Medical Technology Journal of Applied Science (MTJAS)

Volume 2, Issue 1, 2026, Page No: 36 - 43
Website: https://mtjas.com.ly/index.php/mtjas/index

Impact of Night Shift Work on Weight and Appetite Disturbances among Nurses: Health and Professional Implications

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Received: December, 14, 2025	Accepted: 01\01\2026	Published: 03\02\2026

Abstract:
case–control study was conducted at Misurata Medical Center to examine the impact of night shift work on weight and appetite disturbances among nurses. The sample included 74 participants divided into a case group of night-shift nurses (51) and a control group of day-shift nurses (23). Data were collected through measurements of weight, height, and several health indicators including subcutaneous fat in the triceps region, periorbital dark circles, facial pallor, sleep disturbances, job satisfaction, mood fluctuations, and swelling of the hands and feet. Repeated Measures ANOVA was applied to assess weight changes between the first and second month, revealing a significant difference when each group was analyzed separately (p-value = 0.001), indicating that weight change patterns varied according to work schedule. Chi-square analysis further demonstrated a statistically significant association between work period and weight loss, with 80.6% of night-shift nurses losing weight compared to 13.6% of day-shift nurses. Night work was also significantly associated with periorbital dark circles (75% vs. 27.3%), facial pallor (84.8% vs. 50%), and sleep disturbances (75% vs. 31.8%). Appetite loss was more prevalent among night-shift nurses (88.2% vs. 17.4%), accompanied by higher rates of mood instability and reduced subcutaneous fat accumulation in the triceps region (84.6% vs. 22.7%). Overall, the findings confirm that night shift work is closely linked to weight fluctuations, appetite disturbances, and multiple adverse health indicators, underscoring the serious impact of night work on the physical and psychological health of nurses.

Keywords: Night Shift, Weight, Nurses, Appetite.

Introduction

Night shift work represents one of the most demanding challenges faced by nurses in healthcare institutions, as it requires uninterrupted patient care throughout the day and night. Such schedules disrupt the circadian rhythm, resulting in a wide range of adverse physical and psychological consequences. Evidence indicates that night shifts are strongly associated with weight fluctuations, appetite disturbances, and mood instability, all of which undermine professional performance and diminish overall quality of life (Magalhães, 2024). Moreover, prolonged exposure to night shift schedules has been linked to fatigue, sleep disorders, and an elevated risk of chronic illnesses (Inchingolo et al., 2025). In fact, several studies emphasize that extended night work significantly increases the likelihood of developing hypertension, diabetes, and cardiovascular conditions, primarily due to its direct impact on hormonal regulation and metabolic processes (Qanash et al., 2021; Inchingolo et al., 2025). In addition, recent findings reveal that sleep quality among night-shift nurses is markedly impaired, leading to reduced concentration, higher incidences of medical errors, and lower job satisfaction (Xiao et al., 2024; van der Grinten et al., 2025). Adding to this body of evidence, Zhang and colleagues (2023) conducted a two-year follow-up analysis within the National Nurse Health Study to investigate the metabolic consequences of night shift work. Their research compared a large cohort of nurses working rotating night shifts with those on daytime schedules, assessing multiple metabolic indicators including insulin resistance measured by HOMA-IR, body mass index (BMI) and weight changes, lipid profile abnormalities such as elevated total cholesterol and triglycerides with reduced HDL cholesterol, as well as fasting glucose and blood pressure. The results demonstrated that nurses who worked more than three-night shifts per week exhibited significantly higher rates

of insulin resistance, obesity, and dyslipidemia. Crucially, the study revealed a clear dose-response relationship: the greater the number of night shifts, the higher the risk of metabolic disturbances. The authors concluded that circadian rhythm disruption caused by night work alters the secretion of key energy-regulating hormones, notably cortisol and melatonin. This hormonal imbalance explains the observed metabolic changes and underscores night shift work as a major risk factor for metabolic syndrome and chronic diseases, including diabetes and cardiovascular disorders (Zhang et al., 2023). Ferri and colleagues (2016) conducted a comparative study in a general hospital to evaluate the impact of rotating night shifts on nurses' metabolic and psychological health compared with those working exclusively daytime schedules. The study involved a large sample of nurses and assessed several indicators, including body mass index (BMI), appetite changes, lipid profile disturbances, and stress-related hormonal variations, particularly cortisol. The findings revealed that nurses engaged in night shifts exhibited significantly higher rates of weight gain, appetite dysregulation, and metabolic abnormalities such as elevated triglycerides and reduced HDL cholesterol. In addition, these nurses reported greater levels of fatigue, anxiety, and depressive symptoms, underscoring the dual burden of metabolic and psychological strain. The authors emphasized that circadian rhythm disruption caused by night work alters hormonal balance and energy metabolism, thereby increasing the risk of metabolic syndrome and long-term chronic conditions such as cardiovascular disease and diabetes (Ferri et al., 2016). Building on this evidence, Pepłońska and colleagues (2019) conducted a systematic review of studies examining the relationship between night shift work and dietary habits among nurses. Their analysis demonstrated that night shift schedules directly affect both the distribution and quality of meals, with nurses frequently skipping essential meals such as breakfast or lunch. This pattern contributes to appetite loss and disrupts normal eating behaviors. Furthermore, the review highlighted that circadian rhythm disruption weakens the regulation of appetite-related hormones, notably leptin and ghrelin, thereby explaining the reduced desire to eat or the tendency to consume nutritionally unbalanced meals (Pepłońska et al., 2019). More recently, de Rijk and colleagues (2024) investigated dietary taste patterns among female nurses working night shifts. Their findings revealed that night shift nurses experienced notable changes in food preferences, showing less inclination toward healthy meals and greater reliance on foods rich in fats and sugars. This shift reflects a disturbance in natural appetite regulation and emphasizes that appetite loss or dysregulation is not merely a secondary effect but part of a broader set of metabolic and psychological changes associated with night work (de Rijk et al., 2024). Taken together, these studies highlight that night shift work is associated with a wide spectrum of health disturbances extending well beyond sleep disruption, encompassing serious long-term complications. Reports from the World Health Organization and the International Agency for Research on Cancer classify night work leading to circadian rhythm disruption as a probable human carcinogen, linking it to increased risks of cardiovascular disease and gastrointestinal disorders. This underscores that night work is not simply a social or organizational challenge but a significant health hazard. The IARC Monographs on the Identification of Carcinogenic Hazards to Humans concluded that circadian disruption caused by night shift work falls under Group 2A, emphasizing that chronic exposure to artificial light at night and persistent sleep disturbance alters melatonin secretion and disrupts biological rhythms, thereby elevating cancer risk. Other studies have further examined the broader health impacts of night work, showing that chronic exposure is associated with higher rates of cardiovascular disease, type 2 diabetes, and sleep disorders, with mediating factors such as diet and sleep quality influencing the severity of outcomes. Additionally, research published in Clinical Gastroenterology and Hepatology demonstrated that night-shift workers experience gastrointestinal disorders at significantly higher rates than day workers, a phenomenon attributed to changes in gut microbiota and irregular meal timing (International Agency for Research on Cancer, 2020; van der Grinten et al., 2025; Biesiekierski et al., 2026). However, while global research is extensive, most studies have been conducted in Western or Asian contexts, leaving a significant gap in the literature regarding the Libyan healthcare environment. This research at Misurata Medical Center aims to address this gap by examining the effects of night shift work on nurses' weight, appetite, and mood fluctuations, thereby contributing to the development of locally relevant health policies and supportive workplace strategies.

Material and Methods

The study was designed: as a case-control investigation including 74 nurses from Misurata Medical Center. Participants were divided into two groups according to their work shifts: the case group (51 nurses working night shifts) and the control group (23 nurses working morning shifts). The study was conducted between mid-October and mid-December 2025 and targeted nurses aged 18 to 50 years.

Data collection: was carried out through personal interviews, questionnaires, and clinical examinations. Measurements included weight and height, with weight assessed in the first month and re-measured in the second month. Additional evaluations involved subcutaneous fat thickness under the triceps muscle, shoulder muscle assessment, facial pallor, and foot edema. The questionnaire also addressed workdays, sleep duration and disturbances, appetite loss, mood fluctuations, constipation, diarrhea, job satisfaction, marital status, educational level, and income.

Exclusion criteria were applied to eliminate participants with diabetes, hypertension, cardiovascular disease, kidney disease, cancer, and pregnancy, ensuring the accuracy and reliability of the study findings.

Ethical Approval:

The sample was collected after obtaining the participants' consent and approval from the Human Resources Department at Misurata Medical Center.

Results and Discussion

This case-control study included 74 nurses from Misurata Medical Center, divided into two groups: the case group (51 nurses working night shifts) and the control group (23 nurses working morning shifts). Among the night-shift nurses, 20 were single and 24 were married, while in the control group 15 were single and 15 were married.
Anthropometric measurements and clinical examinations were conducted, including assessments of weight and height, triceps skinfold thickness, shoulder muscle strength, facial pallor, swelling of the hands and feet, as well as evaluations of sleep disturbances, job satisfaction, mood fluctuations, constipation, and diarrhea. Weight was measured in the first month and re-measured in the second month, with a mean of 72.48 kg and a standard deviation of 16.8141 in the first month, and 16.3869 in the second month (Table 1). The proportion of nurses who experienced weight loss was significantly higher among night-shift workers (80%) compared to morning-shift workers (18%).

Table (1): the descriptive statistical values of the mean weight in the first and second months for both groups

Descriptive Statistics						
	N	Minimum	Maximum	Mean		Std. D
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Second weight	74	68	117.0	72.483	1.8922	16.3869
First weight	74	71	112.0	72.725	1.9287	16.8141
Valid N (listwise)	74					

Repeated Measures ANOVA analysis showed no significant difference in weight between the two months when considering all participants together (p-value = 0.793 > 0.05). However, a significant difference was observed when examining the effect of work shift on weight change (p-value = 0.001), indicating that the pattern of change differed between the two groups (Table 2). Moreover, Mauchly's Test of Sphericity confirmed that the assumption of sphericity was met (W = 1.000, p = 1.000), which strengthens the reliability of the results (Table 3).

Table (2): Variance between the two groups according to work shift using ANOVA analysis

Multivariate Tests						
Effect		**Value**	**F**	**Hypothesis df**	**Error df**	**p-value**
Time	Pillai's Trace	0.001	0.069b	1.000	72.000	0.793
	Wilks' Lambda	0.999	0.069b	1.000	72.000	0.793
	Hotelling's Trace	0.001	0.069b	1.000	72.000	0.793
	Roy's Largest Root	0.001	0.069b	1.000	72.000	0.793
time * work	Pillai's Trace	0.169	7.345b	2.000	72.000	0.001
	Wilks' Lambda	0.831	7.345b	2.000	72.000	0.001
	Hotelling's Trace	0.204	7.345b	2.000	72.000	0.001
	Roy's Largest Root	0.204	7.345b	2.000	72.000	0.001

Moreover, Mauchly's Test of Sphericity confirmed that the assumption of sphericity was met (W = 1.000, p = 1.000), which strengthens the reliability of the results (Table 3).

Table 3: Mauchly's Test of Sphericity for verifying the assumptions in ANOVA analysis

Mauchly's Test of Sphericity							
Measure: MEASURE_1							
Within Subjects Effect	**Mauchly's W**	**X^2**	**Df**	**p-value**	**Epsilon b**		
					Greenhouse-Geisser	**Huynh-Feldt**	**Lower-bound**
Time	1.000	0.000	0	.	1.000	1.000	1.000
Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.							
a. Design: Intercept + time work Within Subjects Design: time work							
b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.							

The Chi-square test results revealed statistically significant associations between work shift and most of the studied health indicators, with markedly higher prevalence among night-shift nurses compared to the control group. Specifically, weight loss was observed in 80.6% versus 13.6%, facial pallor in 84.8% versus 50%, sleep disturbances in 75% versus 31.8%, shoulder muscle weakness in 86.6% versus 59%, and reduced triceps fat stores in 84.61% versus 22.7%, all with statistically significant values ($p < 0.001$). Additional significant associations were noted with appetite loss, mood fluctuations, limb swelling, and decreased job satisfaction (Table 4).

Table 4: Chi-square values and p-values for the variables weight, skin pallor, job satisfaction, loss of appetite,

Count					X^2	P-value
		Weight loss		Total		
		Percentage %	No present			
Time work	control	3	20	23	31.952	0.00
	case	42	9	51		
		Skin pallor				
Time work	control	2	21	23	38.034	0.00
	case	43	8	51		
Sleep disorders						
Time work	control	13	10	23	6.651	0.010
	case	43	8	51		
Lose appetite						
Time work	control	4	19	23	35.563	0.00
	case	45	6	51		
		Hand swelling				
Time work	Control	2	21	23	31.408	0.00
	case	40	11	51		
Shoulder muscle assessment						
Time Work	Control	12	11	23	86.864	0.00
	case	8	43	51		

mood swings, and other indicators between the two groups

Overall, these findings indicate that night-shift nurses are more vulnerable to a range of physical and health challenges compared to their morning-shift counterparts, highlighting the negative impact of night work on both physical and psychological health (Figure 1).

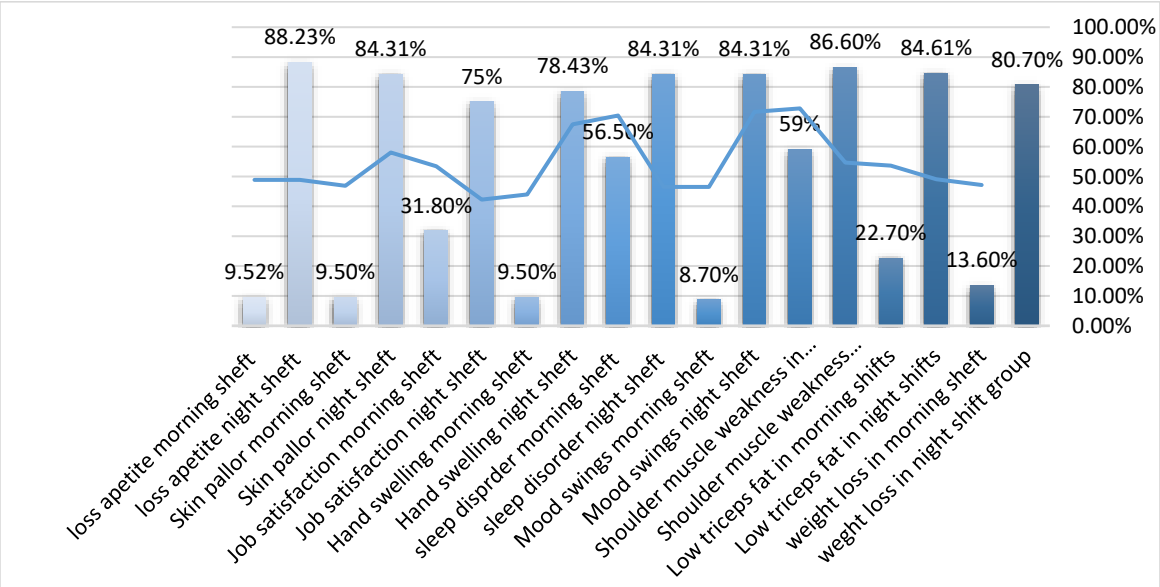

Figure 1: the proportion of cases suffering from underweight, poor fat accumulation, and weak shoulder muscles, associated with loss of appetite, facial pallor, hand swelling, job dissatisfaction, mood swings, and sleep disturbances.

This study was conducted on nurses working at Misurata Medical Center to examine the impact of night shifts on their health. The research took place in October 2025, involving 74 participants divided into two groups. The first group consisted of 51 nurses working night shifts,
while the second group included 23 nurses working morning shifts as controls. Body weight was measured for both groups during the first and second months of the study to assess the effect of work shifts on weight. Results showed that 80.70% of the nurses in the night-shift group experienced weight loss, compared to only 13.60% in the control group. Our findings are consistent with a recent Australian study conducted between 2019 and 2022, which included 250 participants and revealed a significant effect of night-shift work on weight loss, with a statistically significant relationship between weight loss and work shifts (Bonham et al., 2025), Our study is consistent with research conducted in Pakistan in 2023, which included 124 participants to evaluate body mass index (BMI) among night-shift workers compared to day-shift workers. BMI was measured in both groups between September and December. The study found that night-shift workers had a lower BMI than day-shift workers, and the number of individuals with a normal BMI was significantly lower among night-shift workers compared to day-shift workers, reflecting the impact of work shifts on body weight (Ali et al., 2023).
Our findings differed from those of a study conducted in Australia in 2023, which investigated the impact of night-shift work on weight loss over an 18-month period. In that study, night-shift workers were observed to gain weight rather than lose it. The researchers attributed this weight gain to certain dietary and sleep behaviors among night-shift workers, such as sleeping immediately after eating. The difference between our results and theirs may be explained by the longer study duration, during which multiple factors could have influenced outcomes, as well as the specific behaviors highlighted in their participants. Nevertheless, both studies agreed that night-shift work significantly affects the body's metabolic activity (Reid et al., 2023).
Night-shift nurses suffer from health problems related to malnutrition, with 84.6% experiencing poor fat accumulation in the triceps region of the arm. This may be attributed to loss of appetite, as 88.23% of night-shift nurses reported appetite loss. Such conditions reflect weak fat distribution in the body, which indicates the nutritional status of night-shift nurses. Measuring triceps skinfold thickness is considered one of the best methods for predicting malnutrition and fat distribution patterns in the body. This aligns with a study conducted in India in 2012 involving more than 1,400 participants, which demonstrated that mid-upper arm circumference and triceps skinfold thickness are among the most reliable indicators for assessing nutritional status (Khadilkar et al., 2012).
Our study is consistent with research conducted in Taiwan in 2019, which examined the impact of night-shift work on appetite among nurses.
The study included 120 participants and compared nurses working night shifts with those working day shifts as controls. Findings revealed that night-shift nurses experienced appetite disturbances and reduced food intake compared to the control group (Chen et al., 2019). Another study conducted in England in 2022 involved interviews with 16 participants (11 physicians and 5 nurses). The results showed that participants often prioritized their clinical responsibilities over nutrition, frequently skipping meals and relying on caffeine to stay alert, particularly during night shifts, which were associated with less healthy food choices. Although they expressed a desire to eat healthily, work pressure made it difficult to adhere to a proper diet. In many cases, the meal consumed after the shift was the most important, and sometimes the only meal of the day. The study concluded that their dietary practices were below recommended standards, highly individualized, and influenced by environmental and professional factors, highlighting the need for workplace nutritional interventions and follow-up studies to better understand barriers and challenges (Morris et al., 2022).
A referenced study concluded that nurses working night shifts are more prone to malnutrition and appetite disorders compared to their daytime counterparts. These unhealthy dietary patterns may increase the risk of metabolic diseases, obesity, and immune disorders. The study recommended implementing nutritional interventions in the workplace and providing healthier food options during night shifts (Wang et al., 2021).
Data collected from participants in our study revealed sleep disturbances and mood fluctuations, with associated signs such as dark circles under the eyes and facial pallor. The prevalence of sleep disorders among the night-shift group was 84.31%, compared to 56.5% in the control group. There is a clear association between sleep disturbances and the appearance of dark circles under the eyes, as 75% of night-shift nurses exhibited dark circles compared to only 27% of day-shift nurses. Sleep disturbances are largely attributed to hormonal imbalances caused by disruption of the body's circadian rhythm. Exposure to artificial light during night shifts suppresses melatonin secretion from the pineal gland, the key hormone regulating the sleep–wake cycle, and its reduction

leads to difficulty sleeping and symptoms of insomnia (Cho et al., 2016). A study conducted in southern Brazil in 2021 demonstrated that night-shift work causes sleep disturbances due to circadian rhythm disruption and reduced melatonin secretion. The study compared 36 hospital workers (19 day-shift and 17 night-shift) at a university hospital in Brazil, using saliva samples to measure cortisol and melatonin. Findings revealed that cortisol levels among night-shift workers were less regular, and they slept fewer hours compared to day-shift workers (Souza et al., 2021).

There is no doubt that biological rhythms, such as the circadian rhythm, play a vital role in tissue and skin health. Recent studies have shown that light can reset and improve peripheral biological systems independently. The circadian rhythm is closely linked to immunity and skin balance, and any disruption may lead to dermatological disorders such as pallor and discoloration. A systematic review also highlighted the effects of seasonal and annual changes on the skin, in addition to age-related variations. The review emphasized the importance of continuing research on these cyclical processes to better understand their impact and to develop future strategies to counteract the effects of circadian rhythm disruption on the skin and other tissues. Furthermore, another study indicated that facial pallor and dark circles associated with sleep deprivation may reflect physiological changes, such as impaired skin blood circulation, which could accelerate aging (Huang et al., 2020; Kwon et al., 2019).

Conclusion

This study on nurses at Misurata Medical Center found that night-shift workers experienced several health issues, including weight loss, poor appetite, reduced fat accumulation, facial pallor, dark circles, limb swelling, sleep disturbances, and mood changes.

Recommendations

- Better organization of night shifts to reduce fatigue.
- Adequate rest breaks during shifts.
- Increased health awareness about night-shift effects.
- Attention to nurses' psychological well-being.
- Improved work environment (lighting, ventilation).
- Rotation of shifts among nurses whenever possible.

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