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In Depth Study Of Personal Information Of Day Workers And Shift Workers: Special Reference To Their Nutritional Anthropometry & Anthropometric Measurements

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Abstract

The research was carried out to assess and compare the health problems experienced by day and shift workers in Visakhapatnam. The research was conducted on a sample of 70 software engineers, in the age group of 22-33 years in Bhubaneswar, Orissa. All the shift workers followed an 8 hour irregular rotating work schedule namely morning, evening and night shift. Permanent day workers were the workers of typical day schedule who work for 8 hours. It was witnessed that the major health problem experienced by the subjects were loss of appetite, gain of weight, fatigue/tiredness, headache, common cold, backache, irritability, acidity, abdominal bloating or gas etc. more frequently observed in shift workers compared to day workers. To protect the health of the potential young generation nutrition education is required regarding the role of nutrition; importance of balanced diet.

Keywords: Nutritional Anthropometry, Anthropometric Measurements, Day workers, Shift workers

Introduction

The Body Mass Index (BMI) is a recent valid index to assess the nutritional status of individual. Below are the few studies which describe the association between shift work and BMI. Niedhammer et al. (1996) studied 469 nurses for 5 years and found that weight gains (more than 7 kg) were more frequent among nurses on night work than on day time work. An effort was made to determine whether weight gain was more prevalent in workers on late shifts than on day shifts in New York, USA by Geliebter et al. (2000). Data were analyzed for 85 subjects, (36 day shift, 49 late shift). The results showed mean weight gain of 4.3 kg in late shift workers compared to 0.9 kg for day shift group. Late shift workers reported eating fewer meals (1.9) than day shift workers (2.5). A study was conducted to know the shift pattern and its interaction with age, BMI on 787 day shift or day-night shift workers in Oxford University by Parkes et al. (2002). The results revealed the significant interaction effect with day-night shift with increase in BMI. Croce et al. (2007) conducted a study to assess the difference in BMI between day and shift workers, in relation to diet quality and physical activity in Italy. The study included 341 male subjects (165 day workers and 176 shift workers). Results indicated that shift workers had higher BMI than day workers (27.6). The diet quality was better in the shift workers and physical activity was similar in the two groups. A research was conducted by Morikawa et al. (2007) on 1529 male blue collar workers, aged 19-49 yrs. working in a sash and zipper factory in Japan to know the effect of shift work on metabolic disturbances. Results indicated mean increase in BMI was 1.03 kg/m² for shift workers compared to day workers. Boye et al. (2008) determined relationship between BMI, weight gain, ergonomics and exercise variables in 395 United States call center employees. Results demonstrated a substantial weight gain over a period of 8 months in the participants. Keeping in view, the objective of the study, a detailed schedule was formulated to elicit the information on various aspects related to the assessment of various nutritional and health factors, which influence the nutritional status of the employees.

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The schedule was pre-tested and modified wherever necessary. The final schedule consists of 5 parts as follows. General information of subjects such as age, education, occupation, duration of work, timing of work, residence, family type, family size, marital status, with whom living, nativity, since how long the person has been in that shift, were collected by structured pretested questionnaire through personal interview method. Based on the age and income the subjects were classified into three different groups by using the formula, Mean (0.425). Depending upon the number of family members, they were classified into small, medium and large as indicated below ACRIP (CD, 2000). The nutritional status of subjects was assessed by nutritional anthropometry and diet survey. The anthropometric measurements viz., height, weight before joining the job and at present, waist and hip circumference were recorded as per the guideline suggested by Jelliffe (1966). The height was measured using an anthropometry nearest to 0.1 cm. A portable platform balance (spring) was used to measure weight in kilogram nearest to 0.5kg. Subjects stood without support, with casual clothing and without shoes while taking the weight. Waist and hip circumference were measured using a non-stretchable measuring tape in centimeters. The anthropometric data was further used for computing BMI, by the formula expressed as the ratio of weight in kgs to height in square meters. The Body Mass Index a recent valid index of health status has been calculated to know the relationship between shift work and BMI. The nutritional status of the subjects was assessed in terms of anthropometric measurements, diet survey and biochemical parameters. The difference observed in weight, BMI, WHR was statistically significant between the day and shift workers. However, majority of the subjects doing day workers (41.7%) were having ideal BMI, whereas, 55.9 per cent shift workers were in obese grade I group. This could be due to the irregular work hours, the daily routine is interrupted, regular eating and exercise habits are difficult to maintain. These results were in line with the results of Cheet *al.* (2004), Sudo and Ohtsuka (2001) who stressed that, shift workers have a higher prevalence of being overweight.

Methodology

The study was carried out at various software industries in Visakhapatnam. The purpose of the present investigation was to assess the health status of shift workers in comparison to permanent day workers.

Participants

A total of 70 software engineers, in the age group of 22-33 years were selected for the study, with 36 members in control group (permanent day workers) and 34 members in study group (shift workers). The study was conducted in five software industries in Bhubaneswar, Orissa. All the subjects were male workers as there were no female workers working in shifts due to safety reasons. All the shift workers followed an 8 hour irregular rotating work schedule namely morning, evening and night shift. Permanent day workers were the workers of typical day schedule who work for 8 hours. The first step included sample selection and then, rapport was formed with the subjects.

Stages of Study

Stage-1 Sample was selected through purposive sampling technique.

Stage-2 Rapport was built with the subjects.

Stage-3 The data were collected using the schedules and interviews.

Stage-4 The data were analyzed to make meaningful inferences and comparisons.

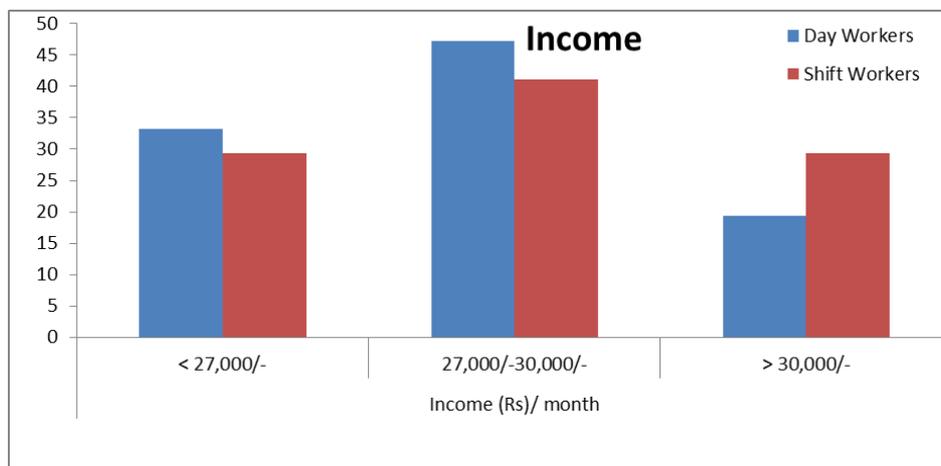
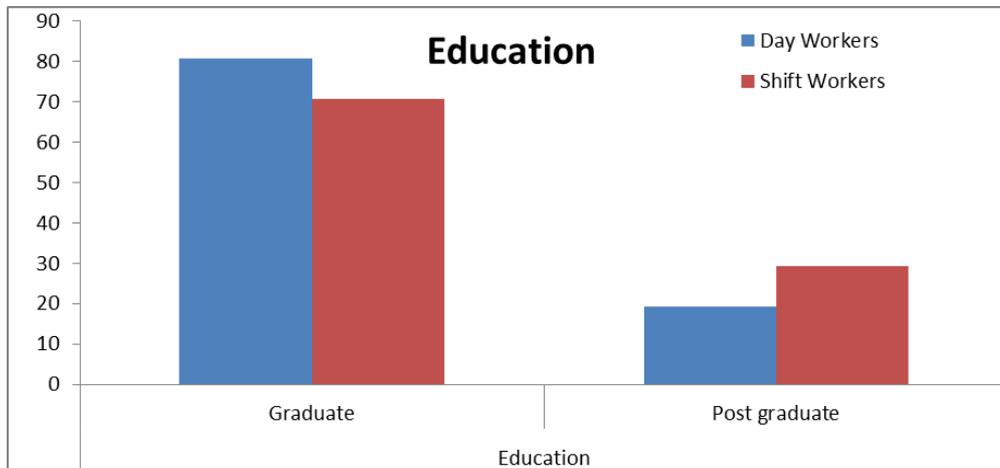
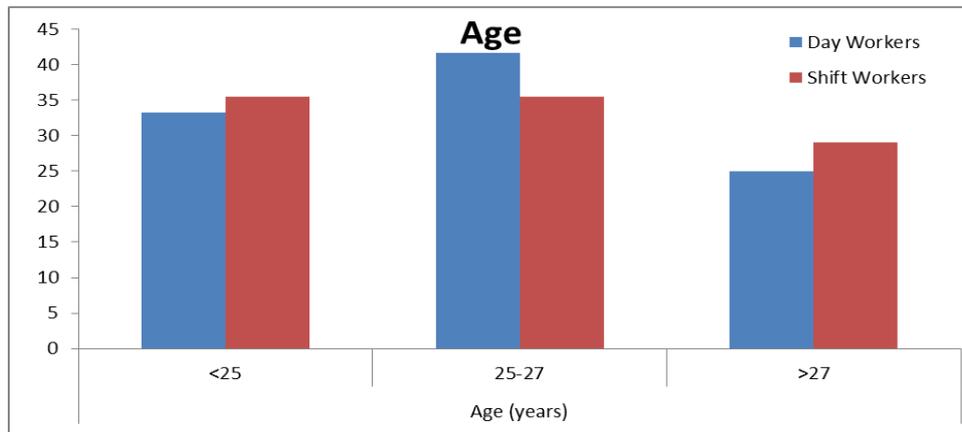
Result and Discussion

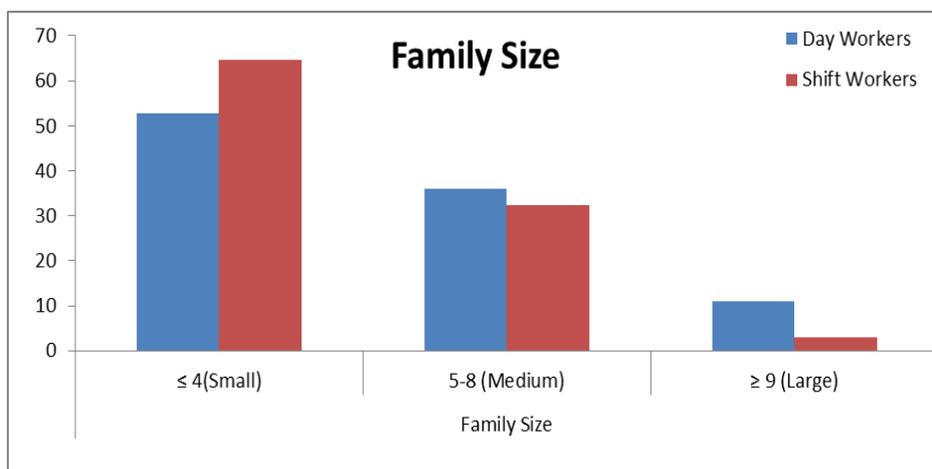
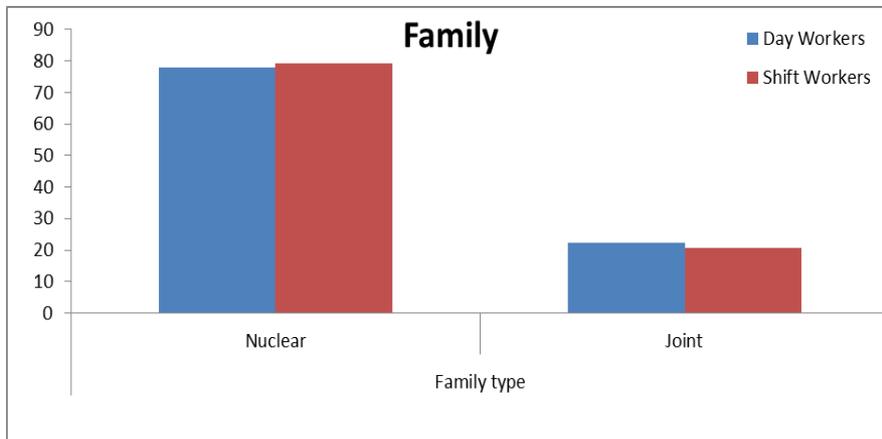
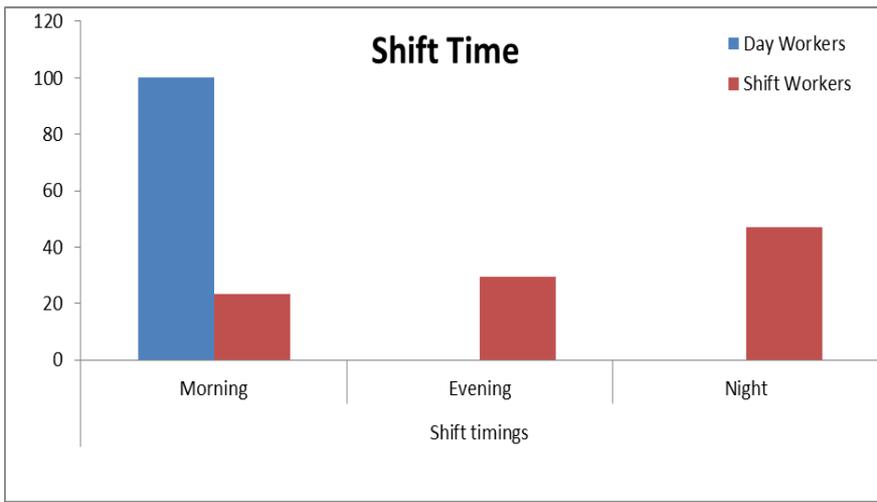
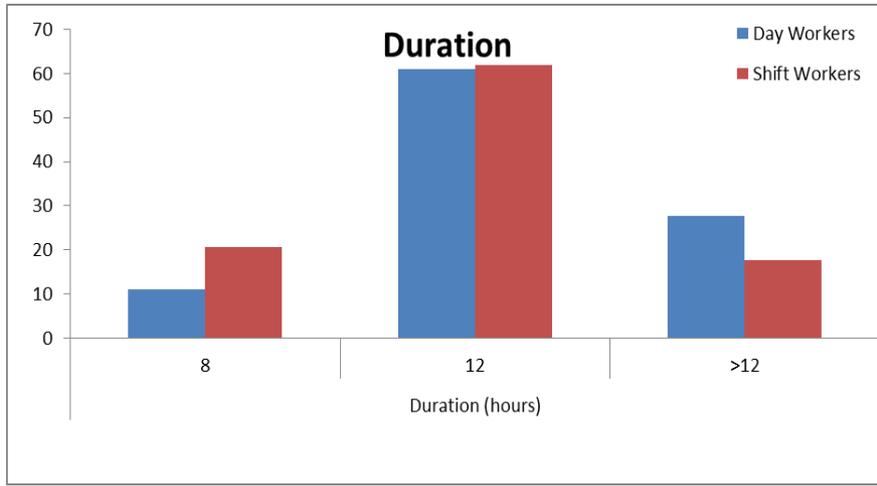
Once the data was obtained, it was coded, tabulated and analyzed, keeping in mind the objectives of the study. Appropriate statistical tools were used to draw meaningful inferences. For the study a total of 80 subjects were selected. Out of which thirty seven were permanent day workers and thirty four were shift workers. In the investigation efforts were made to study the background characteristics of subjects such as age, education, income, duration of work, shift timings, family type, family size, marital status, residence of work, since how long working in the particular shift, nativity.

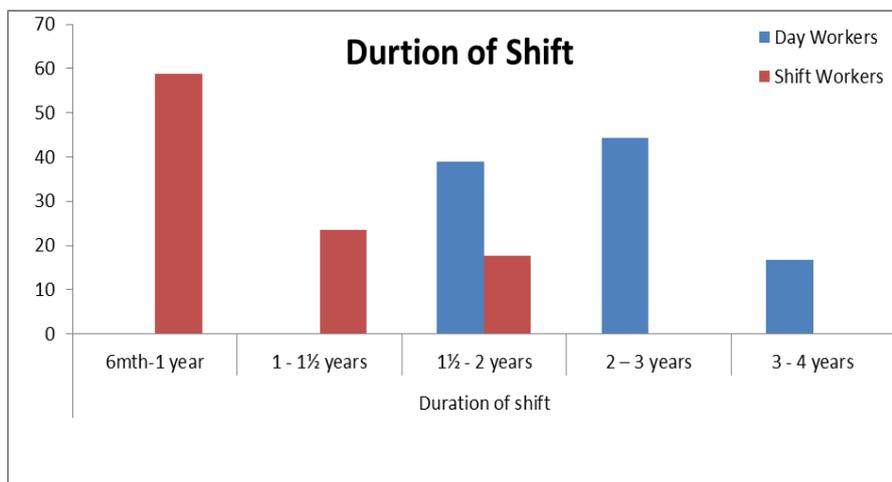
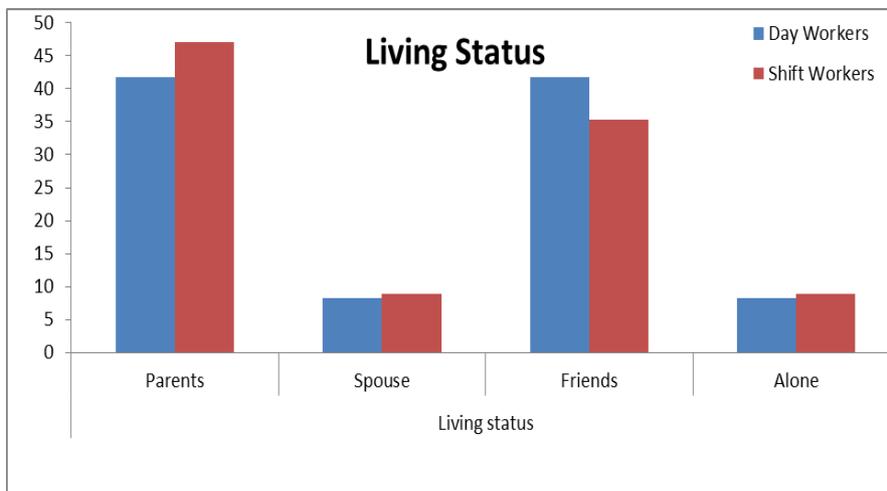
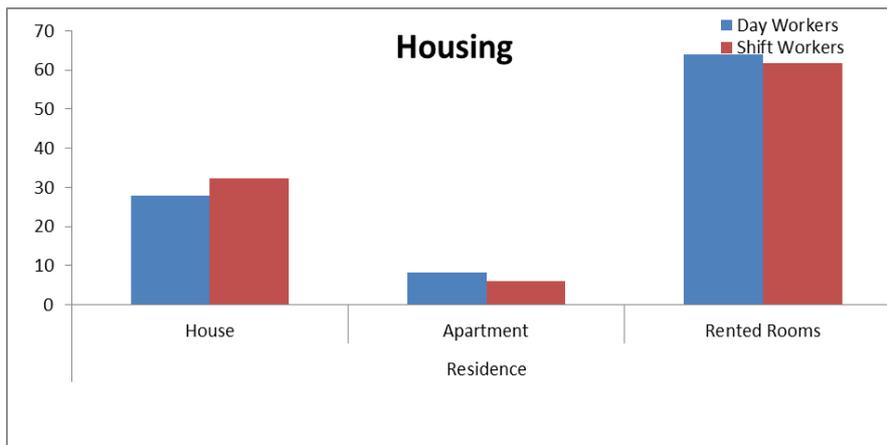
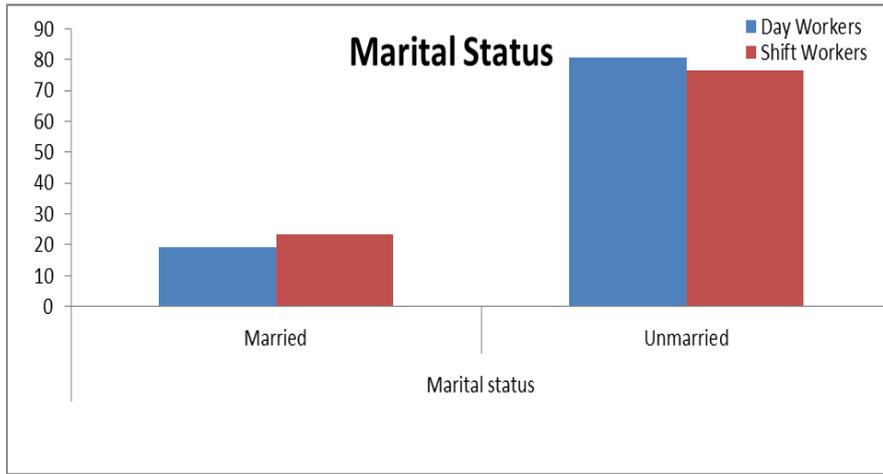
Table 1: General Information of the Subjects

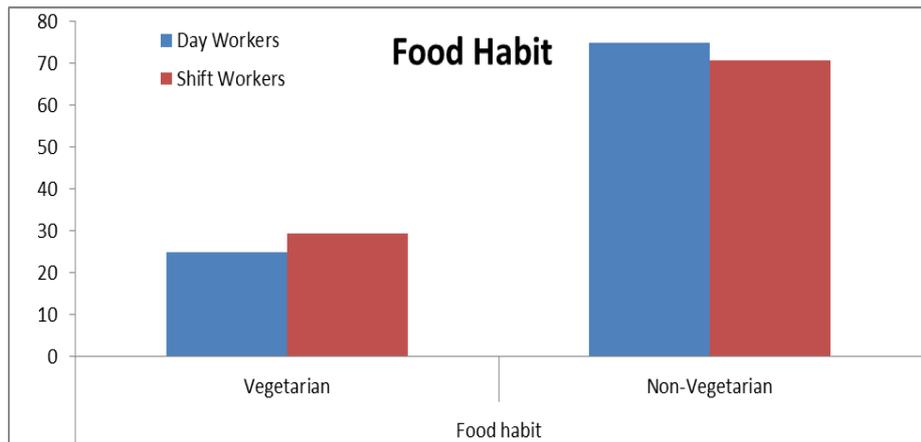
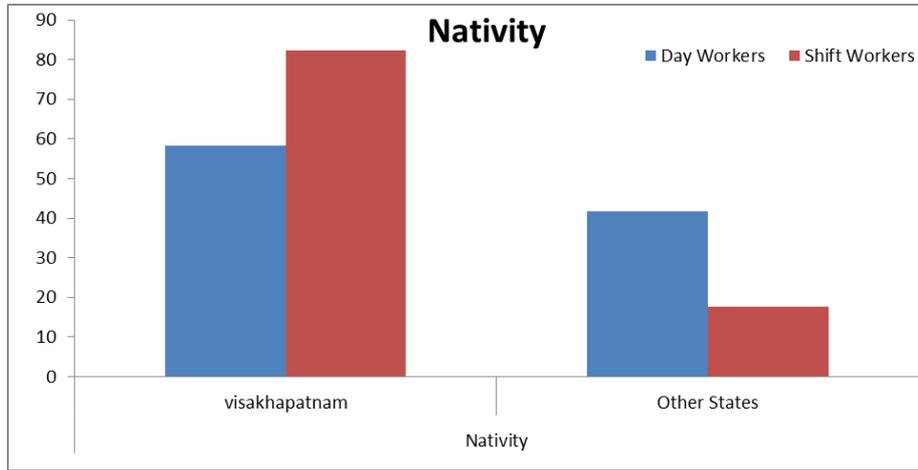
Characteristics	Category	Day Workers		Shift Workers	
		Frequency	Percentage	Frequency	Percentage
Age (years)	<25	12	33.3	12	35.5
	25-27	15	41.7	12	35.5
	>27	9	25	10	29
Education	Graduate	29	80.6	24	70.6
	Post graduate	7	19.4	10	29.4
Income (Rs)/ month	< 27,000/-	12	33.3	10	29.4
	27,000/-30,000/-	17	47.2	14	41.2
	> 30,000/-	7	19.4	10	29.4
Duration (hours)	8	4	11.1	7	20.6
	12	22	61.1	21	61.8
	>12	10	27.8	6	17.6
Shift timings	Morning	36	100	8	23.5
	Evening	-	-	10	29.4
	Night	-	-	16	47.1
Family type	Nuclear	28	77.8	27	79.4
	Joint	8	22.2	7	20.6
Family Size	≤ 4(Small)	19	52.8	22	64.7
	5-8 (Medium)	13	36.1	11	32.4
	≥ 9 (Large)	4	11.1	1	2.9

Marital status	Married	7	19.4	8	23.5
	Unmarried	29	80.6	26	76.5
Residence	House	10	27.8	11	32.4
	Apartment	3	8.3	2	5.9
	Rented Rooms	23	63.9	21	61.7
Living status	Parents	15	41.7	16	47.1
	Spouse	3	8.3	3	8.8
	Friends	15	41.7	12	35.3
	Alone	3	8.3	3	8.8
Duration of shift	6mth-1 year	-	-	20	58.8
	1 - 1½ years	-	-	8	23.5
	1½ - 2 years	14	38.9	6	17.7
	2 - 3 years	16	44.4	-	-
	3 - 4 years	6	16.7	-	-
Nativity	visakhapatnam	21	58.4	28	82.4
	Other States	15	41.6	6	17.6
Food habit	Vegetarian	9	25	10	29.4
	Non-Vegetarian	27	75	24	70.6







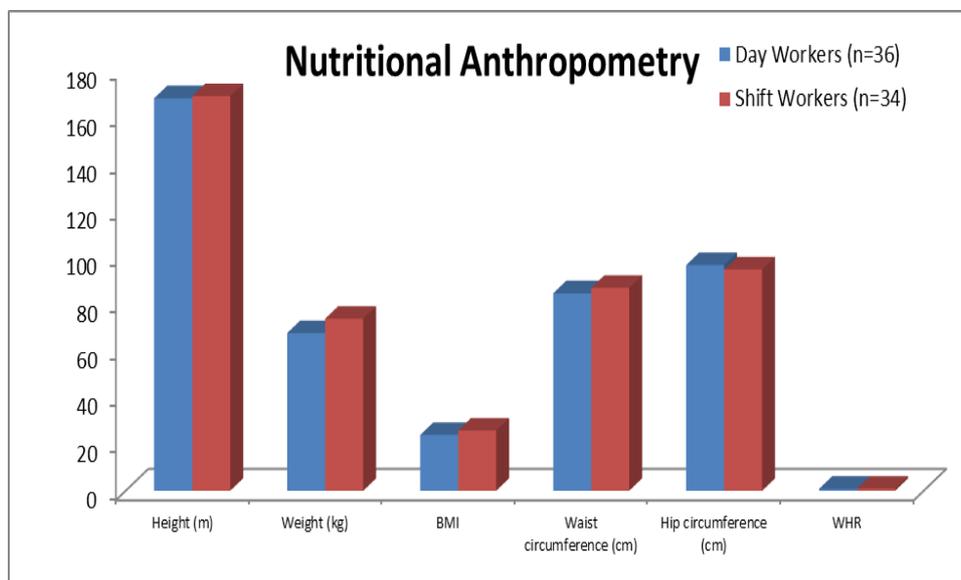


Age wise distribution of the subjects reveals that majority of the day workers (41.7%) were in the age group of 25 to 27 years followed by 33.3 per cent in less than 25 years and 25 per cent were in greater than 27 years age group. Among 34 shift workers equal percentage (35.5%) were in the age group of less than 25 years and 25 to 27 years followed by 29 per cent in greater than 27 years and group. Among the day workers (80.6%) and shift workers (70.6%) higher percentage were graduates, whereas 19.4 per cent of day workers were post graduates and 29.4 per cent of shift workers were postgraduates. Thirty three per cent the day workers and 29.4 per cent of shift workers were found to earn less than Rs. 27,000/-, followed by 47.2 per cent day workers and 41.2 per cent shift worker earning between Rs. 27,000/- to Rs. 30,000/-. Nineteen per cent of day workers and 29.4 per cent shift workers found to earn more than Rs.30, 000/- per month. Among the day workers (61.1%) and shift workers (61.8%), higher percentage worked for ten hours a day, whereas 27.8 per cent of day workers and 17.6 per cent of shift workers were working for more than ten hours a day and 11.1 per cent of day workers and 0.6 per cent of shift workers were working for eight hours a day. All the day workers (100%) were in the morning standard work schedule. But in the study group, 47.1 per cent were in night shift, followed by 29.4 per cent in the evening shift and rests were in morning shift (23.5%). Higher percentage of day workers (77.8%) and shift workers (79.4%) belonged to nuclear family and 22.2 per cent of day workers and 20.6 per cent of shift workers were found to be from joint family. Regarding the family size majority of the day workers (52.8%) and shift workers (64.7%) belonged to small sized family, followed by 36.1

per cent of day workers and 32.4 per cent of shift workers were from the medium size family and least percent of day workers (11.1%) and only one shift worker was found to be from large size family. Higher percentage of day workers (80.6%) and shift workers (76.5%) were unmarried. In case of day workers 19.4 per cent and 23.5 per cent in shift workers were married. Highest percentage of day workers (63.9%) and shift workers (61.7%) lived in rented rooms, followed by 27.8 per cent of day workers and 32.4 per cent of shift workers lived in their own houses. Only 8.3 per cent of day workers and 5.9 per cent of shift workers lived in apartment. Regarding living status equal percentage (41.7%) of day workers were living with parents and friends. In case of shift workers 47.1 per cent were living with parents followed by 35.3 per cent with friends. In both the group the number of subjects living with spouse and living alone was same (approximately 8%). Majority of day workers (44.4%) were in that particular shift since 2-3 years, followed by 38.9 per cent workers working since ½-2 years. Sixteen per cent subjects working since 3-4 years. In shift workers 58.5 per cent were in shift within one year, 23.5 per cent working from 1 to ½ years and 17.7 per cent since 1½ - 2 years. Among the day workers more than half (58.4%) and majority of shift workers (82.4%) were from Orissa, 41.6 per cent of day workers and 17.6 per cent of shift workers were from other states namely Bihar, Jharkhand, Westbengal, Andhrapradesh, Madhyapradesh, Uttarpradesh, Kerala and Tamil Nadu. Among the day workers 25 per cent subjects and 29.4 per cent shift workers were found to be vegetarian. Nearly about 70.6 per cent shift workers and 75 per cent of day workers were non-vegetarian.

Table 2: Mean anthropometric measurements of subjects

Groups	Day Workers (n=36)	Shift Workers (n=34)
Height (m)	168.02	168.91
Weight (kg)	67.52	73.67
BMI	23.87	25.82
Waist circumference (cm)	84.51	86.83
Hip circumference (cm)	96.59	94.7
WHR	0.87	0.91



When the mean height was considered, it was slightly higher in shift workers (168.91cm) compared to day workers (168.02cm). But much higher difference was noticed in mean weight of the shift workers (73.67kg) in comparison to the day workers (67.52kg), which was statistically significant. Similar results were observed with respect to BMI. The mean BMI of the shift workers was 25.82 Kg/m² which was higher than that of day workers, 23.37 Kg/m² and this difference was statistically significant. The mean waist circumference was higher in shift workers (86.83cm) compared to day workers (84.51cm). With reference to mean hip circumference it was higher in day workers (96.59cm) compared to shift workers (94.7cm). When WHR was considered, it was statistically significant for shift workers (0.91) compared to day workers (0.87).

Conclusion

So the study pointed out that majority of the software engineers were in obese category with higher biochemical parameters. The results of the anthropometric measurements revealed that, majority of the shift workers were found to be obese, with higher BMI (table 2). The biochemical parameters were also found to be significantly higher compared to day workers (Table 3). The mean changes in weight of the subjects were found to be significant statistically, showing the relationship between shift work and changes in the weight at the joining time and at present. The per cent change in weight in shift workers were found to be 23 per cent compared to 15.87 per cent that of day workers (Table 5). But the dietary intake did not differed significantly between the groups (Table 8). The findings of dietary intake was in line with the findings of Lennermaset *al.* (1995), who suggested that the frequency of meals and type of snacks across the three different shift schedules showed no significant variation.

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