

Health Problems of Women Working in Night Shift in India: A Review

Dr. Neha¹, Dr. Pallavi Sarji Uthkarsh²

^{1,2}Department of Public Health, Rajiv Gandhi Institute of Public Health and Centre for Disease Control, Bengaluru, Karnataka, India

ABSTRACT

Women in India are regarded as one of the country's most valuable resources. Working women of India are characterized by growth and development, but they are vulnerable often by several factors which affect their health and safety. The health problems of women working on Nightshift is one of the major areas that need urgent attention from public health professionals and policymakers. Overweight and obesity, cardiovascular problems, diabetes, sleep disorders, stress, depression, anxiety, and injuries specifically affect this population and have a long-lasting impact. Not just physical and mental health, but these women are burdened with social problems too. All of these factors have the potential to constitute a burden on Indian society in terms of morbidity, death, disability, and socioeconomic losses. Health promotion policies and programs that are focused on the women working on the night shift is critical for the country's general growth and development.

KEY WORDS: women and occupational health, night shift and women, night work, India, mental health problems, physical and social problems, diabetes, obesity, work and safety, dietary habits, hypertension, musculoskeletal problems, cancer, injuries, substance use, menstrual health, reproductive health, sleep disorders, depression, anxiety, stress, psychosocial problems.

INTRODUCTION

India is one of the populous countries in the world, comprising 138 crores of people, which is equivalent to 17.7% of the world's population. A large portion of India's population comprises females, which is about 48%.⁽¹⁾ For decades, women have proved that they are the backbone of the economy to a great extent. Women, who earlier fulfilled their domestic duties by staying at home are now seen participating increasingly in the labor force steadily. India's workforce is over 48.8 crore in 2018-2019 and among those 48.8 crore people, 11.77 crore workers are women. In rural India, it was 8.46 crores while in urban India it was 3.31

crores. The female labor force participation rate has risen from 17.5 percent in 2017-2018 to 18.6 percent in 2018-2019⁽²⁾ and also women working in the day and night shifts have increased over decades impacting their health and lives.

Women and Nightshift –

Since India opened its door to liberalization in the early 1990s, there has been a tremendous transformation in its economy, the transformation of women from their traditional roles of child-rearing and homemaker to business and social solutions.⁽³⁾ Current

ARTICLE DETAILS

Published On:
04 March 2022

Available on:
<https://ijmscr.org>

Health Problems of Women Working in Night Shift in India: A Review

study reviews the problems faced by women workers during night shifts, issues related to their health and safety. The majority of women used to work in the morning hours till the 1990s, as there were restrictions and bans on women working at night shift. ⁽⁴⁾⁽⁵⁾The results of the struggle for freedom to work in the night shift by women in all sectors is gradually increasing but these women are paying of their health as its price.

Night shift varies from country to country and in India it is considered as working between 7 pm to 6 am. ⁽⁶⁾ The different sectors where women work in the night shift are healthcare, caregivers, customer services or call centers, data center, and IT operators, Emergency services like police, firefighting, Logistics and transportation like railways, ship crew, pilots, military, manufacturing, mining, Television and broadcasting, and entertainment sectors. ⁽⁷⁾

Does the Nightshift affect women's health?

The reproductive axis is disrupted when the circadian timing system is altered, and night shift work has been linked to negative impacts at various periods of the reproductive cycle. ⁽⁸⁾ Pregnant women who work in the night shift have a higher chance of miscarriage. ⁽⁹⁾⁽¹⁰⁾ The likelihood of an irregular menstrual cycle and secondary amenorrhea increases with the high frequency of night shifts. ⁽⁸⁾ Night shift working women are twice likely to report workplace fatigue, Shift Work Disorder, and increased burnout risk. ⁽¹¹⁾⁽¹²⁾ They are also associated with increased overall risk of adverse mental health outcomes, specifically for depression symptoms. ⁽¹³⁾

A meta-analysis of the link between sleep issues and work injuries indicates that night shift working women have a higher risk of occupational harm. ⁽⁸⁾⁽¹⁴⁾ Work injury risk for women is said to be higher among those who switched shifts or worked on night shifts when compared to day shifts. ⁽¹⁵⁾ Women who work night shifts have a higher chance of getting cancer, metabolic syndrome, cardiovascular disease, diabetes, and reproductive problems than women who work during standard working hours, according to epidemiological studies. ⁽⁸⁾⁽¹⁶⁾⁽¹⁷⁾⁽¹⁸⁾ Identifying issues and problems in the occupational health of women remains a challenge.

It is highly relevant and need of the hour to understand the health problems of women working in night shifts, whose health directly affects the family and indirectly affecting the progress of our Nation. Hence the current review is an attempt to understand the problems faced by women workers during night shifts and issues related to health, which would help in formulating better policies.

REVIEW METHODS

Journal articles were searched in PubMed, Google Scholar, Sage journals, ScienceDirect, Sci-Hub using keywords such as women and occupational health, physical health, night shift, and women, night work, mental health, women and outcome of interest namely Nutrition, Diet, Sleep, Reproductive health, social health, Obesity and overweight, Injury, Safety, Violence, Stress, Depression, Anxiety, Substance use, Cancer. Seventy freely available articles, which included population-based studies, independent studies, and reports and review articles. Scientific publications since the year 2000 were considered for the review, among them forty-five relevant articles were included in the review.

The majority of the studies reviewed were cross-sectional, with varying sample sizes and carried out in various parts of India. Majority of the studies were not comprehensive but focused on all health problems based on researcher's and/ or organizational interest.

According to World Health Organization (WHO), "Health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity". ⁽¹⁹⁾ So in the current review attempt is made to highlight problems under physical health, mental health, social health, and reproductive health.

HEALTH PROBLEMS OF WORKING WOMEN IN NIGHTSHIFT

Physical health

Physical health is the wellbeing of the body and the proper functioning of the organs of individuals. Physical health means that every cell and organ in the body is operating at maximum capacity and in perfect harmony with the rest of the body. ⁽¹⁹⁾ The major physical health disturbances seen by night shift working women are overweight and obesity, diabetes, hypertension, and cardiovascular issues, gastrointestinal tract problems, musculoskeletal disorders, cancer, and other general health problems.

Overweight and Obesity-

The combination of a long night shift and a lack of sleep is linked to weight growth. ⁽²⁰⁾⁽²¹⁾⁽²²⁾ Obesity and overweight are characterized as abnormal or excessive fat accumulation that can be harmful to one's health. The Body Mass Index (BMI) is a simple weight-for-height index that is often used to identify humans as overweight or obese. It's calculated by multiplying a person's weight in kilograms by the square of his height in meters (kg/m²). ⁽¹⁹⁾ WHO defines overweight as a BMI greater than or equal to 25; and obesity is a BMI greater than or equal to 30. ⁽¹⁹⁾ In a set of employees working in tertiary care hospital Bangalore, the waist circumference of night shift workers was found to be significantly greater than that of day shift workers. ⁽²³⁾ Similarly a cross-sectional study among female nurses from a government hospital, Delhi revealed that approximately 70% of night shift working nurses were overweight and obese ⁽²⁴⁾ whereas a cross-sectional study among female night working

Health Problems of Women Working in Night Shift in India: A Review

nurses in Andhra Pradesh showed that more than 20.52% of women had BMI more than 25. (25)

A study done at Mumbai, in a set of Business Process Outsourcing (BPO) executives who work in the night shift showed that the Body Mass Index (BMI) of night shift executives was higher when compared to the normal BMI of Asian population cut-offs. (26) A study conducted in North India among female corporate employees, showed that 57% of the study population were overweight and obese. (27)

A study conducted on women call center night shift employees, in Noida, Ahmedabad, Bangalore, Mumbai revealed that the Bangalore call center had maximum women who were obese i.e. 14%, and in Mumbai 50 % of women were overweight. (28) A Study conducted among day and night shift employees of different Multi-National Companies (MNC), BPO, and hospitals in Aligarh district showed that night shift workers had obesity in the age group 20 to 30 years and 30 to 40 years as 5.70% and 5.88% respectively. Compared to day shift workers, night shift workers gained weight rapidly. (29) In a study of call center workers in Bangalore, it was found that 47.72% had normal BMI, 29.54% were overweight, 7.95% were grade 1 obese and 4.54 % were grade 2 obese. (30) Among call center workers of Pune and Mumbai, 22% had grade 1 obesity and more than 2 % had BMI more than 30. (31) Overweight and obesity are known risk factors due to poor diet and lack of physical activity. As a result, there is a higher risk of heart disease, hypertension, and diabetes. (30)

Dietary habits-

We all know that an unhealthy and poor diet can lead to chronic health conditions. A cross-sectional study among female nurses from a government hospital, Delhi revealed that intake of most nutrients, dietary folate, and riboflavin ranged from fairly adequate among 85% of the night shift working nurses, 40% of the participants either 'always' or 'sometimes'-maintained regularity of meals while skipping multiple meals was reported by one-quarter of sample due to their busy schedule, heavy workload and shift duties. 65% skipped breakfast, 45% each skipped lunch and dinner, 30% skipped meals more often and 60% skipped meals once or twice a week. Majority of women consumed outside food, of which 36.1% had outside food at least once a month and 51.4% rarely consumed outside food. To combat their workload and stress, 60% consumed tea/coffee, which 12.6% consumed frequently (3 to 4 times a day). (24) Mean energy, protein, carbohydrate, fat, caffeine, and calcium was observed to be lower than Recommended Dietary Allowance in night shift executives working in BPO, Mumbai. Mean calcium was especially lower in females than males and intake of coffee was moderate to high among them. (26) An exploratory study among night shift corporate employees in North India analyzed data on dietary habits of

employees and found that 71% rely on office canteen, local Dhaba and restaurants for their meals, out of which 81% eat some snacks, paratha or some stuffed items and 81% reported that office canteen doesn't contain healthy diet. (27)

A study conducted among working women in call centers at Noida, Ahmedabad, Bangalore, and Mumbai reported that women who worked the night shift consumed fewer calories and nutrients than those who worked during the day. 80% of Bangalore night shift working women consumed fast food and 60% in Mumbai and Noida. Overall 58% of workers consumed salad daily, out of which the highest was seen among Noida working women (52%) and Ahmedabad being the lowest (22%). Overall, 30% of the participants consumed coffee/tea more than 3 times per day, out of which 32% were among Noida and Mumbai working women and 26% in Bangalore women. 54.5% of women ate pulses, 31.5% took green leafy vegetables, 42.5% had fruits and 52% had milk regularly. Around 20% had fast food, 17.5% never ate fruits, 13% never consumed milk and milk products, and 14% never ate fast foods. (28) Due to the unavailability of eating facilities during night shifts, night shift workers eat at unexpected times and vary their diet, according to another review paper on shift work. (32) A study on female nurses working the night shift in Udaipur, Rajasthan, showed that there is an irregularity of timing and type of meal intake among night shift working nurses and also poorer diet, increase intake of beverages and snacking on junk food is seen to stay awake at night. (33) A study conducted in Pune and Mumbai among call center working women resulted in 34% of women had unhealthy eating habits in form of junk and fast foods. (31)

Diabetes mellitus-

During fasting, the brain utilizes 50% of blood glucose in an insulin-dependent way, and it is the primary organ for blood glucose utilization during sleep. Studies have indicated that night shift workers have lower glucose tolerance and higher insulin resistance, which can contribute to metabolic syndrome. Insulin resistance can lead to decreased glucose use by the brain and higher blood glucose levels. (23) Epidemiological evidence indicates that sleep loss may be a novel risk factor for Type 2 diabetes mellitus. (22) (34) A cross-sectional study in Chennai among supervisors, watchmen, crane operators, loco drivers, junior engineers who worked the night shift showed a positive association between night shift work and risk of diabetes. Around 37% of the participants were diabetic. (20) Another study conducted in a tertiary care hospital; Bangalore reported that blood glucose levels in the night shift working group were 17mg/dl higher than in the day shift population. (23) As we have seen a relation between night shift and poor diet and obesity, it in turn often leads to health conditions like diabetes and cardiovascular diseases. (24)

Health Problems of Women Working in Night Shift in India: A Review

Cardiovascular diseases and Hypertension-

According to epidemiological research, a circadian rhythm disruption causes metabolic syndrome, which raises the risk of stroke and myocardial infarction. Sleep deprivation causes a rise in sympathetic nerve activity, which raises systolic blood pressure. It was discovered among a woman working population in a tertiary care hospital in Bangalore that night shift working women had a 9mmhg higher systolic blood pressure than day shift working women.⁽²³⁾ Shift work has been reported as a risk factor for cardiovascular diseases.⁽²²⁾ Approximately 1.5 times higher risk is found in night shift than day shift workers.⁽³⁵⁾ Long term night shift working women healthcare employees in Tripura medical college and West Bengal have shown higher rates of cardiac disorders.⁽³⁶⁾⁽³⁷⁾

A study was conducted in the night shift working women from BPO, hospitals, textiles, garments, and leather industries from nine cities of India- Delhi, Mumbai, Chennai, Kolkata, Hyderabad, Bangalore, Ludhiana, Ahmedabad, and Pune revealed that 60 % of the women were hypertensive.⁽³⁸⁾ Another study found that 24.5 percent of night-shift workers in Karnataka's public sector business were hypertensive.⁽³⁹⁾ A study conducted among various MNCs, BPOs, and hospitals in Aligarh district compared the health of day and night shift workers and noticed that night shift workers had more hypertensive employees than day shift workers, with 14.25 % of 20 to 30 year age groups, 35.25 % of 30 to 40 year age groups, and 18.20 % of 40 to 50 year age groups working in the night shift being hypertensive.⁽²⁹⁾ Young persons with high blood pressure and chest discomfort, as well as swollen feet, were found among night working female nurses in Udaipur.⁽³³⁾ Another research in Salem found that 8% of the population had high blood pressure among married night shift working women in the IT sector.⁽⁴⁰⁾

Gastro-Intestinal Tract (GIT) problems-

In the long run, disrupting the circadian rhythm, sleep-wakefulness, and eating patterns lead to gastrointestinal problems. Alteration in eating habits is one of the risk factors that make night shift workers more vulnerable to GIT diseases. Tendency to nibble at night than taking full meals, higher intake of carbs, caffeine leads to gastric, peptic ulcer, poor eating, dyspepsia, epigastric pain, diarrhea, etc.⁽³⁵⁾⁽³⁶⁾⁽³²⁾⁽³⁷⁾ In a cross-sectional study conducted in Chennai among various night shift workers, it was observed that 33% of the people had problems related to GIT such as stomach and duodenal ulcers.⁽²⁰⁾ A study in North India among MNC corporate employees working during the night showed 75% of the population had gastric issues.⁽²⁷⁾ Descriptive cross-sectional study in tertiary care hospital in Bangalore among night shift working nurses revealed that 32.3% of them had gastritis.⁽⁴¹⁾ Study conducted among day and night shift workers in Aligarh district in different MNCs, BPO, and hospitals revealed that night shift workers had 20% (age group 20- 30 years),

58.80% (age group 30-40 years), and 54.50% (age group 40- 50 years) GIT issues whereas day shift workers had 4.50% (age group 20- 30 years), 18.80% (age group 30-40 years) and 20% (age group 40- 50 years) GIT issues respectively.⁽²⁹⁾

The majority of female nurses working the night shift in Rajasthan reported indigestion, heartburn, stomach discomfort, and loss of appetite, according to research.⁽³³⁾⁽⁴²⁾ A cross-sectional research of Bangalore contact center workers found that 16.5 % of them had gastritis symptoms, 4.5 % had worsening symptoms, and 72.2 % had noticed a change in their appetite.⁽³⁰⁾ Another study found that night-shift contact center workers in Pune and Mumbai had hyperacidity, bloating, gas, and constipation, among other digestive issues. Only 29% of people did not experience any stomach issues.⁽³¹⁾ Among women employees in a private hospital in Mumbai who worked during the night reported 72% of digestive disorders.⁽⁴³⁾

Musculoskeletal problems-

Odd working hours against the biological clock and also long hours of work at night make women suffer from various musculoskeletal problems like pain in the neck, shoulder, back, wrist, etc.⁽³⁶⁾⁽⁴⁴⁾ This differs from occupation to occupation.⁽²¹⁾ An exploratory study among corporate employees working at night in MNCs in North India reported 30% of people suffering from cervical and arthritis problems.⁽²⁷⁾ A descriptive study in tertiary care hospital in Bangalore reported that 57.6% of nurses who worked at night had back pain issues.⁽⁴¹⁾ Women working at night shifts in BPO, Bangalore reported that 72% of the population had Musculoskeletal disorders, among which 4% had knee/ ankle/ feet related problems, 2% had lower back pain, 13% had neck related issues, 11% had shoulder pain and 17% had hips/ thigh/ buttocks related problems.⁽⁴⁵⁾

According to a survey conducted in Karnataka's public sector, 31.4 % of night-shift workers suffer from musculoskeletal ailments.⁽³⁹⁾ According to a study done among employees of MNCs, BPOs, and hospitals in Aligarh district.⁽²⁹⁾ A review article found that night shift working women in India's contact centers are more likely to experience aches in their arms, hands, wrists, back, and shoulders.⁽⁴²⁾⁽³⁰⁾⁽³¹⁾ Women working night shifts in Mumbai private hospitals indicated that 78 % of them suffer from strains and sprains.⁽⁴³⁾

Cancer-

Reduced melatonin release caused by light exposure during the night has been linked to an increased risk of cancer, according to the World Health Organization.⁽²³⁾ Risk for cancer is not constant and they even vary within a Nation, given that individuals follow different lifestyles, religions, careers, customs, habits, etc. Some of the risk factors for cancer are improper diet and night shift work, decreased sleep. The association between night work and breast cancer was explored using a meta-analysis of published studies of airline cabin

Health Problems of Women Working in Night Shift in India: A Review

attendants and night shift workers. According to this study, exposure to light at night reduces the pineal gland's natural nocturnal production of melatonin, raising the risk of breast cancer. For women who didn't typically sleep between one am and 2 am, the nighttime period when melatonin levels are at high, the risk of breast cancer was highest. ⁽⁴⁶⁾ Another institutional-based cross-sectional study in Tripura among night shift working women hospitals reported that long-term night shift workers have higher rates of breast, colorectal cancer. ⁽³⁷⁾

Injuries-

Night shift workers lack sleep and will be suffering from fatigue because of that, and fatigue due to night work increases injuries and accidents in industrial operations and nuclear power plants and it contributes to all modes of transportation disasters, including rail, marine, aviation, and motor accidents. ⁽⁴⁵⁾ Sleep deprivation causes increased tiredness during the following night shift, especially in the second half of the shift, which is early in the morning, increasing the chance of errors and accidents at work as well as mishaps when going home. ⁽⁴⁷⁾ In a study conducted in Karnataka among a public sector industry, it was seen that 27.3% of night shift working women experienced an injury at the workplace. ⁽³⁹⁾ A cross-sectional study in Delhi among night shift working nurses in a tertiary care hospital reported that there was a great association of night shift with having needle stick injury and work incidents and errors. ⁽⁴⁸⁾

Other Health problems-

Odd working hours against the biological clock makes women suffer from various health problems like voice-related issues- dry, itchy throat, hoarseness of voice, cracking of

voice, cold and cough, eye strain, hearing issues. ⁽²¹⁾⁽⁴⁴⁾⁽⁴²⁾ A cross-sectional study among night-shift workers in Chennai reported 28% of the workers suffered from continuous tiredness. ⁽²⁰⁾ Another study among MNC corporate women night shift employees in North India revealed that 32% of them had eye problems. ⁽²⁷⁾ Night shift working nurses in a tertiary care hospital in Bangalore showed that 60% of them had common headache complaints. ⁽⁴¹⁾ A study conducted among night shift working women in different BPOs, hospitals, garments, leather, and textile industries in nine different cities of India reported that 45% of the population had continuous tiredness, 55% suffered from clinical cold and cough frequently, 45% had respiratory illness and 45% were generally ill frequently. ⁽³⁸⁾

A study among employees of day and night shift of different MNCs, BPO, and hospitals from Aligarh district reported that night shift employees suffered from weakness of sight and blurring of images, watery eyes on concentration. 77% of eye problems were seen in the age group 20 to 30 years, 82.40% in 30 to 40 years of age and 54.50% in 40 to 50 years of age group, whereas 30.30% of day shift employees among 20 to 30 years age group, 26.70% of 30 to 40 years of age and 36.8% of 40 to 50 years of age group suffered from eye problems. ⁽²⁹⁾ Among call center employees of Bangalore, a cross-sectional study showed that 50% of the night shift employees suffered from a voice health issue and 12.5% of the from ear-related problems. ⁽³⁰⁾ Another study among call center workers in Pune and Mumbai showed that 26.9% of the employees suffered from dryness of the eye, 15.4% from headache, 75% from throat issues, and 24% from hearing problems. ⁽³¹⁾

L. N O	AUTHOR	AR	PLACE	TYPE OF STUDY	SAMP LE SIZE	AGE	OCCUPATI ON	OBESITY AND OVERWEIG HT	DIETARY HABITS	DIABETES	CVD AND HYPERTEN SION	GASTR O-INTEST INAL DISOR DERS	MUSCULO SKELETAL DISORDER S	CAN CER	INJURI ES	OTHER HEALT H PROBL EMS
.	V. M. Anantha Eashwar, et al.	2019	Chennai	Cross-sectiona l study	00	25-55 years	supervisors, watchman, quick crane operators, loco drivers, and junior engineers			*Positive association between night shift work and risk of diabetes. *Around 37% of the participants were diabetic.		*33% - stomach and duodena l ulcers.				*28% of the workers suffered from continu ous tirednes s
.	DIVYA B, ANDREW MICHAEL, JIBI PAUL	2019	Chennai	Qualitat ive study			BPO workers	*Obesity	*Affects dietary pattern							*Eye irritatio n Vocal

Health Problems of Women Working in Night Shift in India: A Review

																	auditory and visual problems.
	R. B. Singh, B. Anjum, Rajiv Garg et al	012	India	Review article			Night shift workers	*Greater weight gain associated with night shift		*Epidemiological evidence indicates that sleep loss may be a novel risk factor for Type 2 diabetes mellitus.	*Shift work has been reported as a risk factor for cardiovascular diseases.						
	R.H. Gowda et al.	2016	Bangalore	Cross-sectional study	124(75 - females)	20-60 years	Health care staffs	*Waist circumference of night shift workers were comparatively more than that of day shift workers.		*Blood glucose levels in night shift working group was 17mg/dl higher than day shift population.	*Increase in systolic blood pressure of around 9mmhg in night shift working women than day shift working women. * The odds of metabolic risk was 2.53 times (95% CI, 1.2to 5.2) higher among rotating night shift individuals compared to day shift workers.						
	S. Gupta	2017	Delhi	Cross-sectional study	80	25-39 years	Nurses 62 % of the participants had been married for more than 10 years	*70%-overweight and obese	*65% skipped breakfast, 45% each skipped lunch and dinner, 30% skipped meals more often and 60% skipped meals once or								

Health Problems of Women Working in Night Shift in India: A Review

									twice a week. 36.1% had outside food at least once a month and 51.4% rarely consumed outside food. 60% consumed tea/coffee, in which 12.6% consumed frequently (3 to 4 times a day).							
.	Yogita Khade et al.	2016	Andhra Pradesh and Karnataka	Cross-sectional study	190(128 females)	140 females = 21 to 29 years, 8 members = above 30 years	Nurses - married 78	*More than 20.52% of women had BMI more than 25.								
.	Saiyed, S.H. and Sekhar A.	2015	Andheri East, Mumbai	Cross-sectional study	58(24-female)	25-40 years	BPO workers	*Mean body fat of female workers was 31.92% ± 6.29 as compared to the normal range. *The mean subcutaneous was 25.78% ± 6.12 in females and had low skeletal muscle values than the normal values.	*Mean energy, protein, carbohydrate, fat, caffeine and calcium was observed to be lower than Recommended Dietary Allowance in night shift executives working in BPO, Mumbai. *Mean calcium was especially lower in females than males and intake of coffee was moderate to high among them.							
.	Mohammad Ehteshamuddin, Dr. Vijayendra Gupta	2019	North India	Cross-sectional study	180(31% female)	>20 years	Multinational companies related to IT/ITs, Consulting Firms, Management firms and	*57% - obese and overweight	*71% rely on office canteen, local dhaba and restaurants for their meals, out of which 81% eat some snacks, paratha or some			*75% of the population had gastric issues.	*30% of people suffering from cervical and arthritis problem.			*32% of them had eye problems.

Health Problems of Women Working in Night Shift in India: A Review

							International NGOs		stuffed items and 81% reported that office canteen doesn't contain healthy diet.							
.	Meenakshi Mathur, Monika Harsh, and Sumita Mathur	2015	Ahmedabad, Mumbai, Noida, Bangalore	Cross-sectional study	200	18-30 years	Call centre	*Mumbai-14%, Bangalore-50% obese	<p>*80% of Bangalore night shift working women consumed fast food and 60% in Mumbai and Noida.</p> <p>*Over all 58% workers consumed salad daily, out of which highest was seen among Noida working women (52%) and Ahmedabad being the lowest (22%). Overall, 30% of the participants consumed coffee/tea more than 3 times per day, out of which 32% was among Noida and Mumbai working women and 26% in Bangalore women. 54.5% women ate pulses, 31.5% took green leafy vegetables, 42.5% had fruits and 52% had milk regularly. Around 20% had fast food, 17.5% never ate fruits, 13% never consumed milk and milk products, and 14% never ate fast foods.</p>							
0.	Mohd Fazal, Ur Rehman	2017	Aligarh	ross-sectional study	160	20-50 years	MNC, BPO, Hospital employees	*Obesity in age group 20 to 30 years and 30 to 40 years as			*Night shift working people had more	*Night shift workers had 20% (age	*20% of people aged between 20 to 30 years, 44.10% of			*77% of eye problems were seen in

Health Problems of Women Working in Night Shift in India: A Review

								5.70% and 5.88% respectively. *C compared to day shift workers, night shift workers gained weight rapidly.			hypertensive employees than day shift. 14.25% of 20 to 30 years age group, 35.25% of 30 to 40 years age group and 18.20% of 40 to 50 years age group working in the night shift were hypertensive whereas 6.80% of 20 to 30 years age group, 6.30% of 30 to 40 years age group and 17.50% of 40 to 50 years of age group were hypertensive.	group 20- 30 years), 58.80% (age group 30-40 years) and 54.50% (age group 40- 50 years) GIT issues whereas day shift workers had 4.50% (age group 20- 30 years), 18.80% (age group 30-40 years) and 20% (age group 40- 50 years) GIT issues respectively.	30 to 40 years of age and 45.50% of 40 to 50 years of age employees complained about joint pains.			age group 20 to 30 years, 82.40% in 30 to 40 years of age and 54.50% in 40 to 50 years of age group, whereas 30.30% of day shift employees among 20 to 30 years age group.	
1.	Naveen R. et al	2012	Bangalore	cross-sectional study	176(31.3% females)	21-30 years	Call centres	*47.72% had normal BMI, 29.54% were overweight, 7.95% were grade 1 obese and 4.54 % were grade 2 obese.				*16.5% of them had symptoms of gastritis, 4.5% of people had worsened symptoms,					*50% of the night shift employees suffered from voice health issue and 12.5%

Health Problems of Women Working in Night Shift in India: A Review

												72.2% people observed the change in their appetite.				of the from ear related problems.
2.	Bhuyar, Banerjee A, Pandve H, Padmnabhan P, Patil A, Duggirala S, et al.	008	Pune and Mumbai	Qualitative and quantitative study	100(51 - female s)		Call centres	*22% had grade 1 obesity and more than 2 % had BMI more than 30	*34% of women had unhealthy eating habits in form of junk and fast foods.			*Reported various digestive disturbances such as hyperacidity, bloating, flatulence and constipation. Only 29% did not have any digestive disturbance.				* 26.9% of the employees suffered from dryness of eye, 15.4% from headache, 75% from throat issues and 24% from hearing problems.
3.	Scott A. J.	000	India	Review article			Night shift work		*Unusual timing of eating *Altered diet *Nibble at night, junks			*Gastric , peptic ulcer, poor eating, dyspepsia, epigastric pain, diarrhoea etc.				
4.	Rathore et al.	012	Udaipur	Cross-sectional study	60	30-60 years	Nurses 90 %-married, 5%widowed		*Irregular timings *Poor diet *Increased beverages and junk intake		*Young people- High BP, Chest pain * Old people- swollen feet, High BP	*Indigestion, heartburn, stomach ache, loss of appetite.				

Health Problems of Women Working in Night Shift in India: A Review

5.	S. Sivabalamurugan et.al	019	Chennai	ross-sectional study	00		ESI beneficiary shift workers			*25.6% diabetic						
6.	Atanu kumar pati, Arti Parganiha	006	India	Review article			Night shift workers				*Approximately 1.5 times higher risk is found in night shift than day shift workers.					
7.	Majumdar et. Al.	020	West Bengal	ross-sectional study	140	22-61 years	Nurses				*High Cardiovascular problems	*High gastric problems	*High backpain issues			*Headaches
8.	Kaushik Nag, Anjan Datta, Nabarun Karmakar, Tamal Chakraborty, Partha Bhattacharjee	019	Tripura	Cross-sectional study	135(69 - females)	20-60 years	Health care staffs				*Higher rates of cardiac disorder			*Long term night shift workers have higher rates of breast , colorectal cancer.		
9.	The Associated Chambers of Commerce & Industry of India (ASSOCHAM)	005	Delhi, Mumbai, Chennai, Kolkata, Hyderabad, Bangalore, Ludhiana, Ahmedabad, Pune	Cross-sectional study	272	20-50 years	BPOs, Hospitals, Textiles, Garments and Leather industries				*60%- Hypertensive					*45% - continuous tiredness, 55% suffered from clinical cold and cough frequently, 45% had respiratory illness and 45%

Health Problems of Women Working in Night Shift in India: A Review

																were generally ill frequently.
0.	Manjunathar, Kiran D, Thankappan K R	2011	Karnataka	Cross-sectional study	353(108-females)		Industrial workers				*24.5% of night shift workers were hypertensive.		*31.4% of night shift workers had musculoskeletal related disorders.		*27.3% of night shift working women experienced injury at work place .	
1.	Dr. Priyadarshini		Salem	Cross-sectional study	50		IT workers All married				*8%-Hypertensive		*20%-Backpain			*6% had respiratory issues and 2% had cold and fever frequently.
2.	Surekha Anbazhagan, Naveen Ramesh, Catherine Nisha, and Bobby Joseph	014	Bangalore	Cross-sectional study	130	less than 30 years-89 people , 31 to 40 years-35 people , above 40 -6 people	Nurses 49 -married,78-unmarried, 3 divorced					*32.3% of them had gastritis.	*57.6%-Backpain issues			*60%-headache
3.	Suheba Khan	2017	India	Review article			Call centre						*Aches related to arms, hands, wrists, back and shoulders.			*Voice related issues-dry, itchy throat, hoarseness of voice, crackling of

Health Problems of Women Working in Night Shift in India: A Review

																voice, cold and cough, eye strain, hearing issues.
4.	Dr. Jayachitra.T. A, Mrs. Nandini Jagannarayan	2019	Mumbai	Cross-sectional study	50	25-60 years	Health care staffs 35 - married					*72%- Digestive disorders	*78%- Strains and sprains			
5.	Amrita Gupta	2010	Bangalore, Mumbai, Delhi	Review article			BPO working women						*Pain in neck, shoulder, back, wrist			*Dry, itchy throat, hoarseness of voice, crackling of voice, cold and cough, eye strain, hearing issues
6.	Dr. Kousar Jahan, Ara Begum	2013	Bangalore	Cross-sectional study	100		BPO working women					*2% of the population had Musculoskeletal disorders, among which 4% had knee/ ankle/ feet related problems, 2% had lower backpain, 13% had neck related issues, 11% had shoulder pain and 17% had hips/ thigh/ buttocks	*Fatigue due to night work increases injuries and accidents in industrial operations and nuclear power plants and it contributes to all modes of transportation disasters			

Health Problems of Women Working in Night Shift in India: A Review

														related problems.		including rail, marine, aviation and motor accidents.
7.	Dr. Deepika Nayak	2014	South India	Review article	13 articles		Airline cabin attendants, night shift working women								*Breast cancer high risk	
8.	Anjana Verma, Jugal Kishore, and Shobha Gusain	2018	Delhi	Cross-sectional study	550	25-60 years	Nurses									*Great association of night shift with having needle stick injury and work incidents and errors.

Menstrual health-

Shift work and irregular work patterns can alter the circadian rhythm, changing the regulation of the ovulatory cycle and causing undesirable menstrual abnormalities. A greater prevalence of irregular menstruation cycles, premenstrual syndrome, and menstrual discomfort has been observed in many types of women night shift workers, including nurses, aircrews, and blue-collar employees in industries. ⁽²¹⁾⁽⁴⁷⁾⁽⁴⁹⁾⁽⁵⁰⁾⁽⁵¹⁾ In a study among IT night shift working women in India, a survey was conducted to create awareness of menstrual disturbances, it was reported that 59% of women agree to the fact that the night shift can affect their menstrual cycle, 52.5% consider painful menstrual cycle as the main indication of menstrual disturbances, whereas 29.6% think that irregular menstrual cycle is a menstrual disturbance. ⁽⁵²⁾ A cross-sectional study in tertiary care hospital, Bangalore revealed that the most common complaint of night shift working nurses was about the menstrual disorder. Around 30% of them suffered from menstrual problems. ⁽⁴¹⁾ Among night shift call center women in Bangalore, cross-sectional study revealed that out of 31.3% female employees, 3.63% of them had a change in their menstrual cycle after joining the call center. ⁽³⁰⁾

Reproductive health-

Shift workers have lower fertility and higher abortion rates than day workers, according to studies, not only due to the disruption of their hormonal rhythms but also due to a personal decision to avoid or limit pregnancies or new babies due to more complex or difficult life organization caused by conflicts between irregular work schedules and home commitments. ⁽⁴⁷⁾ When comparing women with a fixed night work schedule to women with a constant daily routine, the risk of pregnancy loss is twice as high. Workers with irregular working hours have been found to have the greatest incidence of abortion. Rotating and night shifts have been demonstrated to have substantial effects on the newborn's gestational age and birth weight. ⁽²¹⁾⁽³⁶⁾⁽⁴⁹⁾⁽⁵⁰⁾ A study on night shift working women in India reported that working irregular hours was associated with an increased risk of low-birth-weight newborns. Night shift work was found to be associated with a statistically significant higher incidence of miscarriage in women who worked during their first trimester. When the study was limited to first pregnancies, night working women were shown to have a considerably higher risk. In shift workers, there has been a considerable rise in the chance of miscarriage and spontaneous abortion. ⁽³²⁾⁽⁵³⁾⁽⁴⁵⁾⁽⁵¹⁾ Some women choose to indulge in smoking and alcohol

Health Problems of Women Working in Night Shift in India: A Review

consumption due to work stress and various reasons which in turn leads to several reproductive hazards like low birth weight, lower gestational periods, higher rate of stillborn.

(44)

SL. NO	AUTHOR	YEAR	PLACE	TYPE OF STUDY	SAMPLE SIZE	AGE	OCCUPATION	MENSTRUAL HEALTH	REPRODUCTIVE HEALTH
1.	Jibi Paul, et al	2019	Chennai	Qualitative study	All women working at night shift in TCS, Chennai		BPO working women	*Menstrual disturbances *Irregular menstrual cycle	*Infertility
2.	Surekha Anbazhagan, Naveen Ramesh, Catherine Nisha, and Bobby Joseph	2014	Bangalore	Cross-sectional study	130	< 30 years- 89 people 31- 40 years- 40 people >40years- 6 people Married-49 people Unmarried- 78 Divorced- 03	Nurses	*30% suffered from menstrual problems	
3.	Bratati Banerjee	2009	India	Review article			Night shift working women	*Affects the regulation of the ovulatory cycle with reluctant menstrual irregularities.	*Risk of pregnancy loss- twice high compared to day shift workers. *Highest abortion rates *Effects on gestational age and birth weight of the new-born found significant.
4.	Singh Zorawar, Randhawa Jasjit Kaur and Kaur Sarabjit	2019	India	Review article			Night shift working women	*Higher rate of abnormal menstruation	*Rate of reproductive system infection, rate of infertility more in shift workers.
5.	A K Srivastava and Vipin Bihari	2000	India	Review article			Night shift working women	*Menstrual irregularities	*Statistically significant increased risk of abortion, who worked during first trimester.
6.	Jibu, Ritya Mary; Rani, S. Leslie; Brundha, M. P.	2020	India	Cross-sectional study			IT industry women	* 59% -agree that the night shift can affect their menstrual cycle, * 52.5% - painful menstrual cycle as the main indication of menstrual disturbances,	

Health Problems of Women Working in Night Shift in India: A Review

								* 29.6% - think irregular menstrual cycle are menstrual disturbance.	
7.	Naveen R. et al	2012	Bangalore	Cross-sectional study	176(31.3%= females, 68.7%= males)	21- 30 years	Call centre	*Out of 31.3% female employees, 3.63% - change in their menstrual cycle after joining the call centre.	
8.	Majumdar et. Al.	2020	West Bengal	Cross-sectional study	140	22- 60 years	Nurses		*8.3% - PCOS
9.	Scott A. J.	2000	India	Review article			Night shift working		*Significant increase risk of miscarriage *Spontaneous abortion risk
10.	Melba Sheila D'Souza, Ganesha Somayaji & Karkada Subrahmanya Nairy	2011	Goa	Cross-sectional study	145	15 -45 years All married	Mining workers		*11% - reproductive illness *15.8% had reproductive healthcare
11.	Dr. Kousar Jahan Ara Begum	2013	Bangalore	Cross-sectional study	100		BPO working women		*Spontaneous abortion, pre-term birth and lowered birth weight.
12.	Amrita Gupta	2010	Bangalore, Mumbai and Delhi	Review article			BPO working women		*Reproductive hazards - low birth weight, lower gestational periods, higher rate of stillborn.

Mental health

Mental well-being does not imply the absence of mental disorders. The ability to adapt to a wide range of life experiences with flexibility and a sense of purpose is a sign of good mental health. It can be characterized as a condition of equilibrium between the individual and the environment, a state of harmony between oneself and others, and coexistence between the self's and other people's realities, as well as the environment's. ⁽¹⁹⁾ Some of the common mental disturbances include sleep-related problems, depression, anxiety, and stress among night shift working women.

Sleep disorders-

Shift employment disrupts the circadian cycle of sleep, which is a significant occupational issue with possible health consequences. The circadian clock is disrupted by light exposure at night, causing sleep activity patterns to alter and melatonin synthesis to be

inhibited. The circadian rhythm of the hypothalamus is essential for maintaining sleep and waking cycles, eating behavior, and central and peripheral tissue metabolism and its disruption has a substantial influence on energy metabolism. ⁽²²⁾ According to the International Classification of Sleep Disorders Diagnostic and Coding Manual, night shift workers suffer from sleep disorders known as Shift Work Sleep Disorder (SWD) and are classed as circadian rhythm sleep disorders. Insomnia like sleep disorder is also one of the major causes of concern among night shift workers. They find it difficult to sleep during the daytime because of noises at home and in a residential community, which in turn leads to impairment in alertness and decreased productivity. ⁽³⁵⁾⁽³⁶⁾ Common sleep problems are sleep latency, insufficient sleep duration, and the feeling of not being refreshed even after a good sleep. A study among the staff of Medical College, Bangalore who worked at night reported that almost 70% of them complained about sleep disorders. ⁽⁵⁴⁾

Health Problems of Women Working in Night Shift in India: A Review

The source of sleep disorders in night shift workers is multifactorial, but multiple studies have shown that the endogenous circadian system, social and employment schedule requirements, home duties, and environmental circumstances are all key determinants of sleep duration and quality. Sleep deprivation has negative consequences for job performance and social functioning, as well as increased irritation and overall exhaustion, all of which can impair social and home interactions. ⁽³²⁾⁽³⁷⁾⁽⁴⁸⁾ Female shift workers have been reported to experience more sleep disturbances than male workers, they suffer from drowsiness more frequently during work. Sleep length is shorter in female workers as reported, because of the added responsibility of looking after home and children. Sleep deprivation can lead to early aging in women. ⁽²¹⁾⁽³⁵⁾⁽⁵⁵⁾⁽³³⁾ Cross-sectional study among nurses and doctors working in the emergency department of 12 major urban hospitals in India reported that 51% had insomnia due to night shifts, out of which 13% of them has symptoms for three months or more. The prevalence of SWD in this study was 13.27% was seen. ⁽⁵⁶⁾ Another cross-sectional study in tertiary hospital Bangalore reported that 53.8% of night shift working nurses have sleep problems, 43.07% prevalence of SWD, and significant association was seen with SWD and night shift work. ⁽⁴¹⁾

A study conducted in NRI Medical college Vishakhapatnam, Andhra Pradesh, and Vijaya Hospital, Belgaum, Karnataka reported that 40.5% of nurses had insomnia, 46.31% suffered from poor sleep quality, 25.26% had daytime sleepiness, 15.78% had borderline daytime sleepiness. ⁽²⁵⁾ A cross-sectional study among night-shift employees from Aligarh district MNCs, BPOs, and hospitals reported that 40% of night-shift workers of age 20 to 30 years, 50% of 30 to 40 years, and 27% of 40 to 50 years of age group employees suffered from sleep disorders. ⁽²⁹⁾ A study among nurses working at night at a private hospital in Hyderabad showed 70% of the nurses having poor quality of sleep, 83.3% of them had mild SWD and 16.6% of them had moderate SWD, only 30 % of the nurses had a good quality of sleep. ⁽⁵⁷⁾ Among women employees in private hospitals in Mumbai, who work at night have reported that 66% of them have difficulty sleep^{ing}. ⁽⁴³⁾

Depression, Anxiety, and Stress-

Night shift working women tend to complain about depression, helplessness, and stress more frequently due to lack of sleep and improper food intake. The relationship between shift work and anxiety, shift work, and depression has been established. ⁽³⁵⁾⁽³⁶⁾ Increased mental pressure and depression due to night shifts affect social and personal life. ⁽²¹⁾⁽³²⁾⁽⁵⁸⁾ A cross-sectional study among night shift working people in Chennai among different sectors, observed that 32% of the participants suffered from stress and depression. ⁽²⁰⁾ Another study conducted in North India, among MNC employees who worked at night reported 81% of people suffering from any form of stress. ⁽²⁷⁾ Cross-sectional study among

night shift nurses at tertiary care hospitals, Bangalore observed that 17.6% of nurses suffered from anxiety and 23.8% of them suffered from depression. ⁽⁴¹⁾ A study conducted among women working in night shift in BPO, Coimbatore city stated that women employees suffered from a high level of stress as compared to women employees of other sectors such as nursing and police services. ⁽⁴⁴⁾

A study conducted among night shift working women from different BPOs, hospitals, textile, garments, and leather industries in nine different cities of India reported that women employees face a lot of problems due to employer's behavior, and 13.3% of them resulted in mental tension, the majority being in textile and leather industries. Mental harassment was seen more in Ludhiana (27%), Kolkata (19%), Pune (17%), Delhi (14%), and less in Mumbai (9%), Chennai (7%), Hyderabad (8%) and least in Bangalore (6%). Overall, 10 % were having clinical depression. ⁽³⁸⁾ Cross-sectional study among police personal in Wardha city, India reported 66.7% of them had stress in the workplace causing problems. A substantial link between gender and mental illness has been discovered, with females scoring higher than males. ⁽⁵⁹⁾

A study in Aligarh district, among shift workers from different BPOs, MNCs, and hospitals reported that night shift working employees suffered more stress than that day shift workers, 54.30% (age group 20 to 30 years), 81.80% (age group 30 to 40 years), 63.60% (age group 40 to 50 years) were suffering from stress whereas 45.50% (age group 20 to 30 years), 31.31% (age group 30 to 40 years) and 20% (age group 40 to 50 years) of day shift workers were suffering from stress. Around 51% of 20 to 30 years of age, 78% of 30 to 40 years of age, and 54% of 40 to 50 years of age employees working at night were having mood disorders and anger issues. ⁽²⁹⁾ Another study in Mumbai and Pune call center reported that 55% of women had higher anxiety issues in International call centers than domestic call centers and 53.1% of women had anxiety issues which were higher than men (37.3%). ⁽³¹⁾ Stress was also reported to be higher among women than men. Anger issues were seen to be 58% among women night shift workers in a study conducted in a private hospital in Mumbai. ⁽⁴³⁾

Substance use-

Women working on shifts, especially night shifts tend to indulge in alcohol use and smoking. ⁽⁴⁵⁾ An exploratory study among MNC corporate employees in North India reported that 17% of the night shift employees drink frequently (at least once a month), 52% drink occasionally and 31% are non-consumers. ⁽²⁷⁾ A study among night shift working women in four BPOs of India reported that 8% of 20 to 25 years of age group women were indulged in smoking and most women had poor knowledge on the ill effects of smoking. They had a history of respiratory issues like cough, throat pain, bronchitis, and gastric disorders. Some

Health Problems of Women Working in Night Shift in India: A Review

women chose to smoke as they thought it's a quick fix to their stress problems and some believe smoking is glamorous.⁽⁴⁴⁾

SL. NO	AUTHOR	YEAR	PLACE	TYPE OF STUDY	SAMPLE SIZE	AGE	OCCUPATION	SLEEP DISORDERS	DEPRESSI ON, ANXIETY AND STRESS	SUBSTANCE USE
1	DIVYA B, ANDREW MICHAEL, JIBI PAUL	2019	Chennai	Qualitative study	All women working in TCS Chennai		BPO working women	*Sleep disturbances	*More mental pressure and face depression.	
2.	R. B. Singh, B. Anjum, Rajiv Garg et al.	2012	India	Review article			Night shift working people	* In developed countries, approximately one fifth of the workers may have disruptions of sleep due to night shifts.		
3.	R.H. Gowda et al.	2016	Bangalore	Cross-sectional study	124(75- female, 49- male)	20- 60 years	Health care staffs		* Stress - significantly higher in rotating night shift workers as compared to day shift (p < 0.001) and (p < 0.017) respectively.	
4.	Yogita Khade et al.	2016	Andhra Pradesh and Karnataka	Cross-sectional study	190(128-females, 42-males)	21 years and above 7 8- married	Nurses	*40.5% nurses had insomnia, 46.31% suffered from poor sleep quality, 25.26% had daytime sleepiness, 15.78% had borderline daytime sleepiness.		
5.	Atanu kumar pati, Arti Parganiha	2006	India	Review article			Night shift workers	*Shorter sleep length in females	*Relations hip between night shift work and anxiety, depression established.	

Health Problems of Women Working in Night Shift in India: A Review

6.	Majumdar et. Al.	2020	West Bengal	Cross-sectional study	140	22-61 years	Nurses	*67.50% - poor sleep quality	*5%- anxiety and stress	
7.	Sandeep Margapuram Sathyanarayana, Sunitha Gangadharaiah	2019	Bangalore	Cross-sectional study	40		Health care staffs	*Sleep latency, insufficient sleep duration and the feeling of not being refreshed even after a good sleep. *70% - sleep disorders.		
8.	Scott A.J	2000	India	Review article			Night shift working people		*Mental pressure * Depression	
9.	Kaushik Nag, Anjan Datta, Nabarun Karmakar, Tamal Chakraborty, Partha Bhattacharjee	2019	Tripura	Cross-sectional study	135(69-females, 66-males)	20-60 years	Health care staffs	*Prevalence of sleep disturbances-54%		
10.	Anjana Verma, Jugal Kishore, and Shobha Gusain	2018	Delhi	Cross-sectional study	550	25-60 years	Nurses	*Disturbed sleep *Increased irritability *Circadian rhythm disruption	*Poor psychological health	
11.	Khushboo Singh, Dr. N. V. Muninarayanappa	2017	India	Review article	10 articles		Nurses	*Drowsiness during work *Sleep disturbances more in females than males *Shorter sleep length *Early aging		
12.	Rathore et al.	2012	Udaipur, Rajasthan	Cross-sectional study	60	30-60 years	Nurses 90%-married, 5%-widowed	*> 50%- disturbed sleep	*Anxiety-High in old age compared to young	
13.	Surekha Anbazhagan, Naveen Ramesh, Catherine Nisha, and Bobby Joseph	2014	Bangalore	Cross-sectional study	130	less than 30 years- 89 people, 31 to 40 years- 35 people, above 40 -6 people	Nurses married- 49 people, unmarried- 78 , divorced- 3		*17.6% - anxiety and * 23.8% - depression.	

Health Problems of Women Working in Night Shift in India: A Review

14.	Mohd Fazal, Ur Rehman	2017	Aligarh	Cross-sectional study	160	20-50 years	MNC, BPO, Hospital employees	*40% - age 20 to 30 years, 50% of 30 to 40 years and 27% of 40 to 50 years of age group employees suffered from sleep disorders.	*Stress- 40% of night shift workers of age 20 to 30 years, 50% of 30 to 40 years and 27% of 40 to 50 years of age group employees suffered from sleep disorders. * Mood disorder and anger issues- Around 51% of 20 to 30 years of age, 78% of 30 to 40 years of age and 54% of 40 to 50 years of age employees .	
15.	Anumol Joseph, Sister Mary Brooke, Jelby, Pushpalatha, Sharon, Sunitha	2019	Hyderabad	Cross-sectional study	60	20-50 years	Nurses 18-married, 42-unmarried	*70% of the nurses having poor quality of sleep *83.3% of them had mild SWD and 16.6% of them had moderate SWD *30 % of the nurses had good quality of sleep.		
16.	Dr. Jayachitra. T.A, Mrs. Nandini Jagannarayan	2019	Mumbai	Cross-sectional study	50	25-60 years	Health care staffs	*66%- Difficulty to sleep	*Stress *Anger issues- 58%	
17.	Jeyapal Dinesh Raja and Sanjiv Kumar Bhasin	2014	India	Review article			Call centres		*Depression *Mental pressure	

Health Problems of Women Working in Night Shift in India: A Review

18.	V. M. Anantha Eashwar, et al.	2019	Chennai	Cross-sectional study	200	25-55 years	supervisors, watchman, quick crane operators, loco drivers, and junior engineers		*32% of the participants suffered from stress and depression.	
9.	Mohammad Ehteshamuddin, Dr. Vijayendra Gupta	2019	North India	Cross-sectional study	180(31% female)	> 20 years	multinational companies related to IT/ITs, Consulting Firms, Management firms and International NGOs 80%- married		*81%- Stress	*17% of the night shift employees drink frequently (at least once a month) , 52% drink occasionally and 31% are non-consumers.
20.	Amrita Gupta	2010	Bangalore, Mumbai and Delhi	Review article			BPO working women		*High level of stress	*8% of 20 to 25 years of age group women were indulged in smoking and most women had poor knowledge on the ill effects of smoking *Some women chose smoking as they thought it's a quick fix to their stress problems and some believe smoking is glamorous.
21.	The Associated Chambers of Commerce & Industry of India (ASSOCHAM)	2005	Delhi, Mumbai, Chennai, Kolkata, Hyderabad, Bangalore, Ludhiana, Ahmedabad, Pune	Cross-sectional study	272	20-50 years	BPOs, Hospitals, Textiles, Garments and Leather industries		*13.3% - in mental tension *Mental harassment was seen more in Ludhiana (27%), Kolkata (19%), Pune (17%), Delhi (14%), and less in Mumbai (9%), Chennai (7%), Hyderabad (8%) and Bangalore (6%).	

Health Problems of Women Working in Night Shift in India: A Review

									* 10 % were having clinical depression.	
22.	Selokar D, Nimbarde S, Ahana S, Gaidhane A, Wagh V	2011	Wardha city	Cross-sectional study	102(4.9% female)		Police personnel		*66.7% of them had stress in workplace *Significant association between gender and mental ill health was found, females more likely to score more than males.	
23.	Bhuyar, Banerjee A, Pandve H, Padmnabhan P, Patil A, Duggirala S, et al.	2018	Pune and Mumbai	Qualitative and quantitative study	100(51 females)		Call centres		*55% of had higher anxiety issues in international call centres than domestic call centres * 53.1% of women had anxiety issues which was higher than men (37.3%).	
24.	Dr. Kousar Jahan, Ara Begum	2013	Bangalore	Cross-sectional study	100		BPO working women			*Alcohol use and smoking indulgence.

Social health

Individual harmony and integration, as well as relationships between individuals and other members of society and persons and the environment in which they live, are all components of social well-being. It can be defined as the quantity and quality of an

Health Problems of Women Working in Night Shift in India: A Review

individual's interpersonal ties and the extent of involvement with the community. The ability to view oneself as a member of a vast society, as well as one's social skills, social functioning, and ability to see oneself as a part of a large society, all contribute to one's social health. Social health is based on a positive physical environment as well as a positive human environment that is concerned with the individual's social network. ⁽¹⁹⁾

Various reasons why women work the night shifts in different sectors were studied and found that some call center working women and IT employees were attracted to the job because of attractive salary, travel facility provision, medical facility, incentives, and insurance policies which came along with the job. Few even reported that it helps them learn new skills and confidence in large to deal with the society, feeling of empowerment and freedom. ⁽²¹⁾⁽⁵⁸⁾⁽⁶⁰⁾⁽⁴⁰⁾ In a study conducted among private hospital women night shift working nurses in Mumbai reported that 71% of the nurses took the job because of better pay package and others due to demand of the job. ⁽⁴³⁾

Psychosocial problems-

The night shift has been known to influence family and social life significantly. Women experience several psychological disturbances and family dysfunctions. Irregular work hours affect the whole family. Shift work's displacement in time and distance can cause domestic difficulty for both people and families, wreaking havoc on relationships. ⁽⁴⁵⁾⁽³⁵⁾ Nightwork or irregular working hours make it difficult to fulfill parenting and social responsibilities. It leads to significant strain in a marriage relationship and leads to higher fights or divorce rates. ⁽³²⁾⁽⁶¹⁾⁽⁴⁰⁾ Some of the psychosocial problems are disrupting family relations, poor recreation opportunities, vices such as alcohol and tobacco use, faulty eating habits seen among night shift working women. ⁽⁵⁵⁾⁽⁴⁴⁾ In a study at a call center at Pune and Mumbai, it was seen that 6% of workers had very bad family relations, 28% had average domestic bliss and 19% workers had very good family support, 60% of the women workers complained of no coincidence in holidays of their spouse or family members which affected their quality time with family. ⁽³¹⁾

A study conducted among different night shift working women in BPOs, hospitals, textiles, garment, and leather industries in nine different cities of India reported that social problems were more in Ludhiana (23%), Kolkata (19%), Delhi (15%), Pune (14%) and less in Mumbai (12%), Chennai (9%), Hyderabad (8%) and Bangalore (8%). Overall, 13.5% of workers face social problems by not being able to devote time to evening parties or functions, small gatherings in their neighborhood, and relations. Difficult to give time for children and attend their school functions and meeting. ⁽³⁸⁾ Another study conducted in Aligarh district among different day and night shift employees from different BPOs, MNCs, and hospitals reported that 61.80% (age 20- 30 years), 84.40% (age 30- 40 years), 63.60% (age 40 to 50

years) of night shift workers had severely disturbed social life than day shift workers by 39.50% (age 20 to 30 years), 18.80% (age 30 to 40 years) and 27.80% (age 40 to 50 years) respectively. ⁽²⁹⁾ Day shift workers have more work-life balance than night shift workers. ⁽⁶²⁾

Women are perceived to be indecent by society when they work at night. Largely its seen that after marriage, women are forced to quit their jobs because of disapproval of husband and family for the night shift. ⁽⁴²⁾⁽⁶³⁾ In a study among women night shift employees from IT, textiles, manufacturing, hospitals, and flight services at Chennai reported that 60 % of IT and manufacturing women employees were able to cope up with their family demands while working night shifts, whereas 20% of textiles, 14% of hospital and 34% of flight servicewomen night shift employees were not at all able to cope. ⁽⁶⁴⁾

Job satisfaction-

It was seen that, in a study conducted among night shift working women in Chennai city among IT services, textile, manufacturing industries, hospitals, and flight services overall, many women in the textile industry do not have job satisfaction when compared with other sector women. ⁽⁶⁴⁾ In a study conducted among nurses in tertiary care hospital Delhi, it was found that night shift working nurses have less job satisfaction when compared to day shift working nurses. ⁽⁴⁸⁾ Another study among women working at night from different BPOs, hospital, textile, garments, and leather industries in nine different cities revealed that only 8.6% were satisfied with their jobs and also got childcare services within the company premises. ⁽³⁸⁾

Insecure- work and commute-

Violence women face at work during nightshifts includes verbal harassment by supervisors, rage both inside and outside the industry, the real threat of assault and abduction. ⁽⁴²⁾ Studies have shown that women workers have an issue with mobility and feel unsafe and insecure to travel at night. ⁽⁶⁵⁾⁽⁴⁴⁾ In a study conducted among female nurses working at night shifts, in Udaipur, India reported that 43.3% of them felt unsafe during morning hours to travel back home and 73.3% felt unsafe during a night shift to commuting to the workplace. ⁽³³⁾ Another study among night shift working women at different BPOs, hospitals, textile, leather, and garment industries at nine different cities in India reported that overall, 28.9% of women felt insecure at work, Bangalore and Ludhiana are found to be highly insecure zones with 44% and 45% insecurity perceptions respectively. Around 83% of workers are satisfied with the commute, other travel for at least two hours to and fro to the workplace, 13% face difficulties during commute and 87% are satisfied by the arrangements made by their employers. More commute issues were seen in Kolkata (18%), Mumbai (17%) and Pune (17%), less in Delhi (14%), Hyderabad (13%) and Ludhiana (10%), and least in Chennai (8%) and Bangalore (8%). ⁽³⁸⁾

International Journal of Medical Science and Clinical Research Studies

ISSN(print): 2767-8326, ISSN(online): 2767-8342

Volume 02 Issue 03 March 2022

Page No: 177-208

DOI: <https://doi.org/10.47191/ijmscrs/v2-i3-02>, Impact Factor: 5.276

SL. NO	AUTHOR	YEAR	PLACE	TYPE OF STUDY	SAMPLE SIZE	AGE	OCCUPATION	PSYCHOSOCIAL PROBLEMS	JOB SATISFACTION	INSECURE - WORK AND COMMUTE
1.	Dr. Kousar Jahan Ara Begum	2013	Bangalore	Cross-sectional study	100		BPO working women	* Unsocial hours work shift * Social life is affected		
2	Atanu kumar pati , Arti Parganiha	2006	India	Review article			Night shift workers	*Psychological disturbances *Family dysfunctions *Domestic inconvenience *Inharmonious relationship between work schedules. *Psychosocial stress * 20% discontinue jobs because of social problems.		
3	Scott A. J.	2000	India	Review article			Night shift workers	*Increased irritability *Compromised social and domestic interactions.		

Health Problems of Women Working in Night Shift in India: A Review

								*Increased social and family stress		
4.	Cecilia MG and Swasti Mitter	2005	India	Review article			Call centres	*Higher fights and divorce rates *Strain in marriage *Difficult parenting		
5	J.Priyadharshini and Selladurai M	2005	Salem	Cross-sectional study	50	25- 30 years All married women	IT industry workers	*30% agree that work affects family relationships *Higher divorce rates		
6	Khushboo Singh, Dr. N. V. Muninarayanappa	2017	India	Review article	10 articles		Nurses	*Disrupting family relations *Poor recreation opportunity *Alcohol and tobacco use *Faulty eating habits		
7	Amrita Gupta	2010	Bangalore, Mumbai, Delhi	Review article	9 articles		BPO working women	*Social stigma *Disreputation of women *Dual burden of work and family *90% can't maintain work and family life balance		*Issue with mobility *feel unsafe and insecure to travel at night.
8	Bhuyar, Banerjee A, Pandve H, Padmnabhan P, Patil A, Duggirala S, et al.	2008	Pune and Mumbai	Qualitative and Quantitative study	100(51 females and 49 males)		Call centres	*6%- had very bad family relationships *28%- average domestic bliss *19%- very good family support *60%- complained of no		

Health Problems of Women Working in Night Shift in India: A Review

								coincidental holidays with family members.		
9	The Associated Chambers of Commerce & Industry of India (ASSOCHAM)	2005	Delhi, Mumbai, Chennai, Kolkata, Hyderabad, Bangalore, Ludhiana, Ahmedabad, Pune	Cross-sectional study	272	20- 50 years	BPOs, Hospitals, Textiles, Garments and Leather industries	*Social problems- Ludhiana (23%), Kolkata (19%), Delhi (15%), Pune (14%) and less in Mumbai (12%), Chennai (9%), Hyderabad (8%) and Bangalore (8%). * Overall, 13.5% workers face social problems.	* Only 8.6% were satisfied with their jobs.	* 28.9% of women felt insecure at work * Bangalore and Ludhiana- 44% and 45% insecurity perceptions respectively . 13% face difficulties during commute. * Commute issues were seen in Kolkata (18%), Mumbai (17%) and Pune (17%), less in Delhi (14%), Hyderabad (13%) and Ludhiana (10%) and least in Chennai (8%) and Bangalore (8%)

Health Problems of Women Working in Night Shift in India: A Review

10.	Mohd Fazal ,Ur Rehman	2017	Aligarh	Cross-sectional study	160	20- 50 years	MNCs, BPOs and Hospital employees	* 61.80% (age 20-30 years), 84.40% (age 30- 40 years), 63.60% (age 40 to 50 years) of night shift workers had severely disturbed social life than day shift workers by 39.50% (age 20 to 30 years), 18.80% (age 30 to 40 years) and 27.80% (age 40 to 50 years) respectively.		
11.	Parul Agarwal	2014	Delhi and NCR	Cross-sectional study	200(50% females)		Call centres	*Difficult to fulfil parenting and social responsibility. * Less work life balance.		
12.	Suheba Khan	2017	India	Review article			Call centres	*Quit jobs after marriage, disapproval by husband and family for night shift work.		*Violence- Verbal harassments by supervisors, rage, assault and abduction threats
13.	Reena Patel	2010	Mumbai, Bangalore, and Ahmedabad	Qualitative study	72		Call centres	*Perceived indecent by society *Forced to quit jobs after marriage		

Health Problems of Women Working in Night Shift in India: A Review

14.	A. Anuradha	2019	Chennai	Cross-sectional study	250		hospital, IT/ITES, Textiles, Manufacturing, flight services	* 60 % of IT and manufacturing women employees were able to cope up with their family demands * 20% of textiles, 14% of hospital and 34% of flight service women night shift employees were not at all able to cope.	*Textile industry women- job dissatisfaction compared to others	
15.	Anjana Verma, Jugal Kishore, and Shobha Gusain	2018	Delhi	Cross-sectional study	550	25-60 years	Nurses		*Less job satisfaction compared to day shift workers.	
16.	Shilpi Bora, Abhirup Chatterjee, Pallavi Rani, Deb Kumar Chakrabarti	2016	Assam	Cross-sectional study	30		Police personnel	*50% agree that job affects social life.		*100% feel insecure while doing duty at night and travel
17.	Rathore et al.	2012	Udaipur, Rajasthan	Cross-sectional study	60	30- 60 years 90 % married, 5% widowed	Nurses			* 43.3% - felt unsafe during morning hours to travel back home * 73.3% felt unsafe during night shift to commute to workplace.

DISCUSSION

The Labour Laws and Acts (Total 13 in number)in India which restricted the women workforce, especially the night shifts were recently changed and drafted after amalgamation,

simplification and rationalization and were mentioned under "The Occupational Safety, Health and Working Conditions Code 2020".⁽²⁾ It envisages the employment of women in all establishments covering all types of work. Women are now entitled to work in the night,

Health Problems of Women Working in Night Shift in India: A Review

subject to their consent, with provisions of safety, holidays, working hours, or any other condition as prescribed by the appropriate government. ⁽²⁾ But the real challenge is to implement this by all states and follow the regulations as per the code.

We can see from the above information that physical health, mental health, and social aspects of health are interrelated to each other and when one aspect is disturbed due to the night shift work, women face issues in other aspects of health too, for example, timings of night shift work lead to sleep issues, which in turn can lead to chronic conditions like diabetes or hypertension and lifestyle changes like the disturbance is diet, which again leads to overweight and obesity which is a risk factor for diabetes and other chronic health issues and musculoskeletal problems, which later can lead to reproductive problems. Everything is interconnected, interlinked, and even coexist. So, it's necessary to maintain a healthy lifestyle and prevent health problems in the long run and maintain quality of life. More studies and researches are to be done on reproductive health problems and social problems faced by night shift working women so that proper measures can be taken to lessen their burden. In this review, we can see that many sectors like the police force, journalists are given less importance in terms of research, and more focus is thrown on women working in BPOs and Health sectors. In terms of place of study, more importance is given in certain places of India like Delhi, Mumbai, Bangalore, and Chennai. There should be more research studies and proper records on the number of women working night shifts in each sector and that should be maintained and monitored regularly.

Training by providing courses to nurses, doctors, and other healthcare workers, managers of different companies on the risk of shift work as well as strategies to reduce these risks, effective recording systems for occupational accidents should exist. ⁽¹⁴⁾⁽¹⁶⁾ Fewer consecutive night shifts, adequate shift intervals, and shorter night shift duration may minimize cancer risk and other health issues, whereas schedules that maximize sleep and reduce tiredness may reduce injury risk. At the workplace, fatigue risk management should be adopted. ⁽¹⁰⁾ Scheduled napping, controlled light exposure during the night shift, nutrition guidelines to follow, psychoeducation can help in increasing sleep quality and reduce fatigue among night shift working women eventually. ⁽⁸⁾ Individual differences, as well as work environment variables, should be taken into account while developing measures to improve adaptation to night shift employment. These strategies should be tailored to individual needs and working conditions for achieving better results both in terms of health and economy.

CONCLUSION

The present review, though limited in nature highlights that even in this era, many Indian women struggle to get into night shift work and when they are into it, there is a significant proportion of women who face health and social problems that in turn affect their growth

and development. If proper measures are not taken, then the problem is likely to increase in the coming years. The public health community should identify, prepare, integrate and implement activities that help the promotion of health and lifestyle of these working women. There is need of good quality population data which can drive policies and programs for women working in night shift in every sector of India. This doesn't end here, it should be monitored and evaluated for its effectiveness and efficacy using the intersectoral approach. Rather than viewing this either as a site of western imperialism or a space that liberates women from traditional gender roles, one should begin to see that it has the potential to reshape the individual perception and community that surrounds them. Safety of women remains the main challenge, problems at any level should not be ignored and change in the attitude of society for allowing women to work at night should be put light on.

For health concerns and dangers in night shift employment for women, appropriate indicators must be established. To have a better understanding of any potentially lethal occupational health risks faced by women, longitudinal study and record linking are required. Women's workplace health legislation should be re-evaluated regularly to ensure that it does not discriminate against women or neglect potential occupational health risks in men. Mainly, there is a strong need for research in every sector where women work at night shift in India, as we saw from the article that only certain sectors are being given importance like call centers, IT professionals, and healthcare workers. But there are other sectors like police services, emergency services, logistics, and transportation services, television and broadcasting sectors where women work at night, and the health needs and problems of these women should also be focused on. Finally, strategic investments in health, nutrition, education, employment, and welfare are necessary for the growth of these women and India.

REFERENCE

- I. Population, female (% of total population) - India | Data [Internet]. [cited 2021 Feb 22]. Available from: <https://data.worldbank.org/indicator/SP.POP.TOTL.FE.ZS?locations=IN>
- II. (No Title) [Internet]. [cited 2021 May 18]. Available from: https://www.indiabudget.gov.in/economicsurvey/doc/vol2chapter/echap10_vol2.pdf
- III. 104 countries have laws that prevent women from working in some jobs | World Economic Forum [Internet]. [cited 2021 Feb 24]. Available from: <https://www.weforum.org/agenda/2018/08/104-countries-have-laws-that-prevent-women-from-working-in-some-jobs/>
- IV. (No Title) [Internet]. [cited 2021 Feb 25]. Available from: <http://un-act.org/publication/view/ilo-convention-no-89-night-work-women->

Health Problems of Women Working in Night Shift in India: A Review

- convention-revised-1948/Appendixes.
- V. Definition and Occurrence of Exposure - Painting, Firefighting, and Shiftwork - NCBI Bookshelf [Internet]. [cited 2021 Mar 2]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK326824/>
- VI. (No Title) [Internet]. [cited 2021 Feb 24]. Available from: https://www.who.int/occupational_health/publications/en/oehwomenandoh.pdf
- VII. Kervezee L, Shechter A, Boivin DB. Impact of Shift Work on the Circadian Timing System and Health in Women [Internet]. Vol. 13, Sleep Medicine Clinics. W.B. Saunders; 2018 [cited 2021 May 19]. p. 295–306. Available from: <https://pubmed.ncbi.nlm.nih.gov/30098749/>
- VIII. Willis SK, Hatch EE, Wesselink AK, Rothman KJ, Mikkelsen EM, Wise LA. Female sleep patterns, shift work, and fecundability in a North American preconception cohort study. *Fertil Steril*. 2019 Jun 1;111(6):1201-1210.e1.
- IX. Garde AH, Begtrup L, Bjorvatn B, Bonde JP, Hansen J, Hansen ÅM, et al. How to schedule night shift work to reduce health and safety risks. *Scand J Work Environ Heal* [Internet]. 2020 [cited 2021 May 19];46(6):557–69. Available from: <https://pubmed.ncbi.nlm.nih.gov/32895725/>
- X. Chung SA, Wolf TK, Shapiro CM. Sleep and health consequences of shift work in women. *J Women's Heal*. 2009 Jul 1;18(7):965–77.
- XI. Peterson SA, Wolkow AP, Lockley SW, O'Brien CS, Qadri S, Sullivan JP, et al. Associations between shift work characteristics, shift work schedules, sleep, and burnout in North American police officers: a cross-sectional study. *BMJ Open* [Internet]. 2019 [cited 2021 May 19];9:30302. Available from: <http://bmjopen.bmj.com/>
- XII. Torquati L, Mielke GI, Brown WJ, Burton NW, Kolbe-Alexander TL. Shift work and poor mental health: A meta-analysis of longitudinal studies. *Am J Public Health* [Internet]. 2019 [cited 2021 May 19];109(11):E13–20. Available from: <https://pubmed.ncbi.nlm.nih.gov/31536404/>
- XIII. Hägg SA mi., Torén K, Lindberg E. Role of sleep disturbances in occupational accidents among women. *Scand J Work Environ Health* [Internet]. 2015 Jul 1 [cited 2021 May 19];41(4):368–76. Available from: <https://pubmed.ncbi.nlm.nih.gov/25830787/>
- XIV. Wong IS, Smith PM, Mustard CA, Gignac MA. For better or worse? changing shift schedules and the risk of work injury among men and women. *Scand J Work Environ Heal*. 2014;40(6):621–30.
- XV. Shan Z, Li Y, Zong G, Guo Y, Li J, Manson JE, et al. Rotating night shift work and adherence to an unhealthy lifestyle in predicting risk of type 2 diabetes: Results from two large US cohorts of female nurses. *BMJ*. 2018;363.
- XVI. Vetter C, Devore EE, Wegrzyn LR, Massa J, Speizer FE, Kawachi I, et al. Association between rotating night shiftwork and risk of coronary heart disease among women. *JAMA - J Am Med Assoc* [Internet]. 2016 Apr 26 [cited 2021 May 19];315(16):1726–34. Available from: <https://pubmed.ncbi.nlm.nih.gov/27115377/>
- XVII. Travis RC, Balkwill A, Fensom GK, Appleby PN, Reeves GK, Wang XS, et al. Night shift work and breast cancer incidence: three prospective studies and meta-analysis of published studies. *J Natl Cancer Inst*. 2016 Dec 1;108(12).
- XVIII. Park Textbook of Preventive and Social Medicine 23th Edition Read & Download Online - Libri book [Internet]. [cited 2021 May 15]. Available from: <https://libribook.com/ebook/14221/park-textbook-preventive-social-medicine-23th-edition-pdf>
- XIX. Eashwar A, Anantha Eashwar VM, Vijay A, Gopalakrishnan S. Study of type 2 diabetes mellitus among night-shift workers in Chennai [Internet]. Vol. 12, Drug Invention Today |. 2019 [cited 2021 Feb 22]. Available from: <https://www.researchgate.net/publication/337275412>
- XX. (No Title) [Internet]. [cited 2021 Mar 1]. Available from: <https://ijmaes.org/wp-content/uploads/2020/03/FULL-TEXT.pdf>
- XXI. (PDF) Association of Circadian Disruption of Sleep and Night Shift Work with Risk of Cardiovascular Disease [Internet]. [cited 2021 Feb 26]. Available from: https://www.researchgate.net/publication/235962228_Association_of_Circadian_Disruption_of_Sleep_and_Night_Shift_Work_with_Risk_of_Cardiovascular_Disease
- XXII. Gowda RH, Sukumar GM, Gowda SH. Association between metabolic risk, oxidative stress, and rotating shift work in a tertiary health care facility. *Clin Epidemiol Glob Heal* [Internet]. 2019 Dec 1 [cited 2021 Feb 26];7(4):564–70. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S2213398418302756>
- XXIII. Gupta S. Dietary Practices and Nutritional Profile of Female Nurses from Government Hospitals in Delhi, India. *Iran J Nurs Midwifery Res* [Internet]. 2017 [cited 2021 Feb 26];22(5):348–53. Available from: </pmc/articles/PMC5637141/>
- XXIV. Study of Insomnia, Day Time Sleepiness, and Sleep Quality among South Indian Nurses. [cited 2021 Feb 26]; Available from: www.jcdr.net
- XXV. Saiyed SH, Sekhar A. A study on anthropometric measurements, Nutritional status, and Body Composition of the Nightshift BPO executives [Internet].

Health Problems of Women Working in Night Shift in India: A Review

- [cited 2021 Feb 26]. Available from: www.ijpab.com
- XXVI. Ehteshamuddin M, Gupta Associate Professor V. Work-Related Factors contributing to Obesity in North India-A New Paradigm.
- XXVII. Mathur M, Harsh M, Mathur S. Diet Pattern and Nutritional Status of Women Working in Call Centers of India.
- XXVIII. Fazal M, Rehman U. EVALUATION OF HEALTH RISK PROBLEMS AMONG NIGHT SHIFT WORKERS OF ALIGARH DISTRICT [Internet]. JETIR; 2019 [cited 2021 Feb 22]. Available from: www.jetir.org
- XXIX. (No Title) [Internet]. [cited 2021 Feb 22]. Available from: https://www.researchgate.net/profile/Naveen_Ramesh3/publication/32157232_9_CALL_HANDLERS_AND_THEIR_HEALTH_PROBLEMS_AN_INDIA_N_SCENARIO/links/5a276505a6fdcc8e866e62b6/CALL-HANDLERS-AND-THEIR-HEALTH-PROBLEMS-AN-INDIAN-SCENARIO.pdf
- XXX. Bhuyar, Banerjee A, Pandve H, Padmanabhan P, Patil A, Duggirala S, et al. Mental, physical and social health problems of call center workers. *Ind Psychiatry J* [Internet]. 2008 [cited 2021 Feb 22];17(1):21. Available from: <https://www.industrialpsychiatry.org/article.asp?issn=0972-6748;year=2008;volume=17;issue=1;spage=21;epage=25;aulast=Bhuyar>
- XXXI. Scott AJ. Shift work and health. *Prim Care - Clin Off Pract* [Internet]. 2000 Dec [cited 2021 Mar 15];27(4):1057–78. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0095454305701895>
- XXXII. Rathore H, Shukla K, Singh S, Tiwari G. Shift work - Problems and its impact on female nurses in Udaipur, Rajasthan India. In: *Work* [Internet]. *Work*; 2012 [cited 2021 Feb 18]. p. 4302–14. Available from: <https://pubmed.ncbi.nlm.nih.gov/22317381/>
- XXXIII. Sivabalamurugan S, Bhavani V. A Study on Sleep Pattern among Diabetic Shift Workers in Chennai, India-A Comparative Analysis. *Int J Res Rev Vol* [Internet]. 2019 [cited 2021 Feb 26];6. Available from: www.ijrjournal.com
- XXXIV. Kumar Pati Pt Ravishankar A, Parganiha Pt Ravishankar A. Influence of usage of social networking sites on circadian rhythms in human View project DOG POOP INVENTORY View project [Internet]. [cited 2021 Mar 1]. Available from: <https://www.researchgate.net/publication/252067714>
- XXXV. Majumdar P, Barman O, Chakraborty P, Sahu S. COVID-19 Pandemic and Rotational Shift Work : Impact on Physical and Mental Health of Indian Nurses. Vol. 6, *IISRR-International Journal of Research*. 2020.
- XXXVI. Nag K, Datta A, Karmakar N, Chakraborty T, Bhattacharjee P. Sleep disturbance and its effect on work performance of staffs following shifting duties: A cross-sectional study in a medical college and hospital of Tripura. *Med J Dr DY Patil Vidyapeeth* [Internet]. 2019 [cited 2021 Feb 12];12(3):211. Available from: <http://www.mjdrdypv.org/text.asp?2019/12/3/211/258194>
- XXXVII. (No Title) [Internet]. [cited 2021 Feb 12]. Available from: http://ncwapps.nic.in/pdfReports/NIGHT_SHIFT_FOR_WOMEN.pdf
- XXXVIII. Manjunatha R, Kiran D, Thankappan KR. Sickness absenteeism, morbidity and workplace injuries among iron and steelworkers - a cross-sectional study from Karnataka, Southern India. *Australas Med J* [Internet]. 2011 [cited 2021 Mar 1];4(3):143–7. Available from: [/pmc/articles/PMC3562962/](http://pmc/articles/PMC3562962/)
- XXXIX. Selladurai M, ComM, Phil M, Priyadharshini J. A STUDY ON MARRIED WOMEN WORKING IN NIGHT SHIFT AND ITS IMPACT ON FAMILY RELATIONSHIP [Internet]. [cited 2021 Feb 16]. Available from: <https://ssrn.com/abstract=3067522>
- XL. Anbazhagan S, Ramesh N, Nisha C, Joseph B. Shift work disorder and related health problems among nurses working in a tertiary care hospital, Bangalore, South India. *Indian J Occup Environ Med* [Internet]. 2016 Jan 1 [cited 2021 Feb 12];20(1):35–8. Available from: [/pmc/articles/PMC4922274/](http://pmc/articles/PMC4922274/)
- XLI. Khan S. Volume-IV, Issue-I [Internet]. 2017 [cited 2021 Feb 16]. Available from: <http://www.ijhsss.com>
- XLII. A study on Transformation of women employed in jobs involving night shift and its impact on their physical and mental health.
- XLIII. Gupta A. Health, Social and Psychological Problems of Women Employees in Business Process Outsourcing: A Study in India*.
- XLIV. Jahan K, Begum A. WOMEN & BPOs in INDIA [Internet]. [cited 2021 Feb 12]. Available from: www.ijhssi.org
- XLV. “ANALYSIS OF RISK FACTORS FOR CARCINOMA BREAST IN SOUTH INDIAN WOMEN.” 2014.
- XLVI. Costa G. Shift work and health: Current problems and preventive actions [Internet]. Vol. 1, *Safety and Health at Work*. Elsevier Science B.V.; 2010 [cited 2021 Mar 2]. p. 112–23. Available from: [/pmc/articles/PMC3430894/](http://pmc/articles/PMC3430894/)
- XLVII. Verma A, Kishore J, Gusain S. A comparative study of shift work effects and injuries among nurses working in rotating night and day shifts in a Tertiary Care Hospital of North India. *Iran J Nurs Midwifery Res* [Internet]. 2018 [cited 2021 Feb 16];23(1):51–6. Available from: [/pmc/articles/PMC5769186/](http://pmc/articles/PMC5769186/)
- XLVIII. Banerjee B. Physical hazards in employment and pregnancy outcome. *Indian J Community Med* [Internet]. 2009 Apr 1 [cited 2021 Mar 1];34(2):89–93. Available from: [/pmc/articles/PMC2781135/](http://pmc/articles/PMC2781135/)

Health Problems of Women Working in Night Shift in India: A Review

- XLIX. Zorawar S, Jasjit Kaur R, Sarabjit K. Occupational exposures and women reproductive health. *GSC Adv Res Rev* [Internet]. 2019 [cited 2021 Mar 1];(01):26–030. Available from: <https://doi.org/10.30574/gscarr.2019.1.1.0005>
- L. Srivastava AK, Bihari V. December 2000, pp 995-100 I Epidemiology Di vis ion, Industrial Toxicology Research Centre. Vol. 59, *Journal of Scientific & Industrial Research*.
- LI. EBSCOhost | 143462595 | Awareness of menstrual disturbances among women working night shifts in information technology. [Internet]. [cited 2021 Mar 1]. Available from: <https://web.a.ebscohost.com/abstract?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=09757619&AN=143462595&h=JGdaslCxnJ2Q8YliCebwAaBpNIGvOqN4EsANvpfpoB8Bxg2f9ZdzkyEiqylt8MfwAazWWFDEi3tqV%2BnHqICtXQ%3D%3D&crl=c&resultNs=AdminWebAuth&resultLocal=ErrCrlNotAuth&crlhashurl=login.aspx%3Fdirect%3Dtrue%26profile%3Dehost%26scope%3Dsite%26authtype%3Dcrawler%26jrnl%3D09757619%26AN%3D143462595>
- LII. Sci-Hub | Determinants of reproductive health and related quality of life among Indian women in mining communities. *Journal of Advanced Nursing*, 67(9), 1963–1975 | 10.1111/j.1365-2648.2011.05641.x [Internet]. [cited 2021 Mar 1]. Available from: <https://sci-hub.se/https://doi.org/10.1111/j.1365-2648.2011.05641.x>
- LIII. Sathyanarayana SM, Gangadharaiah S. Night shift working and its impact on sleep quality, calorie intake, and serum thyroid-stimulating hormone level among health-care workers in a tertiary hospital, Bengaluru. *Natl J Physiol Pharm Pharmacol* [Internet]. 1330 [cited 2021 Feb 26];(9). Available from: www.njppp.com
- LIV. Singh K, Muninarayanappa PDN V. PSYCHOLOGICAL DISTRESS AMONG STAFF NURSES WORKING IN NIGHT SHIFTS [Internet]. Vol. 3, *International Education and Research Journal*. 2017 Apr [cited 2021 Feb 18]. Available from: <http://ierj.in/journal/index.php/ierj/article/view/817>
- LV. (No Title) [Internet]. [cited 2021 Mar 1]. Available from: <https://medclinres.org/pdfs/2019/shift-work-disorder-prevalence-%26-burden-of-illness-in-healthcare-providers-of-india-mcr-19.pdf>
- LVI. Joseph A, Brooke S, Jelly, Pushpalatha, Sharon, Sunitha. The prevalence of shift work sleep disorder and the quality of sleep among nurses working in selected Hospitals, Hyderabad. *Indian J Psychiatr Nurs* [Internet]. 2018 [cited 2021 Feb 15];15(1):10. Available from: <http://www.ijpn.in/text.asp?2018/15/1/10/262498>
- LVII. Raja JD, Bhasin SK. Health issues amongst call center employees, and emerging occupational groups in India. *Indian J Community Med* [Internet]. 2014 [cited 2021 Feb 12];39(3):175–7. Available from: <http://pmc/articles/PMC4134534/>
- LVIII. Selokar D, Nimbarte S, Ahana S, Gaidhane A, Wagh V. Occupational stress among police personnel of Wardha city, India. *Australas Med J* [Internet]. 2011 [cited 2021 Mar 1];4(3):114–7. Available from: <http://pmc/articles/PMC3562957/>
- LIX. (PDF) Nightshift and its effect on the health of working women in BPO Chennai [Internet]. [cited 2021 Feb 11]. Available from: https://www.researchgate.net/publication/333103910_Nightshift_and_its_effect_on_the_health_of_working_women_in_BPO_Chennai
- LX. Ng C, Mitter S. Valuing Women’s Voices: Call Center Workers in Malaysia and India. *Gend Technol Dev* [Internet]. 2005 Jan 25 [cited 2021 Feb 26];9(2):209–33. Available from: <https://www.tandfonline.com/doi/full/10.1177/097185240500900203>
- LXI. Agarwal P, Assistant S. A Study of Work-Life Balance with Special Reference to Indian Call Center Employees [Internet]. *International Journal of Engineering and Management Research*. 2014 [cited 2021 Feb 16]. Available from: www.ijemr.net
- LXII. ResearchGate [Internet]. [cited 2021 Feb 16]. Available from: https://www.researchgate.net/publication/277237201_Reena_Patel_Working_the_Night_Shift_Women_in_India's_Call_Center_Industry/link/558a331708ae273b2876ecde/download
- LXIII. Job Satisfaction among Women Working in Night Shift in Chennai City.
- LXIV. Bora S, Chatterjee A, Rani P, Chakrabarti D. On-the-Job Stress: Interventions to Improve the Occupational Well-being of Policewomen in Assam, India [Internet]. 2016 [cited 2021 Mar 1]. Available from: <http://vc.bridgew.edu/jiwshttp://vc.bridgew.edu/jiws/vol18/iss1/16>