

RESEARCH ARTICLE

Editorial Process: Submission:01/23/2022 Acceptance:10/24/2022

Measuring Occupational Fatigue among Higher and Middle Management at a Specialized Cancer Center during the COVID-19 Pandemic

Majeda A Al-ruzzieh¹, Omar Ayaad^{2*}

Abstract

Purpose: This study aims to measure the occupational fatigue level and describe the sources and consequences of occupational fatigue among middle and higher management at an international specialized cancer center during the COVID-19 pandemic. **Methods:** A mixed-method design was used in this study. A convenience sampling technique was utilized to select the participants from King Hussein Cancer Center, Amman, Jordan. The data was collected through a self-administered questionnaire. This questionnaire included both quantitative and qualitative sections. We utilized Fatigue Risk Assessment and Management in High-Risk Environments (FRAME)-26 items scale for the quantitative section. Two main questions were included in the survey to identify the sources and consequences of occupational fatigue. **Results:** The results show that the average mean of occupational fatigue was 2.95/5 (SD=0.70). The level of changes in fatigue levels after the COVID-19 pandemic increased by 0.87/3 (SD=1.45). The sources of occupational fatigue could be categorized into five themes: workload, work environment, staffing, psychological, and physical sources. There are four themes categorizing occupational fatigue: social, economic, health, and daily activity and lifestyle. **Conclusion:** This study affords valuable insight into the level, source, and consequences of occupational fatigue among middle and higher management at an international specialized cancer hospital in developing countries. The results indicate that the occupational fatigue level was moderate, and the fatigue level was negatively impacted by the COVID-19 pandemic.

Keywords: occupational fatigue- Higher and Middle Management- COVID-19 Pandemic- KHCC

Asian Pac J Cancer Prev, 23 (10), 3265-3271

Introduction

Occupational fatigue is a 'complex multidimensional condition with emotional, physiologic, cognitive/mental and sensory components that occur as a consequence of excessive work demands and insufficient energy restoration' (Smith-Miller et al., 2014). There are many dimensions for fatigue. These dimensions include physical fatigue, mental fatigue, sleep, and shift-related fatigue (Al-Majid et al., 2018; Mollica, 2020; Wijdenes et al., 2019).

Globally, the impacts of occupational fatigue are considered the main concern for healthcare managers and authorities. Fatigue can negatively affect professionals' well-being and safety, retention, emotional exhaustion, job performance, job satisfaction, and patient safety (Al-Majid et al., 2018; Graystone, 2019; Wijdenes et al., 2019).

Many studies discussed the source of occupational fatigue among frontline health professionals during the COVID-19 pandemic. According to those studies, the main sources include personal factors such as age and sleep and work-related factors such as high demands and scheduling (Al-Majid et al., 2018; Mollica, 2020;

Wijdenes et al., 2019).

Although health managers and leaders are an important part of the work environment, their occupational fatigue was not considered in previous studies (Hill et al., 2020; Steege et al., 2017). Most studies discussed occupational fatigue among frontline health professionals (Mollica, 2020; Wijdenes et al., 2019; Wolf et al., 2017). Limited studies discuss occupational fatigue among health managers and leaders in a hospital setting, including fatigue levels, sources of fatigue, and consequences including oncology setting. Most of these studies use quantitative measures (Hill et al., 2020; Steege et al., 2017). It is important to create a healthier work environment for both frontline health professionals and health managers and leaders by improving systems of care and developing policies (Hill et al., 2020).

In today's complicated health environments related to the COVID-19 pandemic, many extra responsibilities and burdens are added to health managers and leaders to protect patients and staff, ensure the availability of adequate staffing and protective equipment, prepare frontline professionals to handle COVID-19 patients, and

¹Nursing Department, King Hussein Cancer Center, Amman, Jordan. ²Quality and Accreditation Department, Sultan Qaboos Comprehensive Cancer Care and Research Center, Muscat, Oman. *For Correspondence: omarayad86@yahoo.com

achieve high-quality care and organizational outcomes. These added responsibilities urge them to be more visible accessible at all times, which leads to an increase in their work hours and their meetings' participation and organization (online and onsite) (Basu, 2020; Dewi et al., 2020; Haresh et al., 2020). All these factors may put them at risk of occupational fatigue (Basu, 2020; Prestia, 2020; Stamps et al., 2020).

Many studies discuss how the COVID-19 pandemic increases burnout, stress, fatigue, and psychological problems among health workers, including health managers especially in oncology settings (Alharbi et al., 2020; Al-Ruzzieh and Ayaad, 2021a; Sun et al., 2020); however, to our knowledge, there is no study discussing how the COVID-19 pandemic affects health managers and leaders' experience with fatigue, especially in a setting where patients are at high risks, such as a cancer setting where patients are at risk of mortality and morbidity due to infection or from a delay in treatment plans.

This study aims to measure occupational fatigue and describe its sources and consequences among middle and higher management at an international specialized cancer center during the COVID-19 pandemic. Accordingly, the below specific objectives were set:

- To identify occupational fatigue levels among health managers and leaders at an international specialized cancer center during the COVID-19 pandemic
- To describe the differences in occupational fatigue levels and how they changed during the COVID-19 pandemic according to demographic characteristics
- To identify the main sources and consequences of occupational fatigue among health managers and leaders in a specialized cancer center during the COVID-19 pandemic

The results of this study help hospital and health managers and leaders in oncology settings identify occupational fatigue levels, sources, and consequences. The information may help formulate a support system for the health managers and leaders.

Materials and Methods

Design and Setting

A mixed-method design was used in this study. This design ensures a comprehensive evaluation of certain issues (Busetto et al., 2016). The quantitative part was used to identify occupational fatigue levels and types, while the qualitative part was used to identify coping, sources, and consequences of occupational fatigue. This study was conducted at King Hussein Cancer Center (KHCC), Jordan.

Sample

A convenience sampling technique was utilized to select the participants. Inclusion criteria were the health leaders, managers, and supervisors currently employed at KHCC and with the same position for at least one year.

All eligible participants were approached through an invitation email with a cover letter. The purpose and significance of the study were shared with potential participants using the cover page that was sent with an

invitation email with the questionnaire. The total number of eligible participants was around 100.

Instrument

The data was collected using a self-administered questionnaire. This questionnaire included both quantitative and qualitative sections. We utilized Fatigue Risk Assessment and Management in High-Risk Environments (FRAME)-26 items scale covering physical, mental, sleep, and shift-related fatigue dimensions for the quantitative section. To identify fatigue levels and types, a 5-point Likert scale ranging from "Not at all = 1" to "Extremely = 5" was used (Smets et al., 1995)

To measure occupational fatigue level changes among participants during the COVID-19 pandemic, the authors used the dimensions (physical fatigue, mental fatigue, sleep, shift related) to scale the differences compared to the situation before the pandemic (Smets et al., 1995). A 7-point Likert scale ranged from "strongly worse = -3" to "strongly better strong change = +3," where zero indicated no change.

For the qualitative part, data were collected using open-ended questions. Two main questions were included in the survey to identify the sources and consequences of occupational fatigue. These questions were developed based on previous studies (Alharbi et al., 2020; Hill et al., 2020; Knupp et al., 2018). The participants were asked to write their answers in a blank field.

Data analysis

The participants' answers were coded and analyzed for the qualitative part. All collected data were interpreted and summarized, and meaningful statements were extracted. Accordingly, a thematic analysis was used. A research group discussed and resolved any conflicting opinion.

For the quantitative part, data were analyzed using SPSS. Descriptive statistics such as mean, frequency, percentage, and standard deviation described the demographic and scales' data. Mann-Whitney and Kruskal-Wallis tests were used to identify the difference between nominal demographic data. The Spearman coefficient was conducted to identify the relationship between continued demographic data and the scale.

Ethical Consideration

The Institutional Review Board (IRB) approval (20 KHCC 199) was obtained before conducting the study. The cover page included information about voluntary participation and withdrawal at any time without penalty. The participants were considered to have accepted participation by filling out the questionnaire. Since there were no risks associated with the study, no consent documentation was necessary.

Results

Table 1 presents the sample demographics. The study included 76 participants, with a mean age of 41.18 years. The mean years of the participants' experiences in managerial positions were 7.95 years and 17.68 years as a total experience. Around 61% were female, and 89% were

Table 1. Study Sample Demographics

Characteristics	Results
Age (Mean, SD)	41.18 (7.93)
Experience as manager or leader (in years) (Mean, SD)	7.95 (4.89)
Total Experience (Mean, SD)	17.68 (7.15)
Gender (n, %)	
Male	30 (39)
Female	46 (61)
Marital status (n, %)	
Married	68 (89)
Single	7 (9)
Divorced	1 (2)
Educational level (n, %)	
Bachelor degree	37 (49)
Graduated degree	39 (51)
Profession (n, %)	
Nursing	45 (59)
Physicians	17 (22)

married. Approximately 59% and 51% of participants were nursing and graduated degrees, respectively.

Survey Results

Table 2 presents the results of our study variables which show that the average mean of occupational fatigue was 2.95/5 (SD=0.70). The participants perceived physical fatigue levels as the highest among other types (mean=3.14, SD=0.75). Sleep and shift-related fatigue levels were the lowest among other types (mean=2.91, SD=0.72). Changes in fatigue levels after the COVID-19

Table 2. Means of Occupational Fatigue Levels and Changes in Fatigue Levels after the COVID-19 Pandemic Levels as Perceived by the Participants

Fatigue Type	Mean (SD) (1 to 5)	Change Mean (SD) (-3 TO +3)
Physical Fatigue	3.14 (0.75)	-0.76 (1.39)
Mental Fatigue	2.93 (0.72)	-0.85 (1.55)
Sleep related fatigue	2.91 (0.72)	-0.88 (1.43)
Shift related fatigue	2.91 (0.72)	-0.97 (1.44)
Total Score	2.95 (0.70)	-0.87 (1.45)

pandemic increased by 0.87/2 (SD=1.45). Moreover, the results show that all fatigue types increased; shift-related fatigue increased the most (change mean=-0.97/3, SD=1.44), while the lowest increase was mental fatigue (change mean=-0.85/3, SD=1.55).

Table 3 presents the occupational fatigue levels and their changed score according to demographic characteristics. The results show that females, married individuals, having a bachelor's degree, and other professionals (other than a physician, nursing, and pharmacist professional) had higher fatigue levels. However, the differences compared to different categories were not significant. Likewise, the change score in occupational fatigue was higher among male participants, married, had bachelor's degrees, and pharmacists. However, the differences compared to other categories were not significant. Moreover, the results showed no significant relationships between fatigue and change score and age, years of experience, experience as leaders and managers.

Thematic Analysis Results

The qualitative analysis results showed that

Table 3. Differences in Means of Occupational Fatigue Levels and Changes in Fatigue Levels after the COVID-19 Pandemic Levels According to Sample Demographics

Characteristics	Total Score of Occupational Fatigue		Total Score of Changed Occupational Fatigue	
	Mean (SD)	P value	Mean (SD)	P value
Age ¹	-	-0.220 (0.057)	-	-0.143 (0.217)
Experience as manager or leader (in years) ¹	-	-0.122 (0.295)	-	-0.202 (0.081)
Total Experience (in years) ¹	-	-0.162(0.161)	-	-0.140 (0.229)
Gender ²				P value=0.919
Male	2.93 (0.79)	P value=0.616	-0.86(1.24)	
Female	2.97 (0.54)		-0.85(1.26)	
Marital status ²				P value=0.491
Married	2.98 (0.72)	P value=0.306	-0.87 (1.29)	
Single and Divorced	2.70 (0.50)		-0.75 (0.76)	
Educational level ²				P value=0.334
Bachelor degree	3.05 (0.74)	P value=0.287	-0.95 (1.27)	
Graduated degree	2.86 (0.65)		-0.76 (1.22)	
Profession ³				P value=0.777
Nursing	3.00 (0.76)	P value=0.244	-0.81 (1.22)	
Physicians	2.72 (0.60)		-0.88 (1.17)	
Pharmacist	3.00 (0.54)		-1.05 (.157)	
Others	3.40 (0.35)		-0.62 (0.18)	

¹ Spearman co-efficient: r (p value); ²Mann-Whitney: W (p value); ³ Kruskal-Wallis test : H(p value)

Table 4. Sources and Consequences of Occupational Fatigue as Perceived by the Participants Using Open Ended Questions Survey

Sources	Number (%)	Keywords
Workload Source	30 (39)	Workload, overload, long working hours, day-night working
Work Environment	21 (28)	Multiple tasks, stressful environment, multiple opposite directions
Staffing	43 (57)	Staff shortage, staff incomppliance, regular staff sick leave, staff morale, and stress
Psychological Sources	31 (41)	COVID-19 related depression, stress, anxiety, uncertainty, confusion,
Physical Sources	13 (17)	Tiredness, headache, multiple rounds, standing and sitting for a long time
Patient Sources	16 (21)	Patient incomppliance, poor patient awareness, patient communication
Consequences	Number (%)	
Social	46 (61)	Decreased of social activities, limited family activities, social isolation
Economic	7 (0.09)	Leave, Unpaid level
Health	30 (39)	Back pain, headache, moral distress, general tiredness
Daily activity and lifestyle	32 (41)	Sport and walking constriction, change in sleep pattern

occupational fatigue could be categorized into five themes: workload, work environment, staffing, psychological sources, and physical sources. Staffing was reported as the highest source of occupational fatigue (n=43, 57%), including staff shortage, staff incomppliance, regular staff sick leaves, and staff morale and stress. The participants indicated that their physical health were not as before the pandemic. The second source of occupational fatigue was related to the psychological impact of the COVID-19 pandemic (n=31, 41%), including depression, stress, anxiety, uncertainty, and confusion. The participants indicated that the psychological fatigue is increased by the increasing of incidence of COVID-19 cases in the hospitals. This increase their fear and anxiety from being infected. The third source of occupational fatigue was related to workload (n=31, 41%); overload, long working hours, and day-night working. The participants indicated that the psychological fatigue is increased by the increasing of incidence of COVID-19 cases. See table 4.

The consequences of occupational fatigue could be categorized into four themes: social, economic, health, and daily activity and lifestyle. The social consequences (n=46, 61%) were the most reported, including decreased social activities, limited family activities, and social isolation. The social consequences are generally resulted from isolation precautions that are supposed by the goverement and increased workload as per participants' perspectives. Daily activity and lifestyle consequences (n=46, 61%) were the second most reported consequences, including sport and walking constriction and sleep pattern changes. The daily activity and lifestyle consequences are generally resulted from isolation precautions that are supposed by the goverement and their psychological fatigue as per participants' perspectives. Health consequences (n=30, 39%) were the third most reported consequences, including back pain, headache, moral distress, and general tiredness. Health consequences are generally resulted from isolation precautions that are supposed by the goverement and workload and work stress as per participants' perspectives.

Discussion

Using a mixed design, this study aimed to discuss health managers' experience with occupational fatigue at an international specialized cancer center during the COVID-19 pandemic. We used a validated questionnaire to collect the quantitative part, while two open-ended questions were developed to measure the source and consequences of occupational fatigue. The sample size was considered low due to an inadequate study population; managers and leaders at the specialized cancer center. For this reason, non-parametric tests were conducted. However, including qualitative questions may enhance getting proper data about the study variables.

Hospital management has a significant role in combating the COVID-19 pandemic (Abdi et al., 2021; Basu, 2020; Dewi et al., 2020). This is the first study of its kind, conducted in a developing country to discuss the health managers' experience with occupational fatigue at an international specialized cancer center during the COVID-19 pandemic. The results showed a moderate mean of occupational fatigue among middle and higher-level management during the COVID-19 pandemic. Fatigue is often related to long work hours, shift work, and the accompanying sleep deprivation. The number of fatigue causes increased for middle and high management during the pandemic.

The COVID-19 epidemic caused a slew of severe issues for health institutions, such as supply shortages, critical care bed shortages, insufficient capacity, the need to adapt treatment, and financial loss. Health managers had to transition to a crisis mode from a conventional leadership style with an effective command structure during the COVID-19 pandemic (Basu, 2020; Dewi et al., 2020; Hareesh et al., 2020). These changes in roles and responsibilities may develop their occupational fatigue. A comprehensive strategic plan that addresses emergency preparation, crisis management, and infectious disease outbreak response may be considered one of the critical strategic responsibilities emphasized during the COVID-19 pandemic (Alharbi et al., 2020; Hill et al., 2020; Knupp et al., 2018). Almost certainly, the current emergency preparation and strategy and infection control

measures will need to be reviewed and updated (Abdi et al., 2021; Holton et al., 2021; Kaye et al., 2021).

Additionally, health managers and leaders from all professions were required in a short period to establish and distribute a variety of operational procedures and policies to protect patients, visitors, and healthcare employees from COVID-19 and ensure effective supply chain management surge capacity (Abdi et al., 2021). Managing these issues within a short time may have played an important role in increasing their fatigue level.

Hospital management must make rapid decisions with little information and limited time to react. They must accurately identify issues without losing sight of the big picture and make sound judgments while considering the probable ramifications. They must behave differently amid a crisis; although they remain apprehensive, they become more concentrated and solution-oriented. Additionally, making evidence-based judgments about disease management by examining critical internal and external documentation might be another key ability for hospital directors during epidemic events. This situation may put the management in stress and psychological distress, which may increase their occupational fatigue (Abdi et al., 2021).

Regular communication and collaboration to organize the work environment were considered one of the main sources of occupational fatigue. Throughout the COVID-19 crisis, it became clear that interpersonal communication between hospital teams and leadership was critical for trust development. External communication with other stakeholders such as the ministry of health was also critical since the situation has placed a strain on healthcare institutions, needing tight coordination with universities and municipal governments, as well as effective communication across many surrounding hospitals (Abdi et al., 2021; Al-Ruzziéh et al., 2020).

The staffing-related issues generated other sources for occupational fatigue among managers and leaders. During the COVID-19 pandemic, healthcare workers faced numerous barriers such as an increase in workload, lack of resources, particularly personal protective equipment (PPE), a high risk of infection, emotional strain, psychosocial stress, the need for training, and physical exhaustion, as well as stigma and violence directed toward them as a result of public fear of being infected from them (Abdi et al., 2021; Miethke-Morais et al., 2020; Sheek-Hussein et al., 2021). Staff absenteeism due to personal illness and staff members' anxiety about working in a safe environment was another difficulty for hospital managers to take care of them (Abdi et al., 2021; Gohar et al., 2020). Hospital management must show their capacity to overcome obstacles to ensure their well-being and safety and optimize the health of the staff. Managers must take a proactive role in addressing critical concerns such as precise infection control and contamination paths, PPE supply (both in terms of quality and quantity), and follow-up (Abdi et al., 2021).

Several hospitals are looking for an approach to give emotional support to their workers during the COVID-19 pandemic, such as fostering a positive relationship, fairly evaluating their contributions to crisis response,

effectively appreciating their efforts, and emphasizing the significance of staff contributions. Developing a multidisciplinary planning team for readiness is a critical first step in combating the infection (Abdi et al., 2021; Wang et al., 2020). This burden may increase the incidence of occupational fatigue among health managers and leaders.

These situations created a suitable environment to develop occupational fatigue among middle and higher management, significantly impacting their social, health, economic, and lifestyle status.

Study Limitations and Recommendations

Many limitations faced the authors while conducting this study. The small sample size and the exclusivity of the center to cancer care mean the study generalization may be restricted. Jordan does not offer other specialized cancer settings, and the eligible number of participants at KHCC was limited.

The study was also restricted by the inability to conduct face-to-face interviews, which limited the researchers' ability to find more information about the source and consequences of occupational fatigue in the oncology setting. The qualitative part had to include open-ended questions.

Finally, no study discussed the fatigue level among the managers and leaders during the COVID-19 pandemic, thus limiting our ability to compare our results with other studies' findings.

Many recommendations could be developed based on our research findings. These recommendations include:

- To develop emotional and physical programs for all health workers, including health managers and leaders. Developing the emotional intelligence is considered one of the approach that is needed to be developed among the managers (Al-Ruzziéh & Ayaad, 2021b).
- To create a multidisciplinary team in each hospital, if there is financial and managerial support, to follow COVID-19 related issues. The adoption of shared governance model is considered one of important strategies to support effective collaboration between the health professionals (Al-Ruzziéh et al., 2022; Ayaad et al., 2018)
- To utilize updated e-collaborative tools and e-health which plays important roles to enhance team effectiveness and quality of services (Qaddumi et al., 2021; Sharikh et al., 2020)
- To re-designing the process of care using advance approach such as lean, lean six sigma, and failure mode and effect analysis approaches to enhance the effectiveness and safety of work processes and enhance the staff and patient satisfaction (Ayaad et al., 2019; Haroun et al., 2021)
- To outsource the services to professional and operational agency to cover the staff and equipment related problems (Ayaad et al., 2022)
- Further studies need to be conducted in other settings and on larger sample sizes to generalize the study's findings.
- To conduct the qualitative study using face-to-face interviews to get more structured and reliable information about occupational fatigue among middle and higher

management.

In conclusion, this study affords valuable insight into the level, source, and consequences of occupational fatigue among middle and higher management at an international specialized cancer hospital in a developing country. The results indicated that the occupational fatigue level was moderate, and the COVID-19 pandemic negatively impacted the fatigue level. The participants perceived the physical fatigue level as the highest. The highest increased type of fatigue was shift-related fatigue. The results showed that the sources for occupational fatigue could be categorized into five themes: workload, work environment, staffing, psychological sources, and physical sources. The consequences of occupational fatigue could be categorized into four themes: social, economic, health, and daily activity and lifestyle.

Scientific Approval

the proposal of the study was reviewed and approved by the Office of Scientific Affairs and Research at King Hussein Cancer Center, Amman, Jordan.

Ethical Approval

The Institutional Review Board (IRB) approval to conduct the study was taken from the research department in KHCC, Amman, Jordan (20 KHCC 199). This Approval has confirmed the voluntary participation, the right of refusal or withdrawal from the study, and the confidentiality of participant information.

Conflict of Interest

The authors have no conflicts of interest to disclose.

Author Contribution Statement

The authors confirm that both authors (Majeda A Al-Ruzzieh and Omar Ayaad) actively participated in study conception and design, data collection, analysis, interpretation of results, and draft manuscript preparation processes. All authors reviewed the results and approved the final version of the manuscript.

Acknowledgments

The authors express their appreciation to all nurses and the research office, in King Hussien Cancer Center, for their support during this study.

Availability of data : Data is available- Upon request.

References

Abdi Z, Lega F, Ebeid N, Ravaghi H (2021). Role of hospital leadership in combating the COVID-19 pandemic. *Health Serv Manage Res*, **35**, 2-6.

Alharbi J, Jackson D, Usher K (2020). The potential for COVID-19 to contribute to compassion fatigue in critical care nurses. *J Clin Nurs*, **29**, 2762-4.

Al-Majid S, Carlson N, Kiyohara M, Faith M, Rakovski C (2018). Assessing the degree of compassion satisfaction and compassion fatigue among critical care, oncology, and charge nurses. *J Nurs Adm*, **48**, 310-5.

Al-Ruzzieh MA, Ayaad O (2021a). Work stress, coping

strategies, and health-related quality of life among nurses at an international specialized cancer center. *Asian Pac J Cancer Prev*, **22**, 2995-3004.

Al-Ruzzieh MA, Ayaad O (2021b). Impact of nurses' emotional intelligence on the implementation of a professional practice model in cancer care. *Br J Nurs*, **30**, 1110-6.

Al-Ruzzieh MA, Ayaad O, Hess RG (2022). The role of participation in and effectiveness of shared governance councils in the nurses' perception of a professional practice work environment. *J Nurs Adm*, **52**, 51-6.

Al-Ruzzieh MA, Ayaad O, Qaddumi B (2020). The role of e-health in improving control and management of COVID 19 outbreak: current perspectives. *Int J Adolesc Med Health*, <https://doi.org/10.1515/ijamh-2020-0072>.

Ayaad O, Alloubani A, Thiab F, Yousef D, Banat B (2018). Adopting a shared governance model to improve nurses' working environments. *Br J Health Care Manag*, **24**, 594-602.

Ayaad O, Al-Ruzzieh MA, Qaddumi B, et al (2022). Outsourcing services in the healthcare sector: balancing risks and benefits. *Br J Health Care Manag*, **28**, 96-103.

Ayaad O, Haroun A, Yaseen R, et al (2019). Improving nurses' hand-off process on oncology setting using lean management principles. *Asian Pac J Cancer Prev*, **20**, 1563-70.

Basu P (2020). Healthcare systems need to be organized to fight two pandemics simultaneously. *Asian Pac J Cancer Care*, **5**, 1-3.

Busetto L, Luijckx K, Vrijhoef HJM (2016). Development of the COMIC Model for the comprehensive evaluation of integrated care interventions. *Int J Care Coord*, **19**, 47-58.

Dewi LK, Gatellier L, Sabapathy K, et al (2020). An Asian Perspective of the Management of COVID-19: the Asian National Cancer Centers Alliance Led Regional Comparison. *Asian Pac J Cancer Care*, **5**, 27-42.

Gohar B, Larivière M, Nowrouzi-Kia B (2020). Sickness absence in healthcare workers during the COVID-19 pandemic. *Occup Med*, **70**, 338-42.

Graystone R (2019). Prevent compassion fatigue and burnout with a magnet culture. *J Nurs Adm*, **49**, 231-3.

Haresh K, Izzuddeen Y, Gupta A, et al (2020). A comprehensive review on the working of a radiation oncology facility during the Covid-19 pandemic and adapting it for South Asian settings. *Asian Pac J Cancer Care*, **5**, 75-81.

Haroun A, Al-Ruzzieh MA, Hussien N, et al (2021). Using failure mode and effects analysis in improving nursing blood sampling at an international specialized cancer center. *Asian Pac J Cancer Care*, **22**, 1247-54.

Hill T, Cherry B, LeClair-Smith C, Williams T (2020). A unique strategy to address nurse leader fatigue. *J Nurs Adm*, **50**, 66-71.

Holton S, Wynter K, Trueman M, et al (2021). Immediate impact of the COVID-19 pandemic on the work and personal lives of Australian hospital clinical staff. *Aust Health Rev*, **45**, 656-66.

Kaye AD, Okeagu CN, Pham AD (2021). Economic impact of COVID-19 pandemic on healthcare facilities and systems: International perspectives. *Best Pract Res Clin Anaesthesiol*, **35**, 293-306.

Knupp AM, Patterson ES, Ford JL, Zurmehly J, Patrick T (2018). Associations among nurse fatigue, individual nurse factors, and aspects of the nursing practice environment. *J Nurs Adm*, **48**, 642-8.

Miethke-Morais A, Perondi B, Harima L et al (2020). Overcoming barriers to providing comprehensive inpatient care during the COVID-19 pandemic. *Clinics*, **75**, 1-2.

Mollica JA (2020). Exploring the relationship between patient acuity and fatigue among nurses. Ohio University.

- Prestia AS (2020). The moral obligation of nurse leaders:: COVID-19. *Nurse Lead*, **18**, 326–28.
- Qaddumi B, Ayaad O, Al-Ma'aitah MA, Akhu-Zaheya L, Alloubani A (2021). The factors affecting team effectiveness in hospitals: The mediating role of using electronic collaborative tools. *J Interprof Educ Pract*, **24**, 100449.
- Sharikh EA, Shannak R, Suifan T, Ayaad O (2020). The impact of electronic medical records' functions on the quality of health services. *Br J Health Care Manag*, **26**, 1-13.
- Sheek-Hussein M, Abu-Zidan FM, Stip E (2021). Disaster management of the psychological impact of the COVID-19 pandemic. *Int J Emerg Med*, **14**, 1–10.
- Smets EM, Garssen B, Bonke B, de Haes JC (1995). The multidimensional Fatigue Inventory (MFI) psychometric qualities of an instrument to assess fatigue. *J Psychosom Res*, **39**, 315–25.
- Smith-Miller CA, Shaw-Kokot J, Curro B, Jones CB (2014). An integrative review: Fatigue Among Nurses in Acute Care Settings. *J Nurs Adm*, **44**, 487–94.
- Stamps DC, Foley SM, Gales J (2020). Nurse leaders advocate for nurses across a health care system: COVID-19. *Nurs Lead*, **36**, 178–80.
- Steege LM, Pinekenstein BJ, Arsenault Knudsen É, Rainbow JG (2017). Exploring nurse leader fatigue: a mixed methods study. *J Nurs Manag*, **25**, 276–86.
- Sun N, Wei L, Shi S (2020). A qualitative study on the psychological experience of caregivers of COVID-19 patients. *Am J Infect Control*, **48**, 592–8.
- Wang K, Wong EL, Ho KF (2020). Intention of nurses to accept coronavirus disease 2019 vaccination and change of intention to accept seasonal influenza vaccination during the coronavirus disease 2019 pandemic: A cross-sectional survey. *Vaccine*, **38**, 7049–56.
- Wijdenes KL, Badger TA, Sheppard KG (2019). Assessing compassion fatigue risk among nurses in a large urban trauma center. *J Nurs Adm*, **49**, 19–23.
- Wolf LA, Perhats C, Delao A, Martinovich Z (2017). The effect of reported sleep, perceived fatigue, and sleepiness on cognitive performance in a sample of emergency nurses. *J Nurs Adm*, **47**, 41–9.



This work is licensed under a Creative Commons Attribution-Non Commercial 4.0 International License.