Fatigue and Sleep Quality Among Staff Nurses Working in A Tertiary Care Hospital During COVID-19 Pandemic

Sunita Rana,[a,e] Mamta Koirala,[b,e] Nongmaithem Jid Noon Baral Thapa,[c,e] Samikshya KC [d,e]

ABSTRACT

Introduction: Fatigue, a universal phenomenon, is a suboptimal psychophysiological condition caused by physical and/or mental exertion. Insufficient recovery between work shifts causes accumulated acute fatigue to progress into chronic. As fatigue and sleep quality are related, adequate sleep and inter shift recovery are thus vital to the overall health. The current COVID-19 pandemic has caused added burden to the nursing workforce worldwide. This study aimed to assess fatigue and sleep quality among staff nurses of a tertiary care hospital during the pandemic. **Methods:** A descriptive cross-sectional study was conducted among 151 staff nurses of Lumbini Medical College and Teaching Hospital (LMCTH) using enumerative sampling method. Valid and reliable instruments i.e., Occupational Fatigue Exhaustion Recovery (OFER) and Pittsburgh Sleep Quality Index (PSQI) were used. Analysis was done using descriptive and inferential statistics. **Results:** The mean ±SD age of the participants was 26.54±6.93 years. Less than half (39.1%) of them had moderate to high acute fatigue. Nearly half (41.2%) had high chronic fatigue and most (61.6%) had low to moderate inter shift recovery. Poor sleep was found among 60.9% of the participants with mean global PSQI score of 6.74. Sleep quality had moderate positive correlation with chronic (r=0.4, p<0.001) and acute (r=0.39, p<0.001) fatigue whereas had moderate negative correlation with inter shift recovery (r=-0.41, p<0.001) which were statistically significant. **Conclusion:** The staff nurses had fatigue and poor sleep during COVID-19 pandemic. Nursing administration should take appropriate measures timely to decrease fatigue and improve sleep to prevent serious consequences.

Key words: COVID-19 pandemic; Fatigue; Sleep quality; Tertiary care hospital

INTRODUCTION:

Fatigue, a universal phenomenon, is a suboptimal psychophysiological condition caused by physical and/or mental exertion. In the absence of adequate recovery, acute fatigue may lead to chronic fatigue.[1] Nurses working in shifts are at greater chance of getting fatigued.[2,3] The term 'work shift' is applicable to occupations working throughout the 24-hour cycle.[4] Nursing work in itself is physically and mentally strenuous. Nurses frequently encounter non-standard work schedules, long working hours and frequent circadian adjustment to night shift which make them physically, mentally and emotionally tired putting them at a greater risk of developing chronic fatigue. Thus, work-related fatigue is significant among nurses especially those working at tertiary hospitals.[5]

Fatigue and sleep are intricately woven. Sleep quality has correlations with fatigue.[6] Subjective sleep quality can be defined as the satisfaction towards overall sleep experience, including initiation, maintenance, quantity, and feeling of refreshment upon awakening whereas objective sleep quality consists of the total duration

Corresponding Author:
Sunita Rana
e-mail: rsunita25@gmail.com
ORCID: https://orcid.org/0000-0002-4987-6607

of sleep, the architecture of sleep and the frequency of awakenings across the night.[7] Adequate sleep and full inter shift recovery are vital to the overall health of an individual. Working in day/night shift rotation is responsible for irregular and disturbed sleep causing the shift workers to be more fatigued. [8,9] Insufficient sleep and consequent fatigue may impair cognitive function and increase risk of work-related errors and accidents.[8-12]

International Council of Nurses (2020) concluded that nursing workforce worldwide are over worked. The COVID-19 pandemic has escalated already demanding and stressful working conditions in hospital nurses.[13] The recent change in duty pattern from 8 to 12 hours per day during COVID-19 pandemic forced the nurses working in inpatient units of Lumbini Medical College and Teaching Hospital (LMCTH) to work longer hours. This study aimed to assess fatigue and sleep quality among the staff nurses of LMCTH during COVID-19 pandemic.

METHODS:

A cross-sectional descriptive design was adopted to study the fatigue and sleep quality of staff nurses working in LMCTH after obtaining ethical clearance from Institutional Review Committee (IRC-LMC 02/A021). Enumerative sampling method was used to collect data within two weeks from 23rd February to 9th March 2021. Out of 191, only 151 staff nurses gave consent to participate in the study making response rate of 87%. The participants were informed that their participation will be kept anonymous and the data collected would be used exclusively for scientific research purpose only. Participation in the study was voluntary.

Three-part self-administered structured questionnaire was used as follows-

Part I:

A. Demographic variables of the participants (age, education, marital status, caring for under five years children and elderly family member at home).

B. Work-related variables of the participants (work experience, work area, pattern of shift, shift profile, duration of current shift pattern and work hour per week).

Part II: Occupational Fatigue Exhaustion Recovery (OFER) Scale questionnaire

OFER comprises 15 self-report items with three subscales: Chronic fatigue (1-5), Acute fatigue (6-10), and Inter shift recovery (11-15). The items are scored on a 7-point Likert scale (0= strongly disagree, 1=disagree, 2=slightly disagree, 3=neither agree or disagree, 4=slightly agree, 5=agree and 6= strongly agree). Items 9,10,11,13 and 15 are reverse scored. Scores range from 0-90.The obtained score was converted to percentage. For comparative purposes, cut-points into levels of "low, low/moderate, moderate/high and high" on each subscale was computed according to quartiles of scale score distribution. The OFER has high construct, discriminate validity and internal reliability. Cronbach's alpha coefficients are at least 0.84 for each subscale.[4]

Part III: Pittsburgh Sleep Quality Index (PSQI) questionnaire

PSQI subjectively measures the quality and patterns of sleep during the past month. It measures 7 sleep components- subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction. Each component is scored on a Likert-type 4-point scale (0,1,2,3) and weighs equally from 0 to 3. Adding 7 component scores gives a global score in the range of 0 to 21; the higher the score, the worse the sleep quality. A score of 5 or greater indicates "poor" sleep. The Cronbach alfa for PSQI is 0.83.[14]

Permission to use both tools from the developers were obtained.

Data was collected by the principal and co-authors by distributing the questionnaires among the staff nurses in their respective workplace during lunch or break time. After explaining the objectives and obtaining voluntary consent, data was collected.

Data was analyzed by using statistical packages for social sciences (SPSS) version 16. Frequency, percentage, mean, standard deviation, range and quartiles were used for descriptive statistics whereas to find out the association between selected variables and fatigue level and sleep quality, chi square and Fisher's exact test were used. Pearson's correlation coefficient was used to find out correlation among the variables. The confidence level was set at 95% with p-value <0.05.

RESULTS:

The mean age of the participants was 26.54±6.93 years. Majority (72.1%) of them had completed Proficiency Certificate Level (PCL)

Table 1: Participants' level of acute fatigue, chronic fatigue and inter shift recovery (n=151).

Variables	Level of fatigue			
	Low n (%)	Low/moderate n (%)	Moderate/high n (%)	High n (%)
Acute fatigue	4 (2.6)	40 (26.5)	59 (39.1)	48 (31.8)
Chronic fatigue	4 (2.6)	28 (18.5)	57 (37.7)	62 (41.2)
Inter shift recovery	25 (16.6)	93 (61.6)	20 (13.2)	13 (8.6)

Table 2: Correlation among acute fatigue, chronic fatigue and inter shift recovery of the participants (n=151).

Variables	Mean ± SD	Pearson correlation		
		Acute fatigue	Chronic fatigue	Inter shift recovery
Acute fatigue	69.05±22.163	1	0.721*	-0.658*
Chronic fatigue	64.83± 21.183	0.721*	1	-0.639*
Inter shift recovery	40.42± 20.273	-0.658*	-0.639*	1

*$p<0.05$

nursing. More than half (60.3%) of them were single. Most (62.9%) were caring for elderly family members at home.

More than half (57%) of the participants were working for more than 24 months. More than one-fourth (29.2%) of them were working in surgery department. Regarding shift pattern, most (88.1%) participants had routinely rotating shift. Likewise, majority (86.8%) were performing 12-hour shift. The mean duration of current shift pattern in month was 16.06±23.05. All (100%) of them were doing 48 hours duty per week.

Regarding level, less than half (39.1%) of the participants had moderate to high acute fatigue. Nearly half (41.2%) had high chronic fatigue and most (61.6%) had low to moderate inter shift recovery. (Table 1)

Acute fatigue, chronic fatigue and inter shift recovery were statistically significant with age (p=0.020, 0.040 and <0.001), education(p=0.001, 0.005 and <0.001), marital status(p=0.002, <0.001 and <0.001), work experience (p=0.032, 0.020 and 0.038), work area(p=0.005 and <0.001), pattern of shift (p<0.001, <0.001 and <0.001), shift profile (p<0.001, <0.001 and <0.001), and duration of current shift pattern (p<0.001, <0.001 and <0.001).

Table 2 shows that mean score of acute fatigue, chronic fatigue and inter shift recovery were 69.05±22.16, 64.83±21.18 and 40.42±20.27 respectively. Acute fatigue was moderately and

Table 3: Association between sleep quality and selected variables of the participants (n=151).

Variables	Sleep quality		df	Chi square	p value
	Good n (%) 59 (39.1)	Poor n (%) 92 (60.9)			
Education					
ANM	24 (58.5)	17 (41.5)	1	8.956	0.003
PCL and above	35 (31.8)	75 (68.2)			
Pattern of shift					
Fixed	14 (77.8)	4 (22.2)	1	12.86	<0.001
Routinely rotating	45 (33.8)	88 (66.2)			
Shift profile					
12-hrs	44 (33.6)	87 (66.4)	1	12.5	<0.001
8-hrs	15 (75.0)	5 (25.0)			
Duration of current shift pattern (months)					
≤11	46 (34.6)	87 (65.4)	1	9.433	0.002
>11	13 (72.2)	5 (27.8)			

positively correlated (r=0.721, p<0.001) with chronic fatigue which was statistically proven. Likewise, acute fatigue (r=-0.658, p<0.001) and chronic fatigue (r=-0.639, p<0.001) were moderately and negatively correlated with inter shift recovery which was also statistically significant.

The mean global PSQI score of the study group was 6.74. Majority (60.9%) of them had poor sleep. Sleep quality was statistically significant with education (p=0.003), pattern of shift (p<0.001), shift profile (p<0.001) and duration of current shift pattern (p=0.002) (Table 3).

Scores on PSQI (sleep quality) had moderate positive correlation with chronic fatigue (r=0.4, p<0.001) and acute fatigue (r=0.39, p=<0.001) scores whereas had moderate negative correlation with inter shift recovery (r=-0.41, p<0.001) score which was statistically significant (Table 4).

Table 4: Correlation between PSQI (sleep quality) and OFER (fatigue) scores of the participants (n=151).

PSQI Score (sleep quality)	OFER Score		
	Acute fatigue	**Chronic fatigue**	**Inter shift recovery**
	r=0.394	r=0.400	r=-0.411
	p<0.001	p<0.001	p<0.001

DISCUSSION:

This study aimed to examine fatigue and sleep quality of the staff nurses of LMCTH during COVID-19 pandemic.

This study disclosed that participants experienced moderate to high level of acute fatigue and high level of chronic fatigue. They had low to moderate inter shift recovery. This showed that their inter shift recovery level in relation to acute and chronic fatigue is low. This finding is consistent with other studies.[15,16] A Lebanese study describes that high level of both acute and chronic fatigue is an anticipated finding during crisis like COVID-19 pandemic. Also, worse fatigue and poorer inter shift recovery was found in nursing staffs working in COVID-19 compared to non-COVID-19 ward.[13] Likewise, a study conducted in the USA showed that participants had high acute fatigue, moderate-to-high chronic fatigue and low-to-moderate inter shift recovery.[2]

In the present study, fatigue level is statistically significant with age, education, marital status, work experience, work area, pattern of shift, shift profile and duration of current shift pattern. This is in line with other studies.[16,17,18]

The study discovered that there were moderate correlations among acute fatigue, chronic fatigue and inter shift recovery in predictable direction. These findings highlight the fact that accumulated acute fatigue may progress into chronic in the absence of sufficient inter shift recovery. The inverse relationship between fatigue and recovery was seen in negative correlation. Positive correlation was seen between acute and chronic fatigue. This is congruent with the finding of another study where moderate strength of inter-correlation among chronic, acute fatigue and inter shift recovery was seen.[15]

In the present study, 60.9% participants had poor sleep quality. This study confirms previous finding.[9] The global PSQI of 6.74±3.877explains that participants had poor quality of sleep. This finding is supported by other studies.[6,9] The current study discovered that education, pattern of shift, shift profile and duration of current shift pattern were associated with sleep quality which is consistent with other studies.[8,9] Shift work, job demands, exposure to hazards in work environments, and chronic fatigue were found to affect sleep quality in Chinese nurses.[19]

The present study discovered that PSQI score had moderate positive correlation with acute and chronic fatigue scores and moderate negative correlation with inter shift recovery scores. The correlations were statistically significant. This is supported by a Korean study.[6]

CONCLUSION:

The COVID-19 pandemic has overburdened the nursing workforce worldwide. Staff nurses of LMCTH are experiencing fatigue and having poor sleep. Fatigue and sleep quality are related with education, pattern of shift, shift profile and duration of current shift pattern. Acute fatigue, chronic fatigue and inter shift recovery are related. Sleep quality and fatigue are also related. The nursing administration of LMCTH can work on implementing different staffing model for inpatient staff nurses to reduce chronic fatigue and to promote enough recovery in between shifts. Policies on taking measures to counteract fatigue can be implemented such as scheduling breaks for tea or lunch etc. Reinforcing and monitoring implementation of policies, promoting supportive work environment

J. Lumbini. Med. Coll. Vol 9, No 2, July-Dec 2021

jlmc.edu.np

and developing collaborative team by the nurse managers can prevent fatigue among staff nurses. Similarly, In-service education regarding practices to improve sleep can also be conducted. Arranging easy accessibility of help to address problems of sleep and fatigue could improve the overall health of the staff nurses of LMCTH.

ACKNOWLEDGMENT:

Conflict of Interest: The authors declare that no competing interests exist.

REFERENCES:

1. MohdFauzi MF, MohdYusoff H, Muhamad Robat R, Mat Saruan NA, Ismail KI, MohdHaris AF. Doctors' Mental Health in the Midst of COVID-19 Pandemic: The Roles of Work Demands and Recovery Experiences. Int J Environ Res Public Health. 2020;17(19):7340. PMID: 33050004 DOI: https://doi.org/10.3390/ijerph17197340

2. Sagherian K, Clinton ME, Abu-Saad Huijer H, Geiger-Brown J. Fatigue, Work Schedules, and Perceived Performance in Bedside Care Nurses. Workplace Health Saf. 2017;65(7):304-12. PMID: 27872407 DOI:https://doi.org/10.1177/2165079916665398

3. Josten EJC, Ng-A-Tham JEE, Thierry H. The effects of extended workdays on fatigue, health, performance and satisfaction in nursing. J Adv Nurs. 2003;44(6):643-52.PMID: 14651687 DOI: https://doi.org/10.1046/j.0309-2402.2003.02854.x

4. Winwood PC, Lushington K, Winefield AH. Further Development and Validation of the Occupational Fatigue Exhaustion Recovery (OFER) Scale. J Occup Environ Med. 2006;48(4):381-9. PMID: 16607192 DOI: https://doi.org/10.1097/01.jom.0000194164.14081.06

5. Alahmadi BA, Alharbi MF. Work-Related Fatigue Factors among Hospital Nurses: An Integrative Literature Review. Nurse Media Journal of Nursing. 2018;8(2):113-133. DOI: https://doi.org/10.14710/nmjn.v8i2.19554

6. Sim S, Lee SB, Bang M. Relationship among Sleep Quality, Fatigue, Resilience, and Nursing Performance Ability in Shift Work Nurses. Indian Journal of Public Health Research &Development. 2019;10(11):4659-63. DOI:https://doi.org/10.5958/0976-5506.2019.04341.9

7. Jahrami H, BaHammam AS, AlGahtani H, Ebrahim A, Faris M, AlEid K, et al. The examination of sleep quality for frontline healthcare workers during the outbreak of COVID-19. Sleep Breath. 2021;25(1):503-11. PMID: 32592021 DOI: https://doi.org/10.1007/s11325-020-02135-9

8. Zhang L, Sun DM, Li CB, Tao MF. Influencing Factors for Sleep Quality Among Shift-working Nurses: A Cross-Sectional Study in China Using 3-factor Pittsburgh Sleep Quality Index. Asian Nurs Res (Korean Soc Nurs Sci).

J. Lumbini. Med. Coll. Vol 9, No 2, July-Dec 2021

jlmc.edu.np

2016;10(4):277-82. PMID: 28057314 DOI: https://doi.org/10.1016/j.anr.2016.09.002

9. Muzio MD, Diella G, Simone ED, Novelli L, Alfonsi V, Scarpelli S, et al. Nurses and Night Shifts: Poor Sleep Quality Exacerbates Psychomotor Performance. Front Neurosci. 2020;14(0):579938. PMID: 33154716 DOI: https://doi.org/10.3389/fnins.2020.579938

10. Rasoulzadeh Y, Bazazan A, Safaiyan A, Dianat I. Fatigue and Psychological Distress: A Case Study Among Shift Workers of an Iranian Petrochemical Plant, During 2013, in Bushehr. Iran Red Crescent Med J. 2015;17(10):e28021. PMID: 26568862 DOI: https://pubmed.ncbi.nlm.nih.gov/26568862/

11. Chien PL, Su HF, Hsieh PC, Siao RY, Ling PY, Jou HJ. Sleep Quality among Female Hospital Staff Nurses. Sleep Disord. 2013;2013(0):283490. DOI: https://doi.org/10.1155/2013/283490

12. Shiffer D, Minonzio M, Dipaola F, Bertola M, Zamuner AR, Dalla Vecchia LA, et al. Effects of Clockwise and Counterclockwise Job Shift Work Rotation on Sleep and Work-Life Balance on Hospital Nurses. Int J Environ Res Public Health. 2018;15(9):2038. PMID: 30231514 DOI: https://doi.org/10.3390/ijerph15092038

13. Sagherian K, Steege LM, Cobb SJ, Cho H. Insomnia, fatigue and psychosocial well-being during COVID-19 pandemic: A cross-sectional survey of hospital nursing staff in the United States. J Clin Nurs. 2020;10.1111/jocn.15566. PMID: 33219569 DOI: https://doi.org/10.1111/jocn.15566

14. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh sleep quality index: A new instrument for psychiatric practice and research. Psychiatry Research. 1989;28(2):193-213. DOI: https://doi.org/10.1016/0165-1781(89)90047-4

15. MohdFauzi MF, MohdYusoff H, Mat Saruan NA, Muhamad Robat R, Abdul Manaf MR, Ghazali M. Fatigue and recovery among Malaysian doctors: the role of work-related activities during non-work time. BMJ Open. 2020;10(9):e036849. PMID: 32978189 DOI: https://doi.org/10.1136/bmjopen-2020-036849

16. Somantri I, Yuliati M, Winwood P, Adiningsih D. Work-Related Fatigue Among Inpatient Unit Nurses. Journal of Nursing Care. 2020;3(3):199-205. DOI:https://jurnal.unpad.ac.id/jnc/article/view/22286/13871

17. Yuan SC, Chou MC, Chen CJ, Lin YJ, Chen MC, Liu HH, et al. Influences of shift work on fatigue among nurses. J NursManag. 2011;19(3):339-45. PMID: 21507104 DOI: https://doi.org/10.1111/j.1365-2834.2010.01173.x

18. Tang C, Liu C, Fang P, Xiang Y, Min R. Work-Related Accumulated Fatigue among Doctors in Tertiary Hospitals: A Cross-Sectional Survey in Six Provinces of China. Int J Environ Res Public Health. 2019;16(17): 3049. PMID: 31443480 DOI: https://doi.org/10.3390/ijerph16173049

19. Li Y, Fang J, Zhou C. Work-Related Predictors of Sleep Quality in Chinese Nurses: Testing a Path Analysis Model. J Nurs Res. 2019;27(5):e44. PMID: 30933051 DOI: https://doi.org/10.1097/jnr.0000000000000319

J. Lumbini. Med. Coll. Vol 9, No 2, July-Dec 2021

jlmc.edu.np