The current issue and full text archive of this journal is available on Emerald Insight at:
https://www.emerald.com/insight/2059-4631.htm

Received 24 November 2022
Revised 12 December 2022
Accepted 14 December 2022

The effect of full-time culture on quality and safety of care – a literature review

Malin Rosell Magerøy and Siri Wiig
Faculty of Health Science, SHARE- Centre for Resilience in Healthcare, University of Stavanger, Stavanger, Norway

Abstract

Purpose – The purpose of this study is to increase knowledge and understanding of the relationship between full-time-culture and the outcome for quality and safety of care.

Design/methodology/approach – The paper is a literature review with a qualitatively oriented thematic analysis concerning quality or safety outcomes for patients, or patients and staff when introducing a full-time culture.

Findings – Identified factors that could have a positive or negative impact on quality and patient safety when introducing full-time culture were length of shift, fatigue/burnout, autonomy/empowerment and system/structure. Working shifts over 12 h or more than 40 h a week is associated with increased adverse events and errors, lower quality patient care, less attention to safety concerns and more care left undone. Long shifts give healthcare personnel more flexibility and better quality-time off, but there is also an association between long shifts and fatigue or burnout. Having a choice and flexibility around shift patterns is a predictor of increased wellbeing and health.

Originality/value – A major challenge across healthcare services is having enough qualified personnel to handle the increasing number of patients. One of the measures to get enough qualified personnel for the expected tasks is to increase the number of full-time employees and move towards a full-time culture. It is argued that full-time culture will have a positive effect on work environment, efficiency and quality due to a better allocation of work tasks, predictable work schedule, reduced sick leave, and continuity in treatment and care. There is limited research on how the introduction of full-time culture will affect the quality and safety for patients and staff, and few studies have been focusing on the relationship between longer shift, work schedule, and quality and safety of care.

Keywords Full-time culture, Work hours, Long shift, Patient safety, Quality of care

Paper type Literature review

Introduction

The healthcare service is facing several challenges in the years to come. One of these major challenges is having enough qualified personnel to handle the number of patients, and the complexity of treatment and care (Jha *et al.*, 2010; Regjeringen, 2021). Lack of qualified staffing may be due to low basic staffing in general, difficulties in recruiting and keeping qualified personnel, but also that no substitutes are appointed in the event of sick leave (Ose and Busch, 2020). Temporary staff, use of unqualified substitutes, turnover and reorganizations lead to organizational instability that can cause production pressures, increased stress and risk of patient harm (Eklof *et al.*, 2014; Jha *et al.*, 2010). Traditionally human error is blamed for accidents or malpractice, but in recent years awareness of the organizational and structural factors, including work environment, qualified and adequate staffing, organizational structure, workload and shift patterns has increased (Vincent *et al.*, 2000; Reason, 1997;

International Journal of Health Governance
Vol. 28 No. 1, 2023
pp. 68-81
Emerald Publishing Limited
2059-4631
DOI 10.1108/IJHG-11-2022-0106

© Malin Rosell Magerøy and Siri Wiig. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at http://creativecommons.org/licences/by/4.0/legalcode

Vincent and Amalberti, 2016; Jha *et al.*, 2010; Gurses *et al.*, 2012). Perspective reports state that the number of elderly people in need of healthcare in primary care – at home or in nursing homes is increasing, at the same time as there will be a shortage of healthcare personnel (Gautun, 2020; Regjeringen, 2021; Vincent and Amalberti, 2016). Primary care is here understood as a whole-of-society approach that includes health promotion, disease prevention, treatment, rehabilitation and palliative care in the community (WHO, 2018).

Studies show that employees often work part time in primary care. For example, only 26% had a full-time position, while 74% worked part time in a Norwegian report from 2018 (Moland and Bråthen, 2019). One of the measures to get enough qualified personnel for the expected tasks in the future is to increase the number of full-time employees in primary healthcare (KS, 2018; Moland and Bråthen, 2019). Full-time position as a norm instead of part-time employees is referred to as a full-time culture. Having many part-time employees in the healthcare service have covered the need for staff on weekends. By increasing the position sizes, with the existing rotation schemes, there will consequently be a great shortage of qualified personnel on weekends. To solve this challenge, one must look at the rotation schemes and how they are organized. A result of this could be that employees must work weekends more frequently, or that they must work longer shifts on weekends, so-called long shift (KS, 2018). Long work hours are defined as shifts with more than 8 h of work, or more than 40 h of work a week (Caruso *et al.*, 2019).

It is argued that full-time culture will have a positive effect on work environment, efficiency and quality due to a better allocation of work tasks, predictable work schedule, reduced sick leave, and continuity in treatment and care (Moland and Bråthen, 2019). However, safety, for patients or staff, is not mentioned as a factor or outcome in full-time culture. Few studies have been focusing on the relationship between longer shift, work schedule, and quality and safety of care (Griffiths *et al.*, 2014; Bae, 2021). It is argued that long-shift is preferred by leaders and employees since it requires fewer overlaps between shifts, which is cost-effective, gives patients fewer employees to relate to, provides increased continuity and compresses work to fewer days (Ose and Busch, 2020). A cross-sectional study from 12 European countries concluded that longer working hours was associated with negative consequences for nurses, and that some of these consequences, such as high degree of fatigue, could pose safety risks for both patients and staff (Dall'ora *et al.*, 2015). Several studies also indicate that the risk of accidents and adverse events increases with the length of the shift (Wagstaff and Lie, 2011; Scott *et al.*, 2006; Jha *et al.*, 2010), but the evidence is inconclusive, since employees have different resistance, endurance and preferences, and are at different stages in life. Also, the knowledge status from the primary healthcare is largely missing in this area and needs particular attention as more patients are supposed to be treated in the community.

Purpose of the study

The purpose of this study was to increase knowledge and understanding of the relationship between full-time culture and the outcome for quality and safety of care. The study aimed to answer the following research question:

RQ1. Does the introduction of full-time culture have a positive or negative impact on quality and patient safety in the primary healthcare service?

Method

The study was conducted as a literature review with a thematic analysis following Braun & Clarkes' 6-phase guide (Braun and Clarke, 2006). The review was reported using the PRISMA 2020 flow diagram (Figure 1).

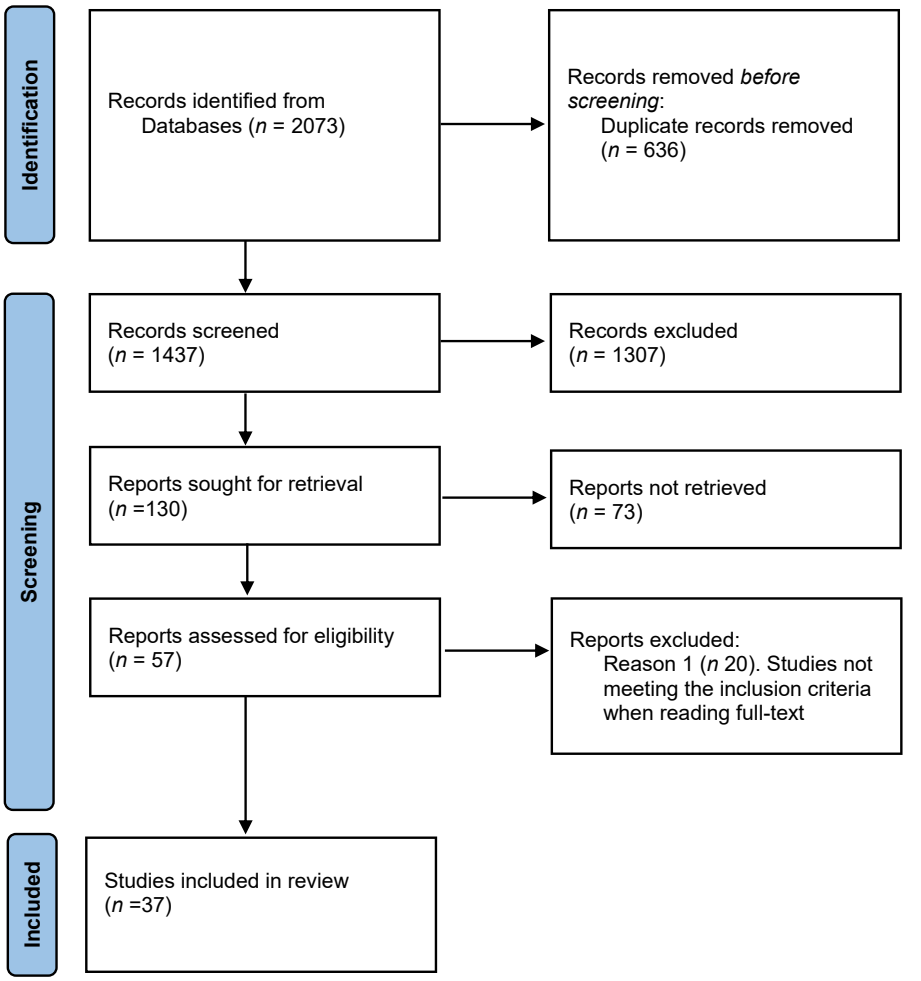

Figure 1.
The PRISMA 2020 flow diagram of article selection process

Inclusion and exclusion criteria

To be included in this review, articles had to be written in English or a Scandinavian language and be published after 2010. The articles had to be about quality or safety outcomes for patients, or patients *and* staff, or factors that could affect the outcome of full-time culture. The literature search identified several studies conducted in hospitals and fewer studies in the primary healthcare service. Studies that examined nursing staff in hospitals were included as they were considered to have transfer value to the healthcare personnel in primary care which is mainly preoccupied with nurses and healthcare assistants. Review studies were included.

Studies were excluded when written in another language than English or Scandinavian or published before 2010. They were also excluded if their focus was about outcome for employees only. Studies about dentists, residents, general practitioners and doctors in hospital were excluded. Studies that focused only on nightshift and sleep patterns were also excluded.

Identification of studies

A systematic literature search was conducted searching following databases; Cinahl, Academic search premiere, Medline, Scopus and SveMed+. The search was conducted in January 2022. The terms used when searching the databases was "full-time culture" and "quality and patient safety". A PICO form was used to systematize the search. See Table 1 for included search words. The search was also conducted in Norwegian language. Search words that disclosed "full-time culture" were combined with terms disclosing "quality and patient safety" in a systematic manner which included all possible combination of these words. See appendix 1 for the search strategy.

Selection of studies

The database search identified 2073 records. Of the 1,437 records screened, 1,307 were excluded. The remaining 130 articles were read and evaluated in full text. Following the full text evaluation, 37 articles were finally included based on the inclusion and exclusion criteria as depicted in Figure 1.

Table 2 shows an overview over the included studies, their methods, settings and main focus areas.

Analysis

The result of the included studies was analysed through thematic analysis. Thematic analysis is suitable to identify, analyse and report patterns or themes within the data. Thematic analysis involves searching across a data set to find repeated patterns of meaning (Braun and Clarke, 2006). We used Braun and Clarke (2006) six-phase guide to thematic analysis: 1. reading the articles, 2. generating initial codes, 3. searching for main themes, 4. reviewing themes, 5. defining and naming themes, 6. Producing the report. The analysis resulted in four themes reported below.

Results

This literature study presents findings that could have a positive or negative impact on quality and patient safety when full-time culture amongst healthcare workers is considered. 37 studies were included and from these studies four main themes were identified. 24 of the included studies involved the length of shifts for healthcare personnel, 11 of the included studies involved the theme fatigue/burnout, five of the included studies involved the theme autonomy/empowerment, 15 of the included studies involved the theme system/structure. Since some of the articles included more than one topic, the sum of articles in the various themes is greater than the total number of articles included in this study. The included studies are from Europe, USA, Australia, New Zealand, Canada and developed countries in Asia.

P – Person/Problem	I – Intervention	C – Comparison	O – Outcome
Full-time culture	Long shift		Patient safety
Part-time positions	Long working hour		Patient injury
Full-time positions	Position size		Quality of care
Healthcare professionals	Weekend work		Patient harm
Healthcare personnel	Rotation schemes		Malpractice
Primary healthcare	Work schedule		Adverse events
	Shiftwork		Adverse patient outcome

Table 1.
Pico framework

Author	Method	Setting	Main focus
Nejati *et al.* (2016)	Literature review	Across all healthcare settings	Interventions related to staff restorative breaks and healthcare outcomes
Stimpfel and Aiken (2013)	Secondary analysis	Acute care hospitals	Hospital staff nurses shift length, scheduling characteristics and reported safety and quality
Andre *et al.* (2014)	Review	Nursing homes	Identify factors that characterize the relationships between work culture and quality of care
Kupperschmidt (2018)	Literature review	Nurses in all settings	Impact of 12-h shift on nurse's health and wellbeing
Smith-Miller *et al.* (2016)	Mixed method	Hospital wards	Identify barriers and facilitators in implementing a fatigue management plan. Explore the effects of fatigue management intervention on nursing staff
Dall'ora *et al.* (2015)	Cross-sectional survey	Hospital wards	The association between long shifts and burnout, job dissatisfaction and intention to leave current job
Dall'ora *et al.* (2016)	Scoping review	All sectors including healthcare	Identify the characteristics that have effect on performance and wellbeing
Dall'ora *et al.* (2019)	Retrospective observational study	Hospital wards	Association between nurses working shifts of at least 12 h and an objective measure of missed care
Dall'ora *et al.* (2020a, b)	Theoretical review	Across all healthcare settings	Association between burnout and work-related factors
Olds and Clarke (2010)	Survey	Nurses in all settings	Relationship between nurses extended work duration with adverse events and errors
Martin (2015)	Mixed method	Acute care hospitals	How working 8-h shift compared to 12-h shift affect fatigue
Alshammari *et al.* (2021)	Descriptive study	Hospital wards	Investigate the perceptions of nurses regarding system risk factors
Blasche *et al.* (2017)	Survey	Nursing homes	Examining recovery from 12-h shift
Lu *et al.* (2019)	Literature review	Acute care hospitals	Identify knowledge of the job satisfaction of nurses working in acute care hospitals
Ball *et al.* (2017)	Cross-sectional survey	Hospital wards	Association between shift length and nurse self-reported measures
Taylor *et al.* (2012)	Cross-sectional longitudinal study	Hospital wards	The association of safety climate and specific nurse working conditions with injury outcomes for nurses and patients
Clendon and Gibbons (2015)	Systematic review	Acute care hospitals	Effect of working 12 h or more on a shift
Westley *et al.* (2020)	Retrospective study	Across all healthcare settings	Impact of nurse's work hours on near-miss medication error
Hurst and Smith (2011)	Mixed methods	Hospital wards	Compare temporary and permanent staff work activity, cost and quality of care
Han *et al.* (2014)	Survey	Hospital wards	Association between work and non-work fatigue-producing factors and self-reported fatigue and intershift recovery when working 12-h shifts

Table 2.
Overview over included studies

(*continued*)

Author	Method	Setting	Main focus
Han *et al.* (2015)	Cross-sectional secondary data analysis	Nurses in all settings	Relationships of nine work environment factors with nurse's job satisfaction and intent to leave their job
Barker and Nussbaum (2011)	Cross sectional survey	Across all healthcare settings	Investigate the relationship between perceived fatigue and perceived performance across demographic and work environment variables
Thomson *et al.* (2017)	Qualitative (interviews)	Across all healthcare settings	Explore unregistered healthcare staff's perceptions of 12-h shifts on work performance and patient care
Estryn-Béhar and Van der Heijden (2012)	Survey	Across all healthcare settings	Determine the effect of work schedule on work/family balance, health, and safety
Farid *et al.* (2020)	System dynamics modelling	Acute care hospital	Demonstrate how system dynamics modelling can be used as a tool to understand the effect of nursing workload on burnout, absenteeism, and medical errors
Di Muzio *et al.* (2019)	Systematic review	Hospital/ inpatient setting	Correlation between the clinical risk management and the occurrence of medication errors and effects of shift work
Jarrar *et al.* (2019)	Cross sectional survey	Hospital wards	Investigate the effect of shift length and patient- centred care on perceived quality and safety of nurses
Ejebu *et al.* (2021)	Scoping review	Nurses in all settings	Nurses' experiences around shift patterns in the international literature
Griffiths *et al.* (2014)	Cross-sectional survey	Hospital wards	Shift patterns and nurse-reported care quality, safety and care left undone
Harris *et al.* (2015)	Scoping review	Across all healthcare settings	Extent, range and nature of evidence around the impact of 12-h shift patterns
Hayashi *et al.* (2020)	Cross-sectional survey	Hospital wards	Relationship between patient safety culture and working environment
Hinno *et al.* (2012)	Cross-sectional survey	Hospital wards	Relationship between registered nurses' evaluations of their working environment and nurse-reported outcome
Bae and Fabry (2014)	Literature review	Across all healthcare settings	Evaluate the effect of nurse overtime and long work hours on nurse and patient outcomes
Bae (2021)	Systematic review	Across all healthcare settings	Nurse work schedule and patient outcomes
Bernstrøm *et al.* (2019)	Literature review	Across all healthcare settings	Investigate if employee health explains the relationships between working time arrangements and patient safety
Yinghui *et al.* (2013)	Cross-national survey	Hospital wards	The impact of long working hours on patient safety culture in countries with different cultural background
Keys (2020)	Delphi study	Acute care	Nurse leaders' perspectives regarding strategies to mitigate the job demands of 12-h shift work

Table 2.

Our review will therefore be most relevant to these areas, or healthcare systems with similar characteristics of their context.

Length of shifts

Historically, shift patterns were based on three 8-hours shifts per day, but over the past 20 years there has been a tendency to move towards 12 h shift several places in the world (Ball *et al.*, 2017; Harris *et al.*, 2015). Some studies show a link between long shifts and negative outcomes for staff and patients, while others point out that there also are positive factors in introducing long shifts, such as continuity of care and fewer handovers (Ejebu *et al.*, 2021; Thompson *et al.*, 2017). Working shift over 12 h or more than 40 h a week is associated with increased adverse events and errors (Olds and Clarke, 2010; Dall'ora *et al.*, 2016; Bae, 2021). Self-reported data from nursing staff shows that extended shift patterns may have adverse implications for the quality and safety of care (Harris *et al.*, 2015). Work periods over 8 h carry an increased risk of adverse events that cumulates, so that the increased risk of accidents after 12 h is twice the risk after 8 h (Estryn-Béhar and Van der Heijden, 2012; Wagstaff and Lie, 2011). The risk of adverse events is three times higher when nurses are working shifts lasting of 12.5 h or more or when working weeks over 40 h (Bae and Fabry, 2014; Clendon and Gibbons, 2015; Barker and Nussbaum, 2011). Nurses working 12-h shifts report lower quality patient care, less attention to safety concerns and more care left undone (Kupperschmidt, 2018; Ball *et al.*, 2017; Griffiths *et al.*, 2014). More than 40 h of weekly shift work may have a negative impact on employees' performance and job satisfaction and may also lead to increased fatigue and adverse events and errors (Dall'ora *et al.*, 2016; Di Muzio *et al.*, 2019). Long shifts affect nurses' wellbeing, job satisfaction and intention to leave their job, and studies have shown that longer working hours are associated with adverse outcomes for nurses, such as burnout, which may pose a safety risk for patients (Dall'ora *et al.*, 2015; Kupperschmidt, 2018; Estryn-Béhar and Van der Heijden, 2012; Westley *et al.*, 2020). It is more likely that working shifts over 12 h leads to burnout, than working shifts of 8 h and shorter. Nurses working shifts of 12 h were more likely to experience job dissatisfaction and wanted to leave their job (Dall'ora *et al.*, 2015; Kupperschmidt, 2018; Ball *et al.*, 2017). Sufficient days off between long shifts, regular breaks during the shift and working with familiar patients may mitigate some of the negative impacts on 12-h shifts (Harris *et al.*, 2015; Keys, 2020; Ejebu *et al.*, 2021).

Some studies show that healthcare personnel are satisfied with working long shift as it gives them more flexibility in daily life, better quality time off, and improved understanding and relationships with patients (Clendon and Gibbons, 2015; Estryn-Béhar and Van der Heijden, 2012; Ball *et al.*, 2017; Keys, 2020; Ejebu *et al.*, 2021; Thompson *et al.*, 2017). Nurses working long shifts do not think that the shift length affect patient care (Ejebu *et al.*, 2021), and age seems to have an impact on the experience of working long shift, as older nurses find it more difficult to keep up with the physical demands of a 12-h shift than their younger colleagues (Keys, 2020).

Fatigue and burnout

Burnout among healthcare personnel is not only contributing to a shortage of qualified personnel but also poses a risk to quality and safety of care (Farid *et al.*, 2020). There are conclusive results regarding the association between long shifts and burnout, and that shifts lasting over 8 h increases fatigue and impair performance (Kupperschmidt, 2018; Dall'ora *et al.*, 2020a, b; Barker and Nussbaum, 2011; Han *et al.*, 2014: Estryn-Béhar and Van der Heijden, 2012; Jarrar *et al.*, 2019; Nejati *et al.*, 2016). Nurses experience burnout are more likely to leave their job (Ejebu *et al.*, 2021). Schedule flexibility could have a potential protective effect for burnout and fatigue, as well as worker involvement in schedule selection, shift lengths, timely breaks and rotation patterns (Barker and Nussbaum, 2011; Dall'ora *et al.*, 2016,

2020b). Low or inadequate nurse staffing levels are seen as a predictor of burnout (Dall'ora *et al.*, 2020a, b; Nejati *et al.*, 2016). Burnout is correlated with negative safety climate, lower quality of care and a higher rate of adverse events, and there is evidence that fatigue associated with extended work schedule is related to adverse events and errors in patients and healthcare workers (Olds and Clarke, 2010; Dall'ora *et al.*, 2020a, b). Fatigue has a negative effect on healthcare workers health and wellbeing, it decreases patient safety, and has a negative impact on work environment and institutional outcomes (Smith-Miller *et al.*, 2016; Martin, 2015; Nejati *et al.*, 2016).

Autonomy and empowerment

Improving employees participating in decision-making and increasing empowerment and influence seem to be important factors to improve quality of care by focusing on leadership style and supportive management (Andre *et al.*, 2014). Nurses in Han *et al.*' (2015) study reported significantly higher psychological demands, lower autonomy, and lack of support from colleagues and leaders. They also reported working longer hours with inadequate breaks or sick days. Influence over schedule can reduce some of the negative outcome of working long shift, and workplace empowerment is related to a higher quality of care and reduces patient risk (Andre *et al.*, 2014; Dempsey and Reilly, 2016). Ejebu *et al.* (2021) found that nurses tend to prefer shift patterns when they were involved in designing those patterns, or when changes had been adopted based on their requests. Having choice and flexibility around shift patterns is a predictor of increased wellbeing and health (Ejebu *et al.*, 2021; Thompson *et al.*, 2017).

System and structure

System and structure in this study refers to human factors and work-related factors such as work environment, culture, engagement, turnover and leadership.

There has been an increasing attention to the impact of organizational safety climate and working conditions on healthcare outcomes. Safety climate is associated with both patient and nurse injuries, and increased turnover should be considered a risk factor for nurse and patient injuries, not merely as an organizational outcome (Taylor *et al.*, 2012; Dall'ora *et al.*, 2020a, b). A positive patient safety culture is one of the most critical components that could improve quality and safety in healthcare (Yinghui *et al.*, 2013). Long working hours, numerous night shifts and few days off are associated with low patient safety culture (Hayashi *et al.*, 2020).

Several studies found that there is a relationship between work organization variables and outcomes, such as quality of care, patient safety, turnover, sickness absence and job dissatisfaction (Dall'ora *et al.*, 2020a, b; Di Muzio *et al.*, 2019; Hinno *et al.*, 2012). According to Alshammari *et al.* (2021) adverse events that threaten patient safety are linked to several factors, including system risk factors and human factors. They found that shortage of medical staff and long working hours were two factors that affected the outcome of patient safety (Alshammari *et al.*, 2021) and shortage of staff is often solved by using temporary staff. Temporary staff is less familiar with ward policy and procedures and will thus potentially affect the quality of care provided (Hurst and Smith, 2011).

Work engagement and satisfaction correlates directly with critical safety, quality and patient experience outcomes (Dempsey and Reilly, 2016). A low level of satisfaction and engagement in a workplace can be expressed through reduced productivity, higher sick leave and poorer work performance. This can lead to a higher degree of turnover and poorer safety and quality of care (Dempsey and Reilly, 2016; Lu *et al.*, 2019). Those working long shifts are likely to report lower quality of care and job satisfaction and higher levels of burnout, as well as having a higher rate of sickness absence (Ejebu *et al.*, 2021; Han *et al.*, 2015).

Discussion

The growing number of elderly persons is expected to continue and accelerate in the years to come and there is an increasing risk of lack of qualified personnel (Andre *et al.*, 2014; Caruso *et al.*, 2019). Our review investigated the impact of long shifts on quality and safety for both healthcare personnel and patients (Westley *et al.*, 2020; Nejati *et al.*, 2016). Some studies show that healthcare personnel are satisfied with working 12 h shifts, as it gives them fewer working days, more time off and reducing travel time and costs, while others are concerned about the perceived adverse effect on safety and performance, and describe the 12 h shift as exhausting (Ball *et al.*, 2017). Even if the healthcare personnel find working fewer days more appealing for their work–life balance, this shift pattern may lead to stress, fatigue and burnout, and in the end reduced quality and patient safety due to errors and adverse events (Clendon and Gibbons, 2015). Most healthcare personnel did not conceptualize work-related fatigue as a patient safety issue, which makes this a leadership and organizational responsibility when creating rotation schemes. Nurses working long shift are more likely to experience burnout and report intention to leave their job then nurses working 8-h shift (Ejebu *et al.*, 2021). An important reason for introducing full-time culture by using long shift is having enough qualified personnel on all shifts – even in the weekends (KS, 2018). If working long shifts lead to fatigue, burnout and turnover, this way of organizing work schedule cannot be compatible with the desire of continuity in treatment and care and retain competence. Our review identifies some mitigating factors to long shift, such as involvement when the rotation scheme is created, that can reduce negative outcome regarding fatigue, performance and adverse events (Barker and Nussbaum, 2011). This requires that the leaders who make the rotation schemes are aware of these factors, and that the organization creates a culture of involving employees in matters that concerns them.

From an employer's perspective, changing from 3 to 2 shifts per day reduces periods of shift overlaps and the number of handovers, thus reducing costs, increase productivity and efficiency (Griffiths *et al.*, 2014). For patients, reducing shift overlaps and number of handovers may have beneficial effects, as these are associated with discontinuity, adverse events and more people to relate to. Shortage of staff is usually solved by using substitutes or temporary staff. Temporary staff lacks knowledge of the patient's needs, work tasks and routines compared to the permanent workforce (Hurst and Smith, 2011). Introducing full-time culture with long shift implies less vacancy in the rotation schemes, which will give more continuity and predictability for both patients and staff. Some studies suggest that healthcare personnel need to slow down the pace during long shifts to maintain enough energy until the end of the shift (Keys, 2020). This seems to apply especially to older employees than the younger ones. Thus, this may indicate that the productivity of healthcare personnel when working 12-h shifts may be lower, potentially counteracting the expected efficiency savings (Dall'ora *et al.*, 2019). It is conclusive evidence that long shift could lead to fatigue, errors and reduced quality of care, and several studies warn against introducing 12-h shift or more than 40-h week (Bae, 2021; Dall'ora *et al.*, 2016). The regulation on working hours is different in the various countries, but knowledge about the outcome of safety appears relevant for other settings and areas.

A recommended strategy to mitigate some of the demands of long shift is regular breaks and well-adapted break spaces. This is important for maintaining a sound work environment and should be integrated in organizational policy (Keys, 2020). This is a leader- and organizational responsibility, and it shows that to maintain good solutions and outcome for both employees and patients, one must look at the system. This is in line with the human factors literature arguing that one must focus on both process and outcome, where the different components interact with each other and give different outcomes as result, depending on conditions and terms (Carayon *et al.*, 2006). Several of the included studies were about structure or system and indicated that focus had been changed from individuals to

organizational factors regarding safety and quality of care over the last years. This illustrates the importance of understanding work hours in a holistic perspective including work system, tasks, technology and tools in the healthcare system to understand how this relates to service quality and safety.

Traditionally, occupational, and patient safety have been addressed separately, but seeing them as related components of an organization's safety effort would give a better holistic understanding (Taylor *et al.*, 2012).

Limitations

This study has some limitations. It was conducted with a time limit of studies after 2010, this could have omitted studies of relevance prior to this. Moreover, doctors were excluded, and this could have resulted in relevant studies among a group of healthcare professionals used to work long hours. However, excluding this group was done as the effect on full-time culture is a hot topic currently in nursing and healthcare worker positions, and the effect on these groups was therefore sought, with a particular focus of including studies from the primary healthcare. We did not review working hours legislation in the countries in the included studies. This could potentially have added information to our understanding of the results; however, this was beyond the scope of this review. We searched five databases and additional databases could potentially added more relevant studies.

Conclusion

Multiple factors could influence the outcome when wanting to introduce the concept of full-time culture in healthcare. This study shows that a policy of moving to longer shift, to reduce overall workforce requirements, could lead to unintended consequences and reduce the efficiency and effectiveness of the workforce in delivering high quality and safe care. When and if introducing a full-time culture, leaders must be aware of the increased job demands this cause for healthcare personnel, the possible negative impact on the employee's health and engagement, and the possible negative outcome on quality and safety of care. Healthcare leaders can mitigate some of the strain on employees by focusing on enough staffing, so that the employees can take uninterrupted brakes, have quiet brake areas and can work with familiar patients.

Based on our results, leaders should create an organizational culture that supports job resources, e.g. job control, supervisor support and feedback, to mitigate job demands. Positive outcomes for patients and staff can be achieved if the employees are empowered with control and influence over shift patterns, having a supportive team climate, and sufficient staffing levels. Having the opportunity and organizational guidelines of adjusting rotating schemes to the individual employee and their wishes and needs, could make the outcome of long shifts more successful. Considering that employees in different phases of life have different needs and wishes, a life phase policy can give the organization, employees and patients the desired results of introducing a full-time culture. This means fewer overlaps between shifts, cost-effectiveness, fewer employees to relate to for patients, increased continuity and compressed workdays for staff. If deciding to introduce long shift to implement full-time culture, the review showed that the workhours should not exceed 12 h per shift or 40 h per week, and the employees should be involved in designing the rotation scheme.

Employers have a large responsibility to prevent fatigue and burnout amongst staff, with the fatal consequences it could have for the patient safety and quality of care. The need for human factors and system thinking (e.g. Carayon *et al.*), knowing that the processes and structures will affect the outcome, is important take away knowledge from our investigation of introducing full-time culture.

References

Alshammari, F., Alshammari, H.F., Alsaedi, B., Zreiq, R. and Algahtan, F.D. (2021), "Data on healthcare perceptions about system risk factors associated with patient safety from the Ministry of Health hospitals in Hail Region of Saudi Arabia", *Bioinformation*, Vol. 17, pp. 274-282.

Andre, B., Sjövold, E., Rannestad, T. and Ringdal, G.I. (2014), "The impact of work culture on quality of care in nursing homes - a review study", *Scandinavian Journal of Caring Sciences*, Vol. 28, pp. 449-457.

Bae, S.H. (2021), "Relationships between comprehensive characteristics of nurse work schedules and adverse patient outcomes: a systematic literature review", *Journal of Clinical Nursing*, Vol. 30, pp. 2202-2221.

Bae, S.-H. and Fabry, D. (2014), "Assessing the relationships between nurse work hours/overtime and nurse and patient outcomes: systematic literature review", *Nursing Outlook*, Vol. 62, pp. 138-156.

Ball, J., Day, T., Murrells, T., Dall'ora, C., rafferty, A.M., Griffiths, P. and Maben, J. (2017), "Cross-sectional examination of the association between shift length and hospital nurses job satisfaction and nurse reported quality measures", *BMC Nursing*, Vol. 16, pp. 1-7.

Barker, L.M. and Nussbaum, M.A. (2011), "Fatigue, performance and the work environment: a survey of registered nurses", *Journal of Advanced Nursing*, John Wiley & Sons, Vol. 67, pp. 1370-1382.

Bernstrøm, V.H., Alves, D.E., Ellingsen, D. and Ingelsrud, M.H. (2019), "Healthy working time arrangements for healthcare personnel and patients: a systematic literature review", *BMC Health Services Research*, Vol. 19, 193, doi: 10.1186/s12913-019-3993-5.

Blasche, G., Bauböck, V.-M. and Haluza, D. (2017), "Work-related self-assessed fatigue and recovery among nurses", *International Archives of Occupational and Environmental Health*, Vol. 90, pp. 197-205.

Braun, V. and Clarke, V. (2006), "Using thematic analysis in psychology", *Qualitative Research in Psychology*, Vol. 3, pp. 77-101.

Carayon, P., Schoofs Hundt, A., Karsh, B.T., Gurses, A.P., Alvarado, C.J., Smith, M. and Flatley Brennan, P. (2006), "Work system design for patient safety: the SEIPS model", *Quality and Safety Health Care*, Vol. 15, pp. i50-i58.

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. and Tucker, S. (2019), "Policy brief: nurse fatigue, sleep, and health, and ensuring patient and public safety", *Nursing Outlook*, Vol. 67, pp. 615-619.

Clendon, J. and Gibbons, V. (2015), "12 h shifts and rates of error among nurses: a systematic review", *International Journal of Nursing Studies*, Vol. 52, pp. 1231-1242.

Dall'ora, C., Griffiths, P., Ball, J., Simon, M. and Aiken, L.H. (2015), "Association of 12 h shifts and nurses' job satisfaction, burnout and intention to leave: findings from a cross-sectional study of 12 European countries", *BMJ Open*, Vol. 5, e008331.

Dall'ora, C., Griffiths, P., Redfern, O., Recio-Saucedo, A., Meredith, P. and Ball, J. (2019), "Nurses' 12-hour shifts and missed or delayed vital signs observations on hospital wards: retrospective observational study", *BMJ Open*, Vol. 9 No. 1, e024778, doi: 10.1136/bmjopen-2018-024778.

Dall'ora, C., Ball, J., Reinius, M. and Griffiths, P. (2020a), "Burnout in nursing: a theoretical review", *Human Resources for Health*, Vol. 18, pp. 1-17.

Dall'ora, C., Griffiths, P., Emmanuel, T., Rafferty, A.M., Ewings, S., Sermeus, W., Van den Heede, K., Bruyneel, L., Lesaffre, E., Aiken, L., Smith, H., Sloane, D., Marie Rafferty, A., Jones, S., Ball, J., Kinnunen, J., Ensio, A., Jylhä, V., Busse, R. and Zander, B. (2020b), "12-hr shifts in nursing: do they remove unproductive time and information loss or do they reduce education and discussion opportunities for nurses? A cross-sectional study in 12 European countries", *Journal of Clinical Nursing*, John Wiley & Sons. Vol. 29, pp. 53-59.

Dall'ora, C., Ball, J., Recio-Saucedo, A. and Griffiths, P. (2016), "Characteristics of shift work and their impact on employee performance and wellbeing: a literature review", *International Journal of Nursing Studies*, Vol. 57, pp. 12-27.

Dempsey, C. and Reilly, B.A. (2016), "Nurse engagement: what are the contributing factors for success?", *Online Journal of Issues in Nursing*, Vol. 21, p. 8.

Di Muzio, M., Dionisi, S., Di Simone, E., Cianfrocca, C., Muzio, F.D.I., Fabbian, F., Barbiero, G., Tartaglini, D. and Giannetta, N. (2019), "Can nurses' shift work jeopardize the patient safety? A systematic review", *European Review for Medical and Pharmacological Sciences*, Vol. 23, pp. 4507-4519.

Ejebu, O.-Z., Dall'ora, C. and Griffiths, P. (2021), "Nurses' experiences and preferences around shift patterns: a scoping review", *PloS One*, Vol. 16, e0256300.

Eklof, M., Torner, M. and Pousette, A. (2014), "Organizational and social-psychological conditions in healthcare and their importance for patient and staff safety. A critical incident study among doctors and nurses", *Safety Science*, Vol. 70, pp. 211-221.

Estryn-Béhar, M. and Van der Heijden, B.I.J.M. (2012), "Effects of extended work shifts on employee fatigue, health, satisfaction, work/family balance, and patient safety", *Work*, Vol. 41, pp. 4283-4290.

Farid, M., Purdy, N. and Neumann, W.P. (2020), "Using system dynamics modelling to show the effect of nurse workload on nurses' health and quality of care", *Ergonomics*, Vol. 63, pp. 952-964.

Gautun, H. (2020), En utvikling som må snus- Bemanning og kompetanse i sykehjem og hjemmesykepleien, NOVA rapport 14/20.

Griffiths, P., Dall'ora, C., Simon, M., Ball, J., Lindqvist, R., Rafferty, A.M., Schoonhoven, L., Tishelman, C., Aiken, L.H., Sermeus, W., Van den Heede, K., Bruyneel, L., Lesaffre, E., Diya, L., Smith, H., Sloane, D., Jones, S., Kinnunen, J., Ensio, A., Jylhä, V., Busse, R., Zander, B., Blümel, M., Mantas, J., Zikos, D., Diomidous, M., Scott, A., Matthews, A., Staines, A., Holter, I.M., Sjetne, I.S., Brzostek, T., Kózka, M., Brzyski, P., Moreno-Casbas, T., Fuentelsaz-Gallego, C., Gonzalez-María, E., Gomez-Garcia, T., Alenius, L.S., De Geest, S., Schubert, M., Schwendimann, R., Heinen, M. and Van Achterberg, T. (2014), "Nurses' shift length and overtime working in 12 European countries: the association with perceived quality of care and patient safety", *Medical Care*, Vol. 52, pp. 975-981.

Gurses, A.P., Ozok, A.A. and Pronovost, P.J. (2012), "Time to accelerate integration of human factors and ergonomics in patient safety: Table 1", *BMJ Quality and Safety*, Vol. 21, pp. 347-351.

Han, K., Trinkoff, A.M. and Geiger-Brown, J. (2014), "Factors associated with work-related fatigue and recovery in hospital nurses working 12-hour shifts", *Workplace Health and Safety*, Vol. 62, pp. 409-414.

Han, K., Trinkoff, A.M. and Gurses, A.P. (2015), "Work-related factors, job satisfaction and intent to leave the current job among United States nurses", *Journal of Clinical Nursing*, Vol. 24, pp. 3224-3232.

Harris, R., Sims, S., Parr, J. and Davies, N. (2015), "Impact of 12h shift patterns in nursing: a scoping review", *International Journal of Nursing Studies*, Vol. 52, pp. 605-634.

Hayashi, R., Fujita, S., Iida, S., Nagai, Y., Shimamori, Y. and Hasegawa, T. (2020), "Relationship of patient safety culture with factors influencing working environment such as working hours, the number of night shifts, and the number of days off among healthcare workers in Japan: a cross-sectional study", *BMC Health Services Research*, Vol. 20, p. 310.

Hinno, S., Partanen, P. and Vehviläinen-Julkunen, K. (2012), "The professional nursing practice environment and nurse-reported job outcomes in two European countries: a survey of nurses in Finland and The Netherlands", *Scandinavian Journal of Caring Sciences*, Vol. 26, pp. 133-143.

Hurst, K. and Smith, A. (2011), "Temporary nursing staff - cost and quality issues", *Journal of Advanced Nursing*, Vol. 67, pp. 287-296.

Jarrar, M.T., Minai, M.S., Al-Bsheish, M., Meri, A., Jaber, M. and Al-Bsheish, M. (2019), "Hospital nurse shift length, patient-centered care, and the perceived quality and patient safety", *International Journal of Health Planning and Management*, Vol. 34, pp. e387-e396.

Jha, A.K., Prasopa-Plaizier, N., Larizgoitia, I. and Bates, D.W. (2010), "Patient safety research: an overview of the global evidence", *Quality and Safety in Health Care*, Vol. 19, pp. 42-47.

Keys, Y. (2020), "Mitigating the adverse effects of 12-hour shifts: nursing leaders' perspectives", *JONA: The Journal of Nursing Administration*, Vol. 50, pp. 539-545.

KS (2018), "Sentraledokumenter", available at: https://www.ks.no/fagomrader/arbeidsgiverpolitikk/partssamarbeid-om-heltid/sentrale-dokumenter/.

Kupperschmidt, B. (2018), "12 hours shifts: literature reviewed, wise use challenged", *Journal of Christian Nursing*, Vol. 35, pp. 26-32.

Lu, H., Zhao, Y. and While, A. (2019), "Job satisfaction among hospital nurses: a literature review", *International Journal of Nursing Studies*, Vol. 94, pp. 21-31.

Martin, D.M. (2015), "Nurse fatigue and shift length: a pilot study", *Nursing Economic$*, Vol. 33, pp. 81-87.

Moland, L.E. and Bråthen, K. (2019), "En ny vei mot heltidskultur- resultater fra forprosjektering i åtte kommuner og en landsdekkende undersøkelse", FAFO- rapport 2019:15.

Nejati, A., Shepley, M. and Rodiek, S. (2016), "A review of design and policy interventions to promote nurses' restorative breaks in health care workplaces", *Workplace Health and Safety*, Vol. 64, pp. 70-77.

Olds, D.M. and Clarke, S.P. (2010), "The effect of work hours on adverse events and errors in health care", *Journal of Safety Research*, Vol. 41, pp. 153-162.

Ose, S.O. and Busch, H.J. (2020), *HMS i offentlig sektor: forebygging av sykefravær og tidlig avgang fra arbeidslivet*, Gyldendal, Oslo.

Reason, J. (1997), *Managing the Risks of Organizational Accidents*, Taylor & Francis, Aldershot.

Regjeringen (2021), "Perspektivmeldingen 2021", available at: https://www.regjeringen.no/no/dokumenter/meld.-st.-14-20202021/id2834218/?ch=1.

Scott, L.D., Rogers, A.E., Hwang, W.-T. and Zhang, Y. (2006), "Effects of critical care nurses' work hours on vigilance and patients' safety", *American Journal of Critical Care*, Vol. 15, pp. 30-37.

Smith-Miller, C.A., Harden, J., Seaman, C.W., Li, Y. and Blouin, A.S. (2016), "Caregiver fatigue: implications for patient and staff safety, part 2", *Journal of Nursing Administration*, Vol. 46, pp. 408-416.

Stimpfel, A.W. and Aiken, L.H. (2013), "Hospital staff Nurses' shift length associated with safety and quality of care", *Journal of Nursing Care Quality*, Vol. 28, pp. 122-129.

Taylor, J.A., Dominici, F., Agnew, J., Gerwin, D., Morlock, L. and Miller, M.R. (2012), "Do nurse and patient injuries share common antecedents? An analysis of associations with safety climate and working conditions", *BMJ Quality and Safety*, Vol. 21, pp. 101-111.

Thompson, B.J., Stock, M.S. and Banuelas, V.K. (2017), "Effects of accumulating work shifts on performance-based fatigue using multiple strength measurements in day and night shift nurses and aides", *Human Factors*, Vol. 59, pp. 346-356.

Thomson, L., Schneider, J. and Hare Duke, L. (2017), "Unregistered health care staff's perceptions of 12 hour shifts: an interview study", *Journal of Nursing Management*, John Wiley & Sons. Vol. 25, pp. 531-538.

Vincent, C. and Amalberti, R. (2016), *Safer Healthcare: Strategies for the Real World*, Springer Open, Cham.

Vincent, C., Taylor-Adams, S., Chapman, E.J., Hewett, D., Prior, S., Strange, P. and Tizzard, A. (2000), "How to investigate and analyse clinical incidents: clinical risk unit and association of litigation and risk management protocol", *BMJ*, Vol. 320, pp. 777-781.

Wagstaff, A.S. and Lie, J.-A.S. (2011), "Shift and night work and long working hours-a systematic review of safety implications", *Scandinavian Journal of Work, Environment and Health*, Vol. 37, pp. 173-185.

Westley, J.A., Peterson, J., Fort, D., Burton, J. and List, R. (2020), "Impact of nurse's worked hours on medication administration near-miss error alerts", *Chronobiology International*, Vol. 37, pp. 1373-1376.

WHO (2018), "Declaration of Astana", available at: gcphc-declaration.pdf (who.int).

Yinghui, W., Shigeru, F., Kanako, S., Shinya, I., Kunichika, M., Chiu-Chin, H. and Tomonori, H. (2013), "The impact of nurse working hours on patient safety culture: a cross-national survey including Japan, the United States and Chinese Taiwan using the Hospital Survey on Patient Safety Culture", *BMC Health Services Research*, Vol. 13, pp. 1-7.

Appendix

	Search term	Number of hits	Total
Cinahl	P (and) I (and) O	0	318
	I (and) O	318	
Academic Search Premiere	P (and) I (and) O	3	30
	I (and) O	27	
Medline	P (and) I (and) O	5	352
	I (and) O	347	
Scopus	P (and) I (and) O	1	697
	I (and) O	696	
SveMed+	P (and) I (and) O	0	676
	P (and) I	14	
	P (and) O	662	
	I (and) O	0	

Table A1.
Search strategy

Corresponding author
Malin Rosell Magerøy can be contacted at: malin.r.mageroy@uis.no

For instructions on how to order reprints of this article, please visit our website:
www.emeraldgrouppublishing.com/licensing/reprints.htm
Or contact us for further details: **permissions@emeraldinsight.com**