

Rotating Shift Work That Effect Employees Health Conditions; A Case Of Pharmaceutical Industry, Jamshoro

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Abstract

There are many industries in Pakistan which works 24/7 hours per week that is cement, garment, textile, FMCG etc. This research article is concerned about the pharmaceutical industry of Pakistan. The pharmaceutical industry of Pakistan is new emerging, sustainable and growing in term of sales, export and employees. The industry mainly shares 1% to the GDP of Pakistan. This research article gives overview about the occupational health problems related to shift work that are facing by the employees of pharmaceutical industry of Jamshoro, Pakistan. Rotating shift work can be characterized as "a strategy for organizing step by step working hours wherein different individuals or gatherings work in movement to cover more than the common place 8 hour day, up to and including the whole 24 hour day". The research article is quantitative in nature and used 5 point likert scale. The main variables are general health, stress, fatigue and sleep disturbance. The questionnaire was distributed among more than 60 employees of morning and evening shift employees separately. The collection of data was longitudinal in nature and sampling was random. This research study facilitates to understand the effect of rotational shift work on the health of employees of pharmaceutical industry of Jamshoro. The purpose of this research article is also to know the exact root cause of sleep disturbance, fatigue, and stress on the employees.

Keywords: Rotating Shift Work, Pharmaceutical Industry, Sleep Disturbance, Fatigue, Stress, Jamshoro, Pakistan.

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I. INTRODUCTION

Traditionally, In Pakistan the working hours of any industry is 9am to 5 pm. In some industries the work might be done through shift working. Shift working consider as outside from the traditional way of working. The latest measurements show that most of the working populace is occupied with unpredictable or "non-standard" working hours, including shift and night work, week-end work, split shifts etc (Costa et al., 2010: 2013). The focal and central piece of many people's lives is work. It gives compensation, motivations, security and may fulfill purposes as self-affirmation, social contact, and sensation of having some workplace. People are concerned truly physically and mentally while working. As indicated by the natural phenomena, people feel more energetic during the daytime work proficiently in contrast with evening but when an organization works against normal routine that is shift working it is unfavorable for health. Rotational shift work can be defined as a planning framework where employees go through a pattern of working the day shift, the night shift, and any swing shifts that might be important.

There is the chance of human medical problems like upset rest, weariness, loss of craving, stress, discouragement and uneasiness that may eventually prompts loss of the productivity of employees. Numerous enterprises depend on shift working to accomplish their business targets and a huge number of people or group of people work in positions that require shift working.

Lee et al (2019) characterize that rotational shift work employees have rest issues and they experience more noteworthy weariness, gloom, uneasiness, and traded off personal satisfaction contrasted with non-shift workers. Lee et al (2019) likewise distinguished that shift work is identified with rest issues that sometimes become the reason of shift work intolerance.

This research article tried to address the issue that how shift work affect the health of the employees such as general health, stress, fatigue and sleep disturbance particularly in pharmaceutical industry where employees have to work more than 10 hours daily 24/7 per week.

II. LITERATURE REVIEW

A. IMPACT OF ROTATING SHIFT WORK ON EMPLOYEES

These shifts can be either steady, forcing 24 hours to leave each day, 7 days of the week, or semi-reliable, running 2 or 3 shifts for consistently with or without closures of the week. Shift work empowers the association to create merchandise and enterprises persistently 24 hours and seven days (Heathfield, 2018). The shifts comprise of morning, evening and overnight shifts. There are different benefits of pivoting shifts. It gives the organization inclusion and openness (Monk, 1986; Deng et al., 2018). The central parts behind a negative impact of night work and shift work manage representatives mental health are (i) interference of the body's circadian rhythm, (ii) sleep disturbance, (iii) adjusting responses during challenges. All three factors affect the hormonal structure of the human body that leads to mental and physical tension and sadness.

B. STRESS, FATIGUE AND SLEEP DISTURBANCE

As per clinical reference book "stress is an inclination of emotional or actual strain. It can emerge out of any occasion or thought that causes you to feel disappointed, irate, or anxious". Stress can be characterized as the response of the body that happens under unsafe circumstance (Cannizzaro et al., 2020). At the point when human brain feels undermined it permits the body to act in a manner that keeps from injury. Stress is the state of mind it could be seen or genuine. Everyone bargains diverse with stress. Stress can be grouped into four kinds I) Physical stress, ii) Psychological stress, iii) Psychosocial stress and iv) Cognitive stress yet the stress which is identified with workplace are I) actual ii) psychosocial iii) intellectual stress iv) conduct stress and iv) emotional stress. The physical and mental stress at work may impact the prosperity and productivity of employees. Much effort has been resolved to clarify characteristic, and mental instruments drew in with the way where people respond to troubles for the duration of regular day to day existence. (Barlow, 2002).

The physical stress is identified with the work climate that incorporate clamor, helpless lighting, awful working stances, helpless office work and ergonomic elements while psychosocial stress has prevalent variables that incorporate rigid working hours, high occupation interest, helpless work plan and design, tormenting, provocation, work weakness and occupation control (French et al., 2019). Stress influences the attitude and prosperity of the representatives in number of ways. The people who experienced undeniable degree of stress (intellectually and physically) may create various kinds of illnesses that incorporate ulcer, hypertension, work disappointment, trouble in settling on routine choice, strain, touchiness, loss of craving and weariness. One of the primary reasons of nonappearance from work is stress (Cannizzaro et al., 2020). Workplace stress isn't simply just influencing the presentation and strength of worker however it additionally impacts the exhibition of the association.

Fatigue can be depicted as the condition of feeling tired, languor and laziness that comes against the consequence of constant mental or physical action, tension, openness to unforgiving climate or rest aggravation (Connel, 2020). It can seriously influence the exhibition of the worker that prompts unsafe blunders (Maman et al., 2017). Fatigue is the huge issue in current industry on account of high requests of occupations, delayed working hours and disturbance of circadian rhythm (Halim, Omar, Saman and Othman, 2012; Brzozowski et al., 2021). Fatigue has likewise a mental angle that implies the human body feels hesitant to proceed with any assignment and experience low energy to take care of job. In spite of information, preparing and abilities fatigue influences everybody since it affects physical and mental exercises of human body that makes hard to do the least complex undertaking (Wolf et al., 2017). The impact of fatigue incorporates task demotivation, longer reaction time; debilitate memory, uninformed preparing, misguided thinking and more unfortunate psychometric coordination.

The rule for undisturbed sleep length in sound grown-ups is somewhere in the range of 7 and 9 hours in a 24-hour time span. Upset sleep is the most widely recognized medical issue detailed by shift workers (Costa, 2010). The expression "Shift Work Sleep Disorder" (SWSD) has been applied to portray a circadian disturbance comparable to a work plan that covers with the typical time for sleep, further described by a sleeping disorder and unnecessary sleepiness (Schwartz and Roth, 2006). Shift-workers are at an expanded danger of building up a scope of sleep problems on account of their work plans, including shift work issue due to the disturbance of their normal sleep cycle and circadian rhythms. SWD is a sleep condition portrayed by indications of fatigue and exorbitant sleepiness, which results from working sporadic shifts (Jehan et al., 2017).

III. MATERIAL AND METHODS

In order to achieve the aim, this research article follows systematic approach of quantitative method. The data collection process was done into three steps. In very first step, the development of questionnaire takes place. The author went through literature and set their scales. This research article adopted four different scales to measure the variables I.e. general health, stress, fatigue and sleep disturbance., Åkerstedt, T., & Wright, K. P. (2009) with Pittsburgh Sleep Quality Index (PSQI) for sleep disturbance, Juniarta, I. G. N., Sardjono, T. W., & Ningsih, D. K. (2020) for fatigue and stress and Lahlouh, A., & Mustafa, M. (2020) for Sleep quality and

general health. A five-point Likert scale was used to measure the questionnaire. 1 for No or Disagree, 2 for Often, 3 for Sometimes, 4 for Mostly, and 5 for Yes or Always. In the second step the questionnaire was distributed in morning and evening shift separately. The data collection method was longitudinal and the sampling was random. In third step, after gathering all the responses the data then feed into SPSS to know the exact result and analysis. This research article used SPSS tool for data compilation, analysis and interpretation.

IV. RESULT

This research article generated two hypotheses to measure the effect of rotational shift work on the employees of pharmaceutical industry of Jamshoro, Pakistan. According to H1, the shift work causes general health, stress, fatigue and sleep disturbance issue on the employees and against this the null H0 said that, the rotating shift pattern has no effect on the health of employees. According to the second hypothesis, the general health of morning employees is better than evening employees and its null hypothesis said that, the general health of morning and evening employees are same and has no effect on their health.

TABLE 1
RESEARCH HYPOTHESIS

Research Question	Hypothesis (Ha)	Null Hypothesis (Ho)
1. To measure the health conditions (general health, stress, fatigue and sleep quality) within the existing rotation plan in pharmaceutical industry Jamshoro.	H1=The rotating shift pattern cause general health issue, stress, fatigue and sleep disturbance in employees.	Ho=The rotating shift pattern cause no general health issue, stress, fatigue and sleep disturbance in employees.
	H2= The general health of morning employees is better than evening employees	Ho=The general health of morning and evening employees are same.

TABLE 2
BETWEEN-SUBJECTS FACTORS

	Value Label	N
Shift	1.00 Morning	65
	2.00 Evening	65

TABLE 3
DESCRIPTIVE STATISTICS

	Shift	Mean	Std. Deviation	N
General health	Morning	1.8800	.53944	65
	Evening	2.4215	.76168	65
	Total	2.1508	.71140	130
Stress	Morning	2.1637	.61325	65
	Evening	2.5165	.65887	65
	Total	2.3401	.65826	130
Fatigue	Morning	2.2346	.80692	65
	Evening	2.7462	.75647	65
	Total	2.4904	.82029	130
Sleep disturbance	Morning	2.4949	.78005	65
	Evening	2.6667	.71686	65
	Total	2.5808	.75118	130

The analysis of first hypothesis: There were two shifts as shown in table 2 with 65 respondents. There were 65 respondents for morning and 65 respondents for evening. The other table 3 discloses the descriptive result and mean of the variables of general health, stress, fatigue and sleep disturbance of morning and evening employees. According to table 3, the morning employees mean value of general health was 1.8800, stress mean value was 2.16, fatigue mean value was 2.23 and sleep disturbance mean value was 2.49 while the evening shift employees got slightly higher mean values. The general health, stress, fatigue and sleep disturbance mean value of evening shift employees were 2.42, 2.51, 2.74 and 2.66.

TABLE 4
BOX'S TEST OF EQUALITY OF COVARIANCE MATRICES^A

Box's M	22.377
F	2.162
df1	10
df2	78329.880
Sig.	.017

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + Shift

Table 4 shows the assumption of box`s test of covariance of matrices. According to the table 4, the significance (p) value was 0.17 that showed the p value was less than 0.001. It satisfied the assumption of covariance box`s test matrices.

TABLE 5
MULTIVARIATE TESTS^A

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.946	545.144 ^b	4.000	125.000	.000	.946
	Wilks' Lambda	.054	545.144 ^b	4.000	125.000	.000	.946
	Hotelling's Trace	17.445	545.144 ^b	4.000	125.000	.000	.946
	Roy's Largest Root	17.445	545.144 ^b	4.000	125.000	.000	.946
Shift	Pillai's Trace	.173	6.524 ^b	4.000	125.000	.000	.173
	Wilks' Lambda	.827	6.524 ^b	4.000	125.000	.000	.173
	Hotelling's Trace	.209	6.524 ^b	4.000	125.000	.000	.173
	Roy's Largest Root	.209	6.524 ^b	4.000	125.000	.000	.173

a. Design: Intercept + Shift

b. Exact statistic

The test of multivariate (MANOVA) rejected the assumption of null hypotheses that rotating shift work pattern didn't have any effect on the health of pharmaceutical industry employees. The result was statistically significant because the p value of Wilks`s Lambda was less than 0

H1= The rotating shift pattern has significant effect on general health, stress, fatigue and sleep disturbance in employees.

Ho= The rotating shift pattern has no significant effect on general health issue, stress, fatigue and sleep disturbance in employees.

TABLE 6
LEVENE'S TEST OF EQUALITY OF ERROR VARIANCES^A

	F	df1	df2	Sig.
Generalhealth	6.431	1	128	.012
Stress	.006	1	128	.940
Fatigue	.560	1	128	.456
Sleep_disturbance	1.253	1	128	.265

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Shift

The table 6 shows the levene`s test of homogeneity of variance. According to table 6, all three independent variable stress, fatigue and sleep disturbance got non-significant p value that satisfied the levene`s test assumption.

TABLE 7
TESTS OF BETWEEN-SUBJECTS EFFECTS

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Generalhealth	9.531 ^a	1	9.531	21.882	.000	.146
	Stress	4.044 ^b	1	4.044	9.983	.002	.072
	Fatigue	8.504 ^c	1	8.504	13.903	.000	.098
	Sleep_disturbance	.959 ^d	1	.959	1.709	.193	.013
Intercept	Generalhealth	601.355	1	601.355	1380.594	.000	.915
	Stress	711.895	1	711.895	1757.360	.000	.932
	Fatigue	806.262	1	806.262	1318.092	.000	.911
	Sleep_disturbance	865.848	1	865.848	1542.894	.000	.923
Shift	Generalhealth	9.531	1	9.531	21.882	.000	.146
	Stress	4.044	1	4.044	9.983	.002	.072
	Fatigue	8.504	1	8.504	13.903	.000	.098
	Sleep disturbance	.959	1	.959	1.709	.193	.013
Error	General health	55.754	128	.436			
	Stress	51.852	128	.405			
	Fatigue	78.296	128	.612			
	Sleep disturbance	71.832	128	.561			
Total	General health	666.640	130				
	Stress	767.791	130				
	Fatigue	893.063	130				
	Sleep disturbance	938.639	130				
Corrected Total	General health	65.285	129				
	Stress	55.896	129				
	Fatigue	86.800	129				
	Sleep disturbance	72.791	129				

a. R Squared = .146 (Adjusted R Squared = .139)

b. R Squared = .072 (Adjusted R Squared = .065)

c. R Squared = .098 (Adjusted R Squared = .091)

d. R Squared = .013 (Adjusted R Squared = .005)

The result of test between two subject variables as shown in the table 7, depicted that the rotating shift pattern affects the health of employees that include general health, stress, fatigue and sleep disturbance. The value of p showed less than 0.05 that was statistically significant. The table 7 also showed sleep disturbance value greater than 0.05 which mean the employees of pharmaceutical industry faced sleep disturbance during rotational shift work.

TABLE 8
SHIFT

Dependent Variable	Shift	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
General health	Morning	1.880	.082	1.718	2.042
	Evening	2.422	.082	2.260	2.584
Stress	Morning	2.164	.079	2.008	2.320
	Evening	2.516	.079	2.360	2.673
Fatigue	Morning	2.235	.097	2.043	2.427
	Evening	2.746	.097	2.554	2.938
Sleep disturbance	Morning	2.495	.093	2.311	2.679
	Evening	2.667	.093	2.483	2.851

H2= The general health of morning employees is better than evening employees

H0=The general health of morning and evening employees are same.

According to the interpretation of SPSS data, and all the result, this research article concludes that the employees of pharmaceutical industry experienced sleep disturbance and general health issues. The intensity of health issue was different between morning and evening employees. So this research article rejects the null hypothesis that both shift i.e morning and evening had had same health. According to the likert scale interpretation the mean value of general health of morning shift employees was 1.8 and evening shift employees were 2.4 that mean evening shift employees faced more health issues than morning shift employees.

V. CONCLUSION

This research article investigates about the effect of rotating shift work on the health of human employees of pharmaceutical industry. This research article concludes that the existing rotating shift working pattern develops general health issues, stress, fatigue and sleep disturbance in the employees. The employees feel headache, fatigue in legs, arms and shoulders. Sometimes they get irritated on small issues because of sleep disturbance. The additional discover factor that limits the distinction among morning and evening shift employees was long-standing working hours. The morning shift employees have to work 12 hours per day. It disturbed their routine and directly affects the health of employees. While the evening shifts employees must do 10 hours work/day. It could be 12 hours per day alternate. The sleep cycle of evening shift employees disturbed due to disturbance of their circadian rhythm.

VI. DISCUSSION

This research article found that long working hours develops stress, fatigue and affect sleep which is consistent with previous studies of Wong et al (2019) that have shown the negative effects of long working hours on the risks of chronic fatigue, stress, depressive state, anxiety, sleep quality, all-cause mortality, alcohol use and smoking and self-perceived health, mental health status, hypertension, and health behaviors. The reason behind it its long-standing working hours and quick rotating shift pattern. Because the employees' works outside the standard working hours Deng et al., (2018) said that work that falls outside of 6 am–6 pm, can lead to poor diet, exercise, and sleep habits that lead to decreased productivity, increased workplace accidents, and a variety of negative health outcomes.

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