial outcome 2			
	Beneficial outcome n			
Voluntary overtime		Adverse outcomes		
	Adverse outcome 1			
	Adverse outcome 2			
	Adverse outcome n			
		Beneficial outcomes		
	Beneficial outcome 1			
	Beneficial outcome 2			
	Beneficial outcome n			

Table 6

Associations of Overtime With Patient Outcomes

Type of overtime	Patient outcomes (number od studies)	Significant associations	Non-significant associations	Mixed associations
Overtime (unspecified)		Adverse outcomes		
	Adverse outcome 1			
	Adverse outcome 2			
	Adverse outcomes n			
		Beneficial outcomes		
	Beneficial outcome 1			
	Beneficial outcome 2			
	Beneficial outcome n			
Mandatory overtime		Adverse outcomes		
	Adverse outcome 1			
	Adverse outcome 2			
	Adverse outcome n			
		Beneficial outcomes		
	Beneficial outcome 1			
	Beneficial outcome 2			
	Beneficial outcome n			
Voluntary overtime		Adverse outcomes		
	Adverse outcome 1			
	Adverse outcome 2			
	Adverse outcome n			
		Beneficial outcomes		
	Beneficial outcome 1			
	Beneficial outcome 2			
	Beneficial outcome n			