

**Research Article**

Evaluating mediation and moderation effects in call center employees: A correlational investigation into fatigue, general health, coping and sleep disturbances

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ABSTRACT

Sleep disturbance is usually present in night-shift workers. The objective of this study was to explore the relationships among fatigue, general health, coping and sleep disturbance together with mediating role of general health and moderating role of coping strategies i.e. Task, Emotion oriented & Avoidance in night-shift call center workers. Correlation research design was adopted with sample (N=200) assessed from call centers of Lahore by applying purposive sampling strategy. Data was obtained by administering Multi-dimensional Fatigue Inventory, General Health Questionnaire-28, Coping Inventory for Stressful Situations-21, and Screening Questionnaire for Sleep Disturbance in Shift Workers. Data was analyzed by using Pearson product moment correlation, Hierarchical Multiple Regression Analysis and Hayes Process Regression analysis. Results of this study state that fatigue correlated positively with general health and sleep disturbance. General health, task-oriented, emotion-oriented and avoidance coping strategies also have positive relationship with sleep disturbance. General health seems to have full mediation effect on the relationship of fatigue and sleep disturbance. Task and emotion-oriented coping strategies appear as a moderator while avoidance coping strategy does not appear as a moderator between the relationship of fatigue and sleep disturbance. This research has future implications for identifying night shift call centers workers having proneness to develop Shift work disorder due to sleep disturbance and provides them with better sleep hygiene guidelines to protect their health.

Keywords: *Fatigue; General Health; Coping Strategies; Sleep Disturbances; Call Center Employees; Night-Shift Workers*

1. INTRODUCTION

Due to global changes, there has been a rapid advancement in technology and financial race of countries which have transformed working patterns in organizations. So, as to keep pace with competing world, industries are struggling for maximizing their productivity and benefits to fulfill the demands of public and in this effort, organizations are providing their services like banking, transport, delivery and other services 24 hours a day. Therefore, non-standard working hours have obtained a huge market approval and in turn traditional working hours i.e., working 9am to 5pm; 5 days a week have evolved in this globalized world. A large number of work force is indulging in various forms of shiftwork in order to fulfill

their own financial demands as a result of rising inflation in world. More indulgence of workforce in shiftwork is questioning the health, sleep quality and relationship problems among workers.

A call center worker is an employee who has to spend a major portion of his job time by answering different class via telephones while at the same time utilizing display screen instruments. Such employees have to handle mainly the incoming or outgoing calls or both. In case of outgoing calls, companies typically utilize these services for selling products, researching of market and running advertising campaigns (Norman, 2005). Among night shift call center workers, disturbance of circadian rhythm due to lack of sufficient sleep and fatigue may cause inefficiency during their work (Cruzat, 2014). Prevalence rate of psychological disorders and insomnia is elevated among shift workers as compared to those working in standard job hours. Disturbance of circadian rhythm in shift workers in turn causing sleep disturbances have a potential for creating health hazards and hormonal imbalances i.e., cortisol and melatonin disturbances which in turn cause metabolic disorders i.e., Diabetes type 2, nephropathy and obesity among shift workers. Risk for other health problems i.e., Acute respiratory infections, Cardio metabolic disorders, gastrointestinal problems, headaches, depression, mensuration cycle imbalance, mood disorders and chronic back pain etc. enhances due to sleep disturbances. In shift workers, there is a rise in the count of white blood cells which in turn lowers the immunity of person. There is a higher prevalence and incidence of breast cancer in shift worker females as compared to females working in non-shifts. Moreover, poor sleep causes impairment in daily functioning of the individual consequently effecting work performance and productivity which can then be improved by effective preventive measures to lessen stress at workplace i.e., through supportive environment of workplace, family and support (Jehan et al., 2017).

In numerous researches conducted on fatigue and night shift work, fatigue can be defined in various ways mostly in terms of increased loss of sleep, alleviated alertness and enhanced subjective sleepiness. Two main biological factors are responsible for sleepiness i.e., body clock/ circadian rhythm and homeostatic drive of body for sleep (Goel, 2017). In shift workers, issues mostly arise due to the fact that employees have to work against their regular sleep-wake cycle i.e., to sleep during daytime and to remain awake at night. As it is natural phenomenon that work is more fatigue causing at night while sleep is more ordered and fruitful at night so a remarkable variation may be present between course and augmentation of fatigue in day and night shift employees. For instance, Jansen et al., (2002); reveal that night shift workers need more physical and mental exertion together with investing more time for recovering than day shift employees (Jansen et al., 2003). Foremost symptoms which result in disruption of biological clock by unbalancing circadian rhythms are insomnia and fatigue. The fundamental principle in circadian rhythm disruption is catabolism and anabolism. Catabolism involves shattering and discharging of energy which provides preparedness for action in daily tasks while anabolism involves regeneration of energy which provides comfort at night. During night, body is at its lowest functional point hence working at its lowest point and sleep loss creates a disastrous combination for health resulting in too much fatigue and daytime sleepiness. Moreover,

nervous system and bodily functions decline during early hours of morning and night while night time work makes it tough to have essential sleep for a proper functioning of body in turn effecting work performance and intensifying the risk of any calamity. This poor adaptation of night workers endures chronic fatigue progressively which can be exhibited in the form of depression, constipation, appetite loss, irritation, constipation, deprivation of drive and other issues (Ummul, 2012).

Coping strategies are the methods by which people practice management of perceived discrepancy in demands and resources. This indicates that coping efforts are diverse and do not need to be addressed. Although coping efforts are often aimed towards rectifying or grasping the matter, they can help in changing a person's perception of difference, accepting or putting up with harm or risk (Sarafino & Smith, 2016). Coping has three basic forms i.e. avoidance-oriented (coping strategies and activities deliberately administered to disconnect from disturbing situations e.g. substance abuse, looking for distractions wishful thinking), emotion-oriented (techniques practiced for reconceptualization of problematic event and then finding effective solutions for that problem e.g. planning actions, reappraising situation positively and problem solving) and task-oriented coping (practiced by individuals in order to regulate their negative emotions produced by perceiving a stressor e.g. demanding emotional/social assistance and sharing emotional feelings and unconstructive emotional strategies involve suppressing emotions, self-blaming and rumination (Endler, 2001). The relationship of worker with his environment is being taken as reciprocal and dynamic. The concept of stress is being defined as disparity between individuals' assessment of the demands of environment and resources of individuals. If resources of a person exceed beyond stressors in the environment, then health and well-being of a person is at risk (Olsson et al., 1990).

WHO in 1986, explained health as; "Health is not a prime goal of spending one's life while a means for living every day. It is taken as a positive notion which highlights physical capabilities as well as personal/social resorts" (World Health Organization, 1986, paras 4-5). As per WHO, general wellbeing is described in terms of physical, mental and social prosperity. The process by which shift work can initiate health issues are complicated in nature i.e., the joint effect of behavioral, socio-transient and physiological pathways are involved. Physiologically, interruption of circadian rhythms because of disturbances of the rest/wake cycle at night prompts sleep related problems, de-synchronization of internal mechanisms, and elevated susceptibility to illness; from the perspective of manners involved in spending one's life, shiftwork upsets typical socio-transient behaviors and subsequently meddles with family and recreation activities, prompting social pressure. While analyzing from the perspective of health behavior, adverse effects, for example, rise in smoking behavior and consuming too much alcohol, unhealthy eating routine, and decreased physical exercise, may additionally play a role in developing disturbed health among shift workers. Also, biomarkers (for example cholesterol) depict changes identified with shiftwork, and these biomarkers can play a role of mediator in developing disease. Disturbed sleep may likewise be present in the relationship of shiftwork with chronic illnesses (Parkes, 2017).

Sleep disturbances comprise of the disorders related to disturbances of sleep i.e. to sleep on time and then retaining sleep (insomnia), excessive daytime sleepiness, disorders related to sleep-wake cycle, and maladjustments related to sleep, its phases, or discontinued sleep i.e. waking up randomly during sleeping (parasomnias) (Cormier,1990). Shift work and specifically, night shift is most commonly studied phenomenon that causes interference in well-being of humans and disturbs homeostatic functions of human body. To remain awake at night and then trying to complete that sleep debt during day is against physiological state of human body i.e., as humans are diurnal creatures as this routine causes fluctuations in biological processing by enhancing burden on psychological condition (Costa, 2010).

In Shift Work Disorder, insomnia is experienced during that period when a person normally sleeps and experience excessive sleep during that period when a person is normally awake. This disorder mainly occurs following different patterns of shift work and night shift (Drake & Wright, 2017). Shift Work Disorder is a sleep disorder which occurs due to working in atypical shifts; performing job other than typical working hours i.e., outside 9 am to 5pm working time frame. Individuals with this disorder usually experience fatigue, problems in sleeping and excessive sleeping which disturbs their overall body functioning. Imbalance of circadian rhythm cycle translates into unpleasant health issues. For shift workers having sound and relaxing sleep is necessary for maintaining an effective body functioning. Non-soothing sleep has associations with bad mental, physical health, depression and anxiety which in turn lead to disrupted quality of life hence; there is a lot of financial burden faced by untreated and undiagnosed SWD (Jehan et al., 2017).

Pakistan is passing through a severe economic crisis and due to this job unemployment emerged as a concerning issue which has pushed a large pool of individuals towards night shift jobs to fulfill their financial needs whereas most individuals are employed in night-shift call centers due to easy availability of this job as there has been a consistent growth in transfer of money from foreign countries in IT & IT-Enabled Services-Business Processing Outsourcing in the previous five years, displaying an average growth of 151 % in this particular area with a compound yearly progress rate of 20% i.e. to be the inflated rate of progress out of every industry and largest in whole South Asian region (Pakistan Economic Survey 2018-19, 2019). Moreover, most young individuals in Pakistan are performing night shift jobs and study during day time to meet their education expenses. This creates extra work load on them which causes constant fatigue leading towards health problems, psychological issues and social hindrances. Hence main questions devised for fulfilling the purpose of this research are,

1. Does Fatigue results in Sleep Disturbance in Night-Shift Call Centre Workers?
2. How does Fatigue affect the General Health of Night-Shift Call Centre Workers?
3. How General Health does impact the Disturbance of Sleep in Call Centre Workers?
4. Whether General Health acts a mediator in the relationship of Fatigue and General Health in Night-Shift Call Centre Workers?
5. What is the role of coping strategies in alleviating the level of Sleep disturbance in Call Centre Workers?

2. LITERATURE REVIEW

Fruitful coping techniques were correlated with decreased level of secondary stress coping strategies act as moderator that can well-being of night shift nurses working in critical care unit (Barmawi et al., 2019). Fatigue was present in 4.7 percent and insomnia was found in 39.9 percent workers of a tertiary hospital in Bangalore staff (Mathew et al., 2018). Research conducted in 2 tertiary hospitals of Karachi revealed that the nurses performing their jobs in rotational duties were found to have more proneness towards development of physical health issues than nurses working in morning shifts (Ali et al., 2018). In shift work, generally sleep disruption was highly prevalent to be 39 percent as compared to day work which comes out to be 24.6 percent (Kerkhof, 2017). Mental disorders (96.4 percent), accompanied by social life related problems (84.5 percent) and gastrointestinal disorders (81 percent) were found to be more prevalent shiftwork-related issues (Poursadeghiyan et al., 2017). Results of Raja and Bhasin (2016) research showed that physical illness was present in 37 percent of call center workers while 77.6 percent of call center employees were suspected of having insomnia while others reported to have no sleep related problem. Similarly, a systematic review conducted by Ritcher and his colleagues in 2016 showed that Shift Work Disorder was explained through the incidence of insomnia and fatigue in workers of shifts related with working time. Fixed shifts of night were correlated with higher risks of psychological and sleep issues and sleep disturbance might act as mediator in this relationship (Cheng & Cheng, 2016). There was a significant difference found in call center workers of South Korea between depression and fatigue while fatigue come up as a significant predictor for depression in the sample. Participants who passed from more emotional stress seemed to have elevated depression. Fatigue appeared to be a strong factor which impacted level of depression in employees (Kim & Cha, 2015).

Various behavioral components such as conative i.e., being purposeful and committed to action, affective i.e., to oversee one's emotions and cognitive i.e., skepticism and robust control must be taken into consideration while developing a psychological profile including coping strategies of call center employees were revealed (Harry, 2015). A study done in Father Muller Hospital in India showed that Lifestyle related components included such factors, habit of skipping meals, obtaining inadequate sleep, irregularity in eating patterns and not doing exercise was significantly correlated with shift work and seemed to be a contributing factor in developing unhealthy behavior (Vijayalaxmi et al., 2014). Results of a study revealed that those patients having Ischemic Heart Disease who had no fatigue had better chances of sustaining better general health when they were followed up at two and four years period as compared to those participants who reported fatigue Ekman (2013). Health problems in call center workers were broadly reported as psychosocial, mental and physical health issues in employees of call centers belonging to ITes of India (Vijay, 2013). Chronic symptoms of fatigue were reported in nurses of Norway who were engaged in night shift work (Oyane et al., 2013).

Significant associations of severe shift work sleep disorder were found with languidity, brief sleep, hypertension and night shift work (Milia et al., 2013). Increased stress was exhibited in night shift employees than day shift employee while higher levels of stress were

experienced by inbound call centers in comparison with outbound call center employees (Khalid et al., 2013). Research by Eldevik and his colleagues in 2013 concluded that positive significant correlation was observed in excessive sleepiness, insomnia, quick returns, excessive fatigue and Shift Work Disorder.

Symptoms related to gastrointestinal issues and low quality of sleep partially mediated the relationship between fatigue and mental distress while mental distress and stress may result in developing fatigue in healthy individuals by initially undermining quality of sleep and then enhancing vulnerability to various diseases which in turn can also give rise to symptoms of fatigue. Hence, a cycle is formed (Thorsteinsson & Brown, 2012). Psychosocial components like social support, coping and emotionality that are usually explored had moderated the relationship of perceived stress and illness related behaviors (Thomas & Borrayo, 2011). Fatigue was significantly more prevalent in shift workers. Elevated levels of fatigue are correlated with common diseases as well (Ummul, 2012). Ardekani et al., (2008) discovered that the prevalence of somatic symptoms (34.5 percent) and anxiety (43.2 percent) was more than other forms of psychological disorder while depression was 11.2 percent prevalent and prevalence of somatic dysfunction was 9.5 percent. There was a significant correlation of anxiety and shift work. The findings of survey conducted by Charbotel and his colleagues in 2008 pointed out the high ratio of mental distress and health problems caused due to working situations. Physiological health problems like infection of eyes, musculoskeletal diseases, obesity and auditory problems and Psychosocial issues like alcohol and tobacco use, family disturbance and distorted dietary habits were observed in call center workers (Bhuyar et al., 2008). The findings of a study depicted those coping strategies play a different role in diverse ethnic or racial groups but denial is such a strategy which is persistently correlated with less beneficial results (Njoku et al., 2007). A weak correlation in scores of subjective sleepiness and fatigue in employees were found which provided evidence to the concept that sleeping and fatigue are individualistic and different constructs (Shen et al., 2006). A positive relationship of emotion-oriented coping with depression and symptomatology of psychiatric disorders was also found. A strong relationship was also observed in anxiety and depression; and in depression and emotion-oriented coping (Cosway et al., 2000). Research of Pisarski et al., (1998) revealed that coping strategy to express oneself emotionally had mediated effect on psychological complaints but use of disengagement coping strategy had mediated and direct impact on physical and mental health. However, disengagement coping strategy had mediated roles too by effecting physical complaints.

Table 1. Theoretical Models explaining Fatigue, General Health, Coping and Sleep Disturbance with relation to Shift Work

Models	Authors/Years	Main Findings
Process Model of Adaptation to Shiftwork	Smith, Robie & Folkard, 1999	Different environmental, situational and discrete individual variables have an impact on the development of different disturbances caused by social, sleep and domestic factors.
Model on Health and Shiftwork	Rutenfranz and colleagues, 1981	Changing patterns of sleep and wake cycles which are a part of night shift jobs results in stress which further causes strain or forming health related issues.

Models	Authors/Years	Main Findings
Coping and Shiftwork	Monk, 1988	Coping ability to deal with shift work is governed by 3 correlated domains i.e. sleep, biological clock or domestic and social factors while coping strategies act as an essential predictor to successfully adapt to shiftwork.
Framework of strain/stressor	Olsson and colleagues, 1990	Shiftwork act as one of the many stressors related to job which is assumed to effect health. Certain non-occupational (family problems etc.) and occupational stressors (pressure of time management, shiftwork) together with individual factors (lifestyle and age) affect the development of ailments and their relationships are also influenced by coping strategies and appraisal activities.
Sequence model	Steinmetz & Schmidt, 2010	Impact of job time and stressors related to job on bad health formulates by following a certain sequence of complaints presented by a subject.
Psychobiological model	Vallieres & Bastille-Denis, 2012	Working in night shifts causes disruption in effective regulation of sleep which leads to the development of a sleep disorder i.e. Shift Work Disorder.

3. THE CONCEPTUAL FRAMEWORK: CONCEPTUAL MODEL AND HYPOTHESES

3.1. THE CONCEPTUAL MODEL

The conceptual model of the aetiology of the problems that may result from the various features of abnormal work schedules is explained below. Briefly, the features of abnormal work schedules are seen as potentially disrupting the body clock, sleep, and family and social life (Level 3), with the extent of this disruption being moderated by individual, situational and organizational factors (Level 2). These Level 3 disruptions may result in acute effects on mood and performance (Level 4), which may also be influenced by job demands and workload. These acute effects may feed back to Level 3, and may also result in chronic effects on mental health and in decreased safety (Levels 6 and 7). The chronic effects on mental health may also feed back and exacerbate the acute effects on mood, and be moderated by individuals' coping strategies (Level 5). Finally, the chronic effects on physical health may impact on both physical health and safety (Level 7) (Ansiau et al., 2015).

A conceptual model of the manner in which the various problems associated with abnormal work schedules relate both to one another and to the features of the work schedule are explained below,

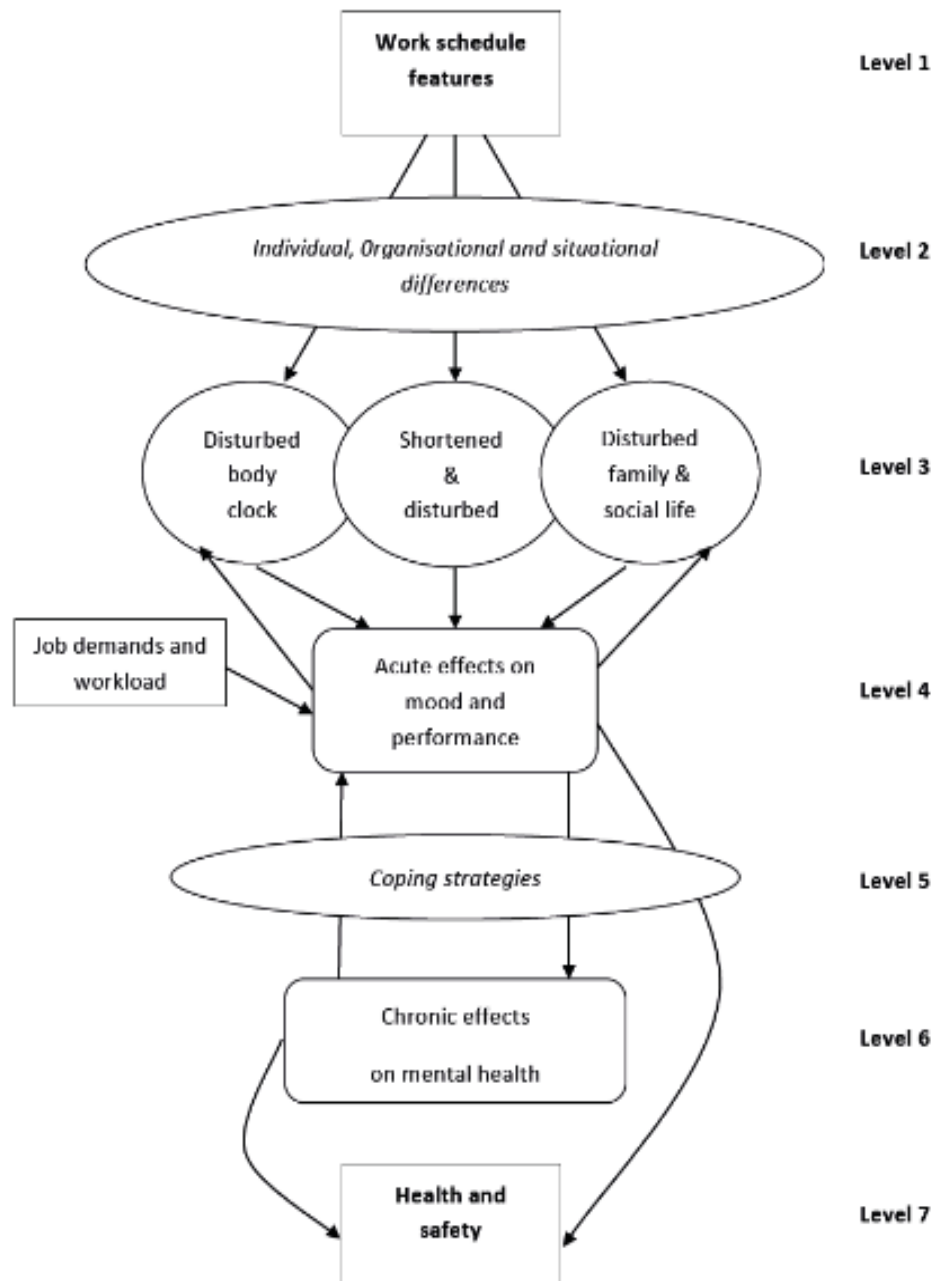


Fig. 1. Adapted From: Longitudinal study of the effects of shift work on health by Leicestershire: IOSH Research Committee, 2015

3.2. HYPOTHESES

The aim of this research is to explore the relationship of different factors i.e. Fatigue, General Health and Coping Strategies with Sleep Disturbance in Night-shift Call Center workers as a large pool of individuals is working in night-shift call centers to meet their financial ends. Moreover, mediating and moderating roles of General Health and Coping Strategies is examined for influencing Sleep Disturbance of Night-shift Call Center workers.

- H_{1A} : There is a likely to be a positive relationship between Fatigue and General Health in Night-shift Call Center Workers.

- H_{1B}: There is likely to be a positive relationship between Fatigue and Sleep Disturbance in Night-shift call center workers.
- H_{1C}: There is likely to be a positive relationship between General and Sleep Disturbance in Night-Shift Call Center Workers.
- H_{1D}: Avoidance and Emotional coping is positively associated to Sleep Disturbance in Night Shift-Call Center Workers.
- H_{1E}: Task-oriented coping is negatively associated to Sleep Disturbance in Night Shift-Call Center Workers.
- H_{1F} : General health will likely to act as mediator between Fatigue and Sleep Disturbance in Night-Shift Call Center Workers.
- H_{1G} : Coping strategies will likely to act as moderator between Fatigue and Sleep Disturbance i.e. Task oriented, Emotion oriented and Avoidance coping strategies will likely to have an interaction effect on the relationship of Fatigue and Sleep Disturbance in Night-Shift Call Center Workers.

3.3. HYPOTHETICAL MODEL

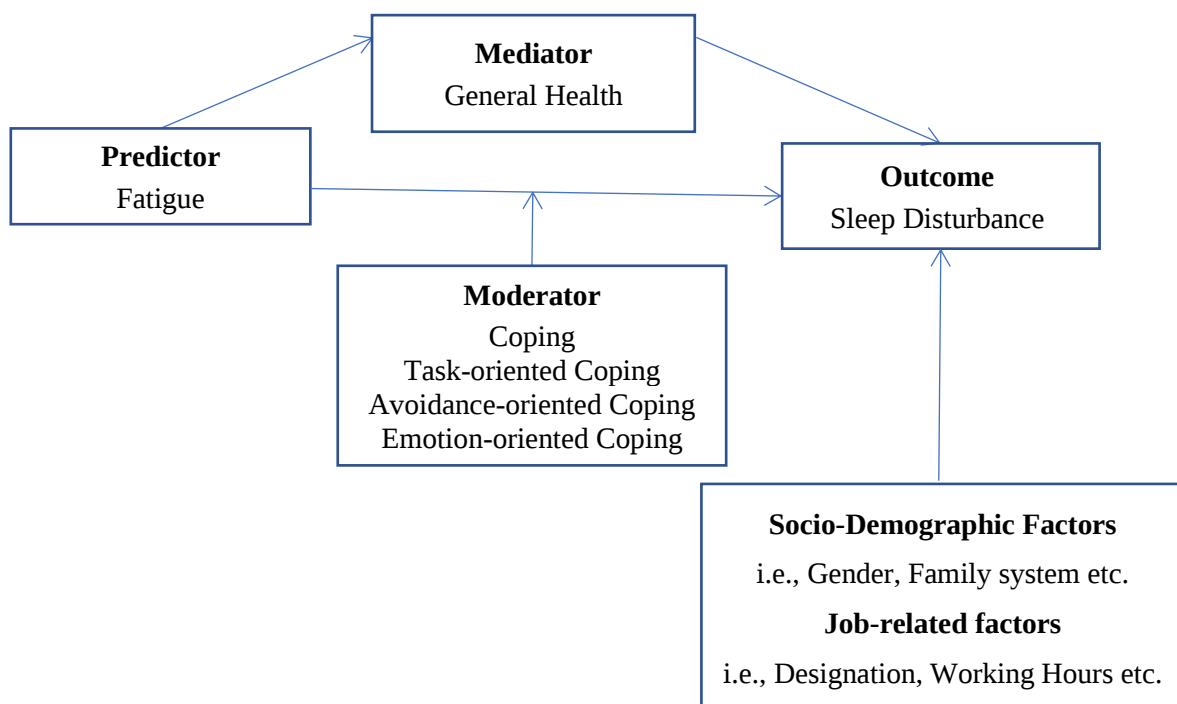


Fig. 2. Hypothetical model of study identifying predictor (fatigue), mediator (general health), moderator (coping strategies) and outcome variable (sleep disturbance).

4. RESEARCH METHODOLOGY

4.1. RESEARCH DESIGN

Correlational research design was used to explore the associations among fatigue, general health, coping and sleep disturbance.

4.2. RESEARCH SAMPLE AND SAMPLING STRATEGY

Purposive Sampling strategy was used to collect data from those call centers workers who were performing their duties during night time at four call centers of Lahore with total sample comprising of 200 call center workers. Those call center workers were included who were operating from 6.00 pm to 6.00 am for past 3 months in respective organizations during night shift working hours; having no diagnosed psychological disorder, physical disability and were not seeking any psychological assistance from any professional. Moreover, permission letters were obtained from the managers of the call centers and informed consent forms were signed at beginning of administering the test by explaining research purpose and details to participants.

5. ASSESSMENT MEASURES

Different measures were used to collect data including: Multidimensional Fatigue Inventory; The authors of this inventory are Smets, Garssen, Bonke and Haes and was formulated in 1995. This inventory is a self-reported questionnaire which consists of 20 questions encompassing various domains of fatigue. These questions are classified in the form of 5 scales i.e. each comprising of 4 questions (Smets et al., 1995). General Health Questionnaire-28; The author of this questionnaire is Goldberg and this scale was developed in 1978. This twenty eight items scale was mainly formulated to screen emotional distress in such individuals who were at the risk of developing different psychiatric disorders and to be applied in medical settings. This questionnaire was classified in four subscales on the basis of factor analysis. These subscales are Somatic Symptoms (consisting of items from 1 to 7), Anxiety and Insomnia (consisting of items from 8 to 14), Social Dysfunction (consisting of items from 15 to 21) and Severe Depression (consisting of items from 22 to 28). It takes less than 5 minutes to complete (Sterling, 2011).

Coping Inventory for Stressful Situations-21; This inventory was initially developed in North America by Endler and Parker and since then it is implemented vastly globally despite being restricted to Western countries only. It has total 21 items with three subscales such as task-oriented coping (consisting of items 2, 6, 8, 11, 13, 16 and 19) emotion-oriented coping (consisting of items 3, 5, 10, 12, 14, 17 and 20) and avoidance coping (consisting of items 1, 4, 7, 9, 15, 18, 21). To calculate the score of subscales, the average of subscales has to be determined (Li et al., 2017). Screening Questionnaire for Sleep Disturbance in Shift Workers; It is a 4-items screening questionnaire to screen out individuals regarding insomnia and excessive sleepiness; major symptoms of shift work disorder; for those individuals who work outside normal working hours i.e. 7.00 am to 6 pm. It was developed by Barger and his colleagues in 2012 (Barger et al., 2012).

6. STATISTICAL ANALYSES AND RESULTS

6.1. RELIABILITY ANALYSIS OF MAJOR STUDY VARIABLES

Table 2 below exhibits Mean, Standard deviation, Cronbach alpha, Actual/ Potential ranges and Skewness values of scales and subscales used in this study. The calculated Cronbach

alpha value of reliability for subscales of Multi-dimensional Fatigue Inventory, General Health, Coping Inventory for Stressful Situations and Screening Questionnaire for Sleep Disturbance in Shift workers; reflects that alpha values falls in acceptable range. The Skewness values lie between +1 and -1 for subscales of above mentioned scales which indicates that data is approximately normally distributed.

Table 2. Psychometric Properties of Major Study Variables

Variables	n	M	SD	a	Range		Skewness
					Potential	Actual	
Multi-dimensional Fatigue Inventory	20	67.33	11.33	0.78	20-100	29-92	-0.64
General Fatigue	4	14.19	3.45	0.65	4-20	4-19	-0.63
Physical Fatigue	4	14.28	4.00	0.78	4-20	4-17	-0.54
Reduced Activity	4	14.07	4.27	0.82	4-20	4-19	-0.66
Reduced Motivation	4	14.44	3.67	0.72	4-20	5-16	-0.66
Mental Fatigue	4	10.37	4.09	0.74	4-20	4-20	0.02
General Health	28	38.89	14.87	0.91	0-84	4-73	-0.03
Somatic Symptoms	7	9.69	4.36	0.79	0-21	0-21	0.06
Anxiety/Insomnia	7	10.06	4.78	0.80	0-21	0-21	0.23
Social Dysfunction	7	10.62	4.23	0.76	0-21	1-20	-0.03
Severe Depression	7	9.53	4.74	0.81	0-21	0-19	-0.09
Coping Inventory for Stressful Situation	21	66.73	11.49	0.80	21-105	42-97	0.25
Task-oriented Coping	7	23.32	4.98	0.70	7-35	10-31	0.31
Emotion-oriented Coping	7	21.41	4.35	0.60	7-35	7-29	0.20
Avoidance Coping	7	22.00	4.74	0.60	7-35	10-29	0.28
Screening Questionnaire for Sleep Disturbance	4	9.91	3.20	0.74	-2-18.24	-2-18	-0.00

Note. n = No. of items, α = Cronbach's alpha; M = Mean; SD = Standard Deviation
It was revealed that all alpha values fall in acceptable range.

6.2. CORRELATION ANALYSIS

Table 3. Summary of Intercorrelations, Means and Standard Deviations for Scores on Socio-demographic variables, Fatigue, General Health, Coping Strategies as a function of Sleep Disturbance

Measure	1	2	3	4	5	6	7	8	M	SD
1.Fatigue	—	0.25***	-0.46*	-0.12	-0.36***	0.14*	-0.03	0.04	56.90	7.93
2.General Health		—	-0.15*	0.20**	-0.00	0.41***	0.04	-0.16*	38.89	14.86
3.Task-Oriented Coping			—	0.37***	0.61***	0.11*	-0.06	0.11	20.45	4.51
4.Emotion-oriented Coping				—	0.40***	0.26***	-0.05	0.05	18.48	4.08
5. Avoidance Coping					—	0.18**	-0.19**	0.05	19.20	4.37
6.Sleep Disturbance						—	-0.26***	0.18***	7.04	5.37
7.Family System							—	-0.24***	1.59	0.49
8.Working Hours								—	8.36	1.77

Note. M=Mean; SD=Standard Deviation. * $p < .05$; ** $p < .01$; *** $p < .001$.

Results of Pearson product moment correlation indicates that Fatigue has significant positive correlation with General Health and Sleep Disturbance while significant negative correlation with Task-oriented Coping and Avoidance Coping strategies. General Health has significant positive correlation with Emotion-oriented Coping strategy and Sleep Disturbance while significant negative correlation with Task-oriented Coping strategy and

Working hours of participants. Task-oriented Coping strategy has significant positive correlation with Emotion-oriented Coping, Avoidance Coping strategies and Sleep Disturbance. Emotion-oriented Coping strategy has significant positive correlation with Avoidance Coping strategy and Sleep Disturbance. Avoidance Coping strategy has significant positive correlation with Sleep Disturbance but significant negative correlation with Family System. Sleep Disturbance has significant positive correlation with Working Hours and significant negative correlation with Family system while Family system has significant negative correlation with Working Hours.

6.3. INVESTIGATING THE MEDIATING EFFECT OF GENERAL HEALTH ON THE RELATIONSHIP OF FATIGUE AND SLEEP DISTURBANCE

Table 4. Hierarchical Multiple Regression Analysis Predicting General Health from Fatigue in Call Centre Workers

General Health		
Call Centre Workers		
Predictor	ΔR^2	β
Step 1	0.02	
Control Variables		
Step 2	0.07***	
Fatigue		0.26***
Total R ²	0.09***	
N	200	

Note. ΔR^2 =R Square; β = Standardized Coefficient; n =total number of participants;
Control Variables= Working Hours, Family System * $p < .05$; ** $p < .01$; *** $p < 0.001$.

Table 5. Hierarchical Multiple Regression Analysis Predicting Sleep Disturbance from Fatigue in Call Centre Workers

Sleep Disturbance		
Call Centre Workers		
Predictor	ΔR^2	β
Step 1	0.08***	
Control Variables		
Step 2	0.01	
Fatigue		0.13
Total R ²	0.09	
N	200	

Note. ΔR^2 = R Square; β = Standardized Coefficient; n =total number of participants;
Control Variables= Working Hours, Family System * $p < .05$; ** $p < .01$; *** $p < 0.001$.

Table 6. Hierarchical Multiple Regression Analysis Predicting Sleep Disturbance from General Health in Call Centre Workers

Sleep Disturbance		
Call Centre Workers		
Predictor	ΔR^2	β
Step 1	0.08***	
Control Variables		
Step 2	0.20***	
General Health		0.45***

Total R ²	0.28***
N	200

Note. ΔR^2 = R Square; β = Standardized Coefficient; n =total number of participants;
Control Variables= Working Hours, Family System * $p < .05$; ** $p < .01$; *** $p < 0.001$.

Table 7. Hierarchical Multiple Regression Analysis Predicting Sleep Disturbance from Fatigue while controlling for General Health in Call Centre Workers

Sleep Disturbance Call Centre Workers		
Predictor	ΔR^2	β
Step 1	0.20***	
Control Variables		
Step 2	0.00	
Fatigue		0.01
Total R ²	0.28	
N	200	

Note. ΔR^2 = R Square; β = Standardized Coefficient; n =total number of participants;
Control Variables= General Health, Working Hours, Family System * $p < .05$; ** $p < .01$; *** $p < 0.001$.

The first assumption of mediation analysis is that IV should predict mediator by controlling demographic variables. In this study, IV is fatigue and mediator is general health while demographic variables which have an effect on DV (Sleep Disturbance) are working hours and family system acting as control variables. Results in table 4 revealed that fatigue significantly predicted general health. Overall model explained 9 % variance in general health with $F(3,196) = 7.00, p=0.00$. When covariates such as working hours and family system were entered in Block 1, model 1 explained 2 % variance with $F_{\text{change}}(2,197) = 2.59, p=0.07$ in general health. When fatigue was entered in Block 2, model 2 explained 7% variance with $F_{\text{change}}(1,196) = 15.44, p= 0.00$ in general health. In model 2, fatigue was a significant predictor of general health ($\beta=0.26^{***}$).

The second assumption of mediation analysis is that IV should predict DV by controlling demographic variables. In this study, IV is fatigue and DV is sleep disturbance while demographic variables which have an effect on DV (Sleep Disturbance) are working hours and family system acting as control variables. Results in table 5 revealed that fatigue did not significantly predict sleep disturbance. Overall model explained 9 % variance in sleep disturbance with $F(3,196) = 7.64, p=0.00$. When covariates such as working hours and family system were entered in Block 1, model 1 explained 8 % variance with $F_{\text{change}}(2,197) = 9.42, p=0.00$ in sleep disturbance. When fatigue was entered in Block 2, model 2 explained 1% variance with $F_{\text{change}}(1,196) = 3.82, p= 0.52$ in sleep disturbance. In model 2, fatigue was not a significant predictor of sleep disturbance ($\beta=0.13$).

The third assumption of mediation analysis is that mediator should predict DV by controlling demographic variables. In this study, mediator is general health and DV is sleep disturbance while demographic variables which have an effect on DV (Sleep Disturbance) are working hours and family system acting as control variables. Results in table 6 revealed that general health significantly predicted sleep disturbance. Overall model explained 28 % variance in sleep disturbance with $F(3,196) = 26.60, p=0.00$. When covariates such as working hours and family system were entered in Block 1, model explained 8 % variance

with $F_{\text{change}}(2,197) = 9.42, p = 0.00$ in sleep disturbance. When fatigue was entered in Block 2, model 2 explained 20% variance with $F_{\text{change}}(1,196) = 55.72, p = 0.00$ in sleep disturbance. In model 2, general health was a significant predictor of sleep disturbance. ($\beta = 0.45^{***}$).

The fourth and last assumption of mediation analysis is that IV should not predict DV by controlling mediator. In this study, IV is fatigue, mediator is general health and DV is sleep disturbance while demographic variables which have an effect on DV (Sleep Disturbance) are working hours and family system acting as control variables. Results in table 7 revealed that fatigue did not significantly predict sleep disturbance by controlling general health. Overall model explained 28 % variance in sleep disturbance with $F(4,195) = 19.86, p = 0.00$. When mediator (general health) and covariates such as working hours and family system were entered in Block 1, model 1 explained 20 % variance with $F_{\text{change}}(3,196) = 26.60, p = 0.00$ in sleep disturbance. When fatigue was entered in Block 2, model 2 explained 0% variance with $F_{\text{change}}(1,195) = 0.03, p = 0.85$ in sleep disturbance. In model 2, fatigue was not a significant predictor of sleep disturbance ($\beta = 0.01$).

Hence, it can be concluded that General health appears as a mediator between fatigue and sleep disturbance in call center worker.

Table 8. Hayes Process Regression Analysis Predicting Direct and Indirect Paths of Fatigue and General Health on Sleep Disturbance in Call Centre Workers

		Call Centre Workers					
Predictors		Direct Effects		Indirect Effects			
		β	LL	UL	β	LL	UL
Fatigue	General Health	0.26***	0.22	0.77			
	Sleep Disturbance	0.01	-0.07	0.08	0.12*	0.05	0.19
General Health	Sleep Disturbance	0.45***	0.12	0.20			
N	200						

Note. Independent Variable= Fatigue; Dependent Variable= Sleep Disturbance; Mediator= General Health;
 β = Standardized Coefficient; n =total number of participants; LL= Lower Limit;
 UL= Upper Limit. * $p < .05$; ** $p < .01$; *** $p < .001$

HAYES Process Macro version 3.5 of SPSS was used to analyze the direct and indirect paths in mediation analysis. The path (direct effect) from Fatigue to General Health was positive and statistically significant i.e. $\beta = 0.26, p = 0.00$ indicating that more fatigue causes more health problems in call center workers while the path (direct effect) from Fatigue to Sleep Disturbance was not statistically significant i.e. $\beta = 0.01, p = 0.84$. Another path (direct effect) from General Health to Sleep Disturbance was also positive and statistically significant i.e. $\beta = 0.45, p = 0.00$ indicating that poor health outcomes causes more sleep disturbance in call center workers. The indirect effect of General Health on the relationship of Fatigue and Sleep Disturbance was calculated by using non-parametric bootstrapping. If the null of zero falls between the lower and upper bound of 95 percent confidence interval then the inference is that the indirect effect is zero. If the value of zero falls outside the lower and upper bound of 95 percent confidence interval then indirect is considered as non-zero. In this case, indirect effect is 0.12 and statistically significant with 95 percent confidence interval values for upper bound and lower bound values to be 0.05 and 0.19 respectively.

Hence, it can be concluded that General Health seems to play a full mediating role on the relationship of Fatigue and Sleep Disturbance as Fatigue has no direct effect on Sleep Disturbance but have indirect relationship with Sleep Disturbance through mediator; General health.

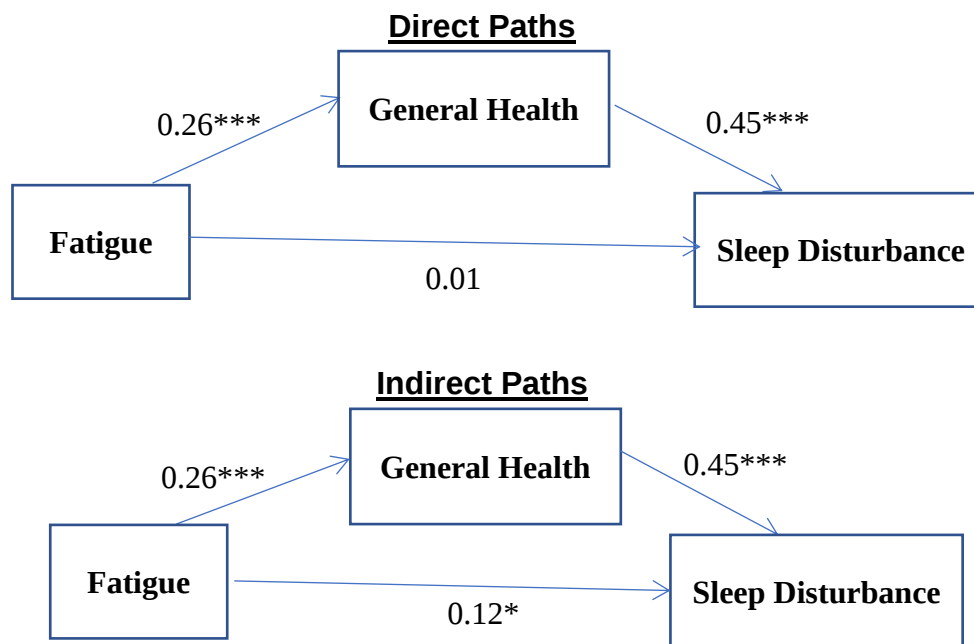


Fig. 3. Emerged Models indicating Mediating role of General Health between Fatigue and Sleep Disturbance in Night-Shift Call Centre Workers (N=200)

6.4. INVESTIGATING THE MODERATING ROLE OF TASK-ORIENTED EMOTION-ORIENTED AND AVOIDANCE COPING STRATEGIES ON THE RELATIONSHIP OF FATIGUE AND SLEEP DISTURBANCE

Table 9. Hayes Process Regression Analysis Predicting Sleep Disturbance from Fatigue and Task-oriented Coping in Call Centre Workers

Sleep Disturbance Call Centre Workers		
Predictor	ΔR^2	β
Step 1		
Family System		-2.27**
Working Hours		0.25*
Step 2		
Task-oriented Coping		0.24**
Step 3		
Fatigue		0.11*
Step 4	0.02*	
Task-oriented Coping $\times$ Fatigue		0.02*
Total R^2	0.16***	
N	200	

Note. ΔR^2 = R Square; β = Standardized Coefficient;
Control Variables= Working Hours, Family System

n=total number of participants;
* $p < .05$; ** $p < .01$; *** $p < 0.001$.

Results in table 9 revealed that fatigue significantly predicted sleep disturbance by adding moderator i.e. Task-oriented coping strategy in the relationship. Overall model explained 16 % variance in sleep disturbance with $F(5,194) = 12.79, p=0.00$. Mean of multi-dimensional fatigue inventory was entered in independent variable block and average of Task-oriented coping strategy in moderator block while demographic variables such as family system and working hours were entered in covariates block. Results revealed that family system ($\beta = -2.27, p=0.003$) had negative significant prediction for sleep disturbance while working hours of participants ($\beta = -0.25, p=0.01$), fatigue ($\beta = 0.11, p=0.03$) and task-oriented coping strategy ($\beta = 0.24, p=0.007$) were positive significant predictors of sleep disturbance. When the interaction effect of IV (fatigue) and moderator (task-oriented coping) was observed then it was found that this interaction effect was positively significant ($\beta = 0.02, p=0.01$) and explained 2 % variance with $F_{\text{change}}(1,194) = 6.74, p= 0.01$ in sleep disturbance.

Hence, it can be concluded that Task-oriented coping strategy seems to act as moderator between fatigue and sleep disturbance in call center workers.

Table 10. Hayes Process Regression Analysis Predicting Sleep Disturbance from Fatigue and Emotion-oriented Coping in Call Centre Workers

Sleep Disturbance Call Centre Workers		
Predictor	ΔR^2	β
Step 1		
Family System		-2.34**
Working Hours		0.32*
Step 2		
Emotion-oriented Coping		0.37***
Step 3		
Fatigue		0.11**
Step 4	0.02**	
Emotion-oriented Coping × Fatigue		0.02**
Total R^2	0.19***	
N	200	

Note. $\Delta R^2 = R$ Square; β = Standardized Coefficient; n = total number of participants;
Control Variables = Working Hours, Family System * $p < .05$; ** $p < .01$; *** $p < 0.001$.

Results in table 10 revealed that fatigue significantly predicted sleep disturbance by adding moderator i.e. Emotion-oriented coping strategy in the relationship. Overall model explained 19 % variance in sleep disturbance with $F(5,194) = 12.30, p=0.00$. Mean of multi-dimensional fatigue inventory was entered in independent variable block and average of Emotion-oriented coping strategy in moderator block while demographic variables such as family system and working hours were entered in covariates block. Results revealed that family system ($\beta = -2.34, p=0.002$) had negative significant prediction for sleep disturbance while working hours of participants ($\beta = 0.32, p=0.04$), fatigue ($\beta = 0.11, p=0.007$) and emotion-oriented coping strategy ($\beta = 0.37, p=0.00$) were positive significant predictors of sleep disturbance. When the interaction effect of IV (fatigue) and moderator (emotion-oriented coping) was observed then it was found that this interaction effect was positively significant ($\beta = 0.02, p=0.008$) and explained 2 % variance with $F_{\text{change}}(1,194) = 7.04, p= 0.008$ in sleep disturbance.

Hence, it can be concluded that Emotion-oriented coping strategy seems to act as moderator between fatigue and sleep disturbance in call center workers

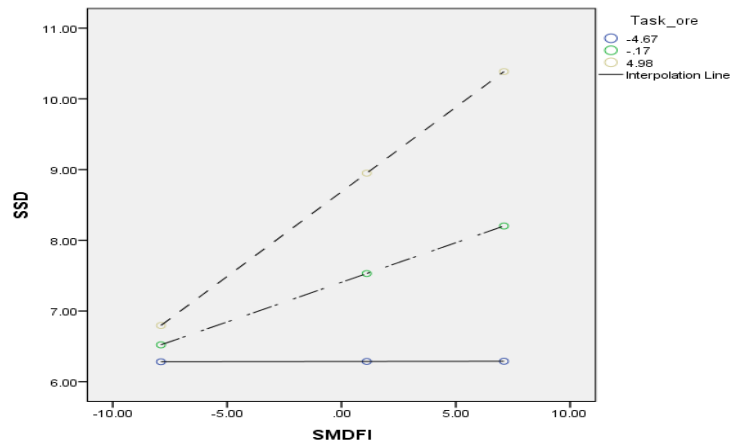


Fig. 4. Interaction Plot for Fatigue × Task-oriented Coping × Sleep Disturbance

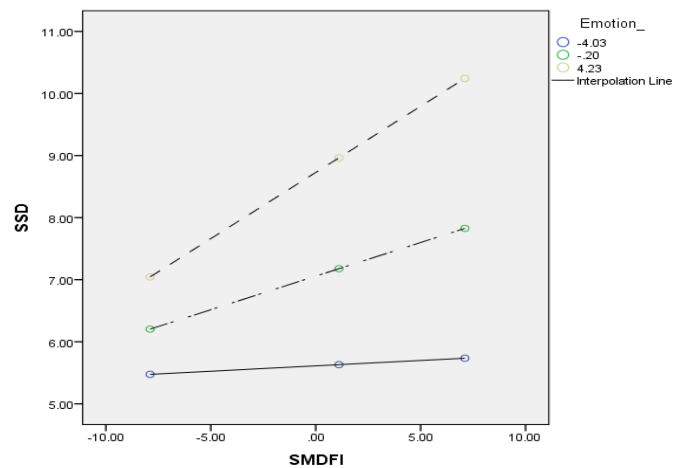


Fig. 5. Interaction Plot for Fatigue × Emotion-oriented Coping × Sleep Disturbance

Table 11. Hayes Process Regression Analysis Predicting Sleep Disturbance from Fatigue and Avoidance Coping in Call Centre Workers

Sleep Disturbance Call Centre Workers		
Predictor	ΔR^2	β
Step 1		
Family System		-1.96*
Working Hours		0.38*
Step 2		
Avoidance Coping		0.28**
Step 3		
Fatigue		0.13**
Step 4	0.01	
Avoidance Coping × Fatigue		0.01
Total R^2	0.15***	
N	200	

Note. ΔR^2 = R Square; β = Standardized Coefficient;
Control Variables= Working Hours, Family System

n=total number of participants;
* $p < .05$; ** $p < .01$; *** $p < 0.001$.

Results in table 11 revealed that fatigue did not significantly predict sleep disturbance in the presence of moderator i.e., Avoidance coping strategy in the relationship. Overall model explained 15 % variance in sleep disturbance with $F(5,194) = 10.28, p=0.00$. Mean of multi-dimensional fatigue inventory was entered in independent variable block and average of Avoidance coping strategy in moderator block while demographic variables such as family system and working hours were entered in covariates block. Results revealed that family system ($\beta = -1.96, p=0.01$) had negative significant prediction for sleep disturbance while working hours of participants ($\beta = 0.38, p=0.03$), fatigue ($\beta = 0.13, p=0.004$) and avoidance coping strategy ($\beta = 0.28, p=0.001$) were positive significant predictors of sleep disturbance. When the interaction effect of IV (fatigue) and moderator (avoidance coping) was observed then it was found that this interaction effect was not significant ($\beta = 0.01, p=0.08$) and explained 1 % variance with $F_{\text{change}}(1,194) = 2.93, p= 0.08$ in sleep disturbance.

Hence, it can be concluded that Avoidance coping strategy did not appear as moderator between fatigue and sleep disturbance in call center workers.

6.5. NORMALITY ANALYSES

Table 12. Normality Tests of Major Study Variables

Variables	N	Skewness	Kurtosis	Kolmogorov-Smirnov	Shapiro-Wilk
Multi-dimensional Fatigue Inventory	20				
General Fatigue	4	-0.63	0.08	0.09	0.95
Physical Fatigue	4	-0.54	-0.65	0.13*	0.93*
Reduced Activity	4	-0.66	-0.68	0.17	0.91
Reduced Motivation	4	-0.66	-0.38	0.17	0.93
Mental Fatigue	4	0.02	-0.62	0.11*	0.95
General Health	28				
Somatic Symptoms	7	0.06	-0.40	0.07	0.98
Anxiety/Insomnia	7	0.23	-0.35	0.08	0.98
Social Dysfunction	7	-0.03	-0.55	0.05	0.98*
Severe Depression	7	-0.09	-0.58	0.08*	0.97*
Coping Inventory for Stressful Situation	21				
Task-oriented Coping	7	0.31	-0.48	0.06	0.98
Emotion-oriented Coping	7	0.20	-0.20	0.06	0.99
Avoidance Coping	7	0.28	-0.76	0.09	0.97*
Screening for Sleep Disturbance	4	-0.00	-0.99	0.60	0.97

Note. n = No. of items.

Table 12 revealed that data was approximately normally distributed. Positively skewed values show that scores are clustered at left side of the graph towards low values while negatively skewed values show that scores are clustered at right side of the graph towards higher end. Kurtosis value shows the peakedness of data scores. The skewness and kurtosis values lie between +1 and -1 for subscales of above mentioned scales reflecting that data has approximately normal distribution. Most values of Kolmogorov-Smirnov and Shapiro-Wilk tests were non-significant, thus indicating the approximate normal distribution of data. Moreover, the observation of curves on histograms also reflect the approximate normal distribution of data together with providing evidence for homoscedasticity and linearity assumptions.

Table 13. Family System Differences in Sleep Disturbance among Call Centre Workers (N=200)

Variables	Joint		Nuclear		t(df)	p	95% CI		Cohen's d
	M	SD	M	SD			LL	UL	
1.SSD	8.75	5.30	5.83	5.11	3.92(198)	0.00	1.45	4.39	0.56

Note. Joint=113; Nuclear = 83; M = Mean; SD = Standard deviation; CI = Confidence interval; LL = Lower limit; UL = Upper limit; SSD=Screening for Sleep Disturbance.

Independent Sample *t*-Test was used to find out differences of family system in sleep disturbance among call centre workers. In table 4.12, the calculated *p* value comes out to be less than alpha value i.e. 0.05; hence this fact is supported that there is a significant difference in nuclear and joint family systems in sleep disturbance among call centre workers. The mean values also exhibit that there is significant difference present in joint and nuclear family systems.

Table 14. Differences of Working Hours in Sleep Disturbance among Call Centre Workers (N=200)

Variables	Joint		Nuclear		t(df)	p	95% CI		Cohen's d
	M	SD	M	SD			LL	UL	
1.SSD	6.90	5.43	7.39	5.25	-0.59(198)	0.55	-2.15	1.16	0.56

Note. Less than or equal to 8 working hours=142; Greater than or equal to 9 working hours = 58; M = Mean; SD = Standard deviation; CI = Confidence interval; LL = Lower limit; UL = Upper limit; SSD=Screening for Sleep Disturbance.

Independent Sample *t*-Test was used to find out differences of working hours in sleep disturbance among call center workers. In table 4.13, the calculated *p* value comes out to be greater than alpha value i.e., 0.05; hence this fact is not supported that there is a significant difference in working hours regarding sleep disturbance among call center workers. The mean values also exhibit that there is no major difference present in two groups of working hours i.e., Less than or equal to 8 hours and Greater than or equal to 9 hours.

6.6. SUMMARY OF FINDINGS

- It was revealed in this study that Fatigue in night-shift call center workers tend to have impacts on their General health and Sleep disturbance but with increasing level of fatigue, there is a decrease in Task-oriented and Avoidance coping strategies and vice versa.
- Positive relationship of General health with Emotion-oriented coping strategy and Sleep disturbance indicates that by increasing or decreasing health related issues there is also an increase or decrease in the use of Emotion-oriented coping strategy and also a rise or fall in Sleep disturbances in night-shift call center workers.
- Significant negative correlation of General Health with Task-oriented Coping strategy indicates that with poor General health, there is more use of Task-oriented coping strategy in night-shift call center workers and with better General health, night-shift workers are less likely to use Task-oriented coping strategy. Similarly, there was negative correlation of General health with Working hours of participants

which reflects that General health decreases with increasing Working hours of participant in night-shift call center workers.

- All coping strategies i.e., Task-oriented, Emotion-oriented and Avoidance coping correlate with each other and have positive correlation with Sleep disturbance indicating that by using these coping strategies, there is an increase in level of Sleep disturbance but Avoidance coping strategy correlated negatively with Family system which states that when role of family is less then then Avoidance coping strategy is used more in night-shift call center workers.
- When relationship of demographic factors and job-related factors with Sleep disturbance was analyzed then two factors i.e., Family system and Working hours of participants appear to correlate with Sleep disturbance but a significant difference was observed in Family system of participants and not in the Working hours of night-shift call center workers.
- Sleep disturbance relates positively with working hours stating that by increasing working hours of participants there is an increase in sleep related problems while negative relationship of Sleep disturbance with Family system indicates that dynamics of family play an important part in affecting the quality of sleep in night-shift call center workers.
- Through mediation and moderation analysis, it was found that fatigue, general health, task-oriented, emotion-oriented, avoidance coping strategies and working hours significantly and positively predicted sleep disturbance while family system had significant negative prediction for sleep disturbance.
- General health appears to have full mediation effect on the relationship of Fatigue and Sleep disturbance. Task-oriented and Emotion-oriented coping strategies seem to moderate positively between the relationship of Fatigue and Sleep disturbance while Avoidance coping strategy did not appear as a moderator in the relationship of Fatigue and Sleep disturbance.

7. DISCUSSION

Shift work disorder specially related to a sample of night-shift call center workers as presented by Psychobiological model of Vallieres and Bastille-Denis postulated that working in night shifts causes disruption in effective regulation of sleep which leads to the development of a sleep disorder i.e. Shift Work Disorder. Results of this study concluded that Fatigue in night-shift call center workers tend to have impacts on their General health and Sleep disturbance and General health also have positive relation with sleep disturbance. Moreover, task-oriented, emotion-oriented and avoidance coping strategies have positive relationship with sleep disturbance. Through mediation and moderation analysis, it was found that fatigue, general health, task-oriented, emotion-oriented, avoidance coping strategies and working hours significantly and positively predicted sleep disturbance while family system had significant negative prediction for sleep disturbance. General health seems to have full mediating role in between Fatigue and Sleep disturbance while task-oriented and emotion-oriented coping strategies appear as a moderator in Fatigue and Sleep disturbance but avoidance coping has no moderating role in their

relationship. This research results have added their contribution in theoretical models i.e., Process Model of Adaptation to Shiftwork as this model hypothesized that different environmental, situational and individual variables have an impact on the development of different disturbances caused by social, sleep and domestic factors hence, fatigue, general health and the use of coping strategies are discrete individual variables and are predictors of sleep disturbance. This research also provided evidence for this model stating that substantial sleep problems were correlated with increased avoidance coping and increased level of sleep disturbances were related to elevated fatigue and going in accordance with the results of this study i.e., avoidance coping strategy has positive relationship with sleep disturbance and fatigue has also positive relationship with sleep disturbance.

Moreover, one of the first models on shift work presented by Rutenfranz and his colleagues state that that changing patterns of sleep and wake cycles which are a part of night shift jobs results in stress which further causes strain or forming health related issues. Results of this study also provided evidence for this hypothesis depicted in above mentioned model as a positive relationship of general health and sleep disturbance was found. The results of this study also add evidences to conceptual model provided by Ansiau, Marquie, Tucker and Folkard in 2015 manner in which the various problems associated with abnormal work schedules relate both to one another and to the features of the work schedule are explained. In this model, coping strategies acted as moderator and results of this study also explained the role of different coping strategies. Different research gaps were also filled as no past literature in Pakistan was found in exploring the relationship of these study variables in specific sample of night-shift workers according to best possible literature search.

Main strengths of this study are that it explored those sleep related issues i.e., insomnia and excessive sleepiness that are specific to Shift work disorder providing information about proneness of night-shift call center workers to develop this disorder. This aspect is least investigated in Pakistan. Mediation was explored too in a different order of variables among night shift call center worker together with direct and indirect paths identification of mediation analysis. Moderating role of coping strategies was investigated. Findings of this research that call center workers use different coping strategies i.e., task-oriented, emotion oriented and avoidance had sleep disturbances which is not found in other researches; a new aspect is revealed.

The implications of this research include different aspects as many individuals in Pakistan are pushed towards night jobs due to risen unemployment and mostly call center jobs at night shifts are easily available, so there is an increased chance that a number of such workers are affected by shift work disorder. Hence, identification of this disorder will lead towards timely treatment and management of this disorder causing less health related and psychological problems. Practices of sleep hygiene i.e., to essentially obtain sound eight hours sleep during daytime, must be introduced to night shift workers by introducing as a specifically designed sleep hygiene plan in every night shift call center as secondary prevention to avoid the severe impacts of awakening whole night shift on their well-being. Night shift workers must be encouraged to participate in hobbies and such management

plans that can improve shift workers' health and wellbeing; reduce stress through satisfying personal needs such as creativity and achievement. It is revealed in this study that coping strategies aggravate sleep disturbance in night shift call center workers, hence workers should be motivated to use coping strategies in an effective way to produce better outcomes. Awareness campaigns can be held in order to educate night-shift workers about worse health, social and sleep related problems caused as a result of their job. The role of social support as a mediator and moderator in further studies should be explored as socializing and receiving social support has been consistently associated with improved wellbeing and satisfaction with shift work.

It is highly suggested that Other important variables such as call timings, impact of breaks, organizational environment, customer attitudes, subjective burden, work load, personality, job satisfaction, screen time, sleep hygiene, lifestyle factors, psychopathic tendencies, suicidal tendencies, family dynamics i.e. spousal, siblings, and parents relationships etc. should be explored in different age groups of night shift call center workers as these variables may play a role in reducing or aggravating mental well-being, health issues and sleep problems in participants. In-depth interviews should be conducted to obtain an insight about other concerning issues of night shift workers.

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