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Comparative Study on Health Status of Women Working in Day and Night Shifts of IT Companies in Coimbatore

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Abstract

The Nutritional and health status of women is of great concern in the contemporary world, because the multiple roles played by women give rise to serious and nutritional problems. Today, women represent over 40% of the global labor force. Approximately 70% of women in developed countries and 60% in developing countries are engaged in paid employment. Hence, the present study was taken up to compare the health status of working women in day and night shifts of Coimbatore district. About 200 IT women employees were selected randomly for the study. A questionnaire was developed to assess the nutritional status, dietary pattern, stress index and nutritional knowledge of the subjects. The anthropometric, bio-chemical, bio-physical measurements were recorded using standard procedures. Dietary intake was based on 24 hour dietary recall method. Perceived Stress Scale (PSS) was used to measure the stress level of the respondents. The impact of nutrition education was also statistically proved. There was no significant difference between their BMI. But there was a significant difference between their haemoglobin levels, blood pressure levels, nutrient intake and impact of nutrition education. This study recommended the assessment of risks and complications that occur due to frequent working in night shifts through awareness programs and supplements in order to stay fit and healthy.

Keywords: Health Care Needs, Nutrient Intake, Nutritional Knowledge, Perceived Stress Scale,Shifts, Stress Index, Working Women

1. Introduction

Women are the forerunner of society and play an important role in society, in all fields of life, without their contribution no society can nurture properly[1]. Worldwide, more women than ever before are completing higher levels of education. Better job opportunities have increased many women's independence and resulted in a new status and role in their families and society[2]. Women play a diverse role in our society. Often they handle two or more tasks simultaneously. They are, therefore, prone to suffer from work related diseases which are further complicated by social, psychological and physiological issues.

Roughly one out of 300 females is suffering from some occupation related diseases and about same number of new cases add on to the existing cases each year[3].

Women at work is an upcoming phenomenon in the industrialist societies, be it in the developed or developing world. Working environment in which women spend a significant part of the functional life, has a decisive influence on their health, safety, physical, mental and social well being. Malnutrition, anemia and

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communicable diseases are the sensitivity of workers to occupational hazards[4]. Subjects consuming one meal daily exhibits a significant reduction of fat mass and significant increases in levels of total LDL and HDL cholesterol[5]. Southern states such as Kerala and Tamil Nadu are linked with higher female autonomy than northern states such as Bihar and Uttar Pradesh. Women's autonomy can affect their health through health-seeking behavior and access to resources[6].

Mental pressure is one of main causes of mental health problems which arise due to various conditions. If the mental condition of a woman is good, she may bear various responsibilities of the family, understand complications, try to solve them, plan for the future and may adjust with others by becoming mentally strong[7]. If the balancing act of work and family life can be obtained there are many benefits as a result including job satisfaction and also job security, less stress and improved health for employees. It is identified that the organization also achieves benefits for implementing good work life practices including reduced absenteeism and turnover, improved productivity and corporate image, and an increase of loyalty and retention[8].

With this background, there is a need to document their nutritional and health status in order to formulate strategies to promote health and prevent nutritional problems that can lead to increase risk of morbidity and illness. An appropriate nutrition intervention program can be emphasized to improve the nutritional status of corporate working women.

2. Materials and Methods

About two hundred subjects from IT company areas of IT companies viz., Tidal park, Nava India and Saravanapati in Coimbatore were selected for the present study. All the subjects were studied for their general information, socio-economic status, anthropometric measurements, biochemical analysis, biophysical measurements, clinical assessment, dietary pattern, health status, physical activity, work pattern, stress level using Perceived Stress Scale (PSS) and nutritional knowledge. The information were collected from the respondents via a structured pretested questionnaire. The statements included for the study included the general information, socio-economic status, nutritional status, health status, physical activity, eating pattern, work pattern, stress index, nutritional knowledge. Nutritional status of the subjects were assessed by both direct and indirect methods such 24 hour dietary survey for consecutive three days after getting prior consent from the subjects, cyanmeth haemoglobin method for assessing haemoglobin level, digital sphygmomanometer for blood pressure and anthropometric measurements viz., height (cm) and weight (kg). BMI of each was calculated. The nutrient intake was calculated to all the subjects using Ntuitive Software with Recommended Dietary Allowances. By calculating their energy input and output, energy balance was computed. The stress level of the subjects was assessed by Perceived Stress Scale(PSS). Their nutritional knowledge was assessed by provision of pre and post education to all the subjects.

3. Results and Discussion

3.1 Anthropometric Measurements of the Subjects

The pattern of growth and physical health of the body through genetically determined is also profoundly influenced by diet and nutrition. Hence, anthropometric

Table1. Mean height, weight and body mass index of the subjects

(N = 200)

Indices	ICMR	Day Shift		Night Shift	
		Mean ± SD	T value	Mean ± SD	T value
Height (cm)	161	156.13±7.58	6.38*	155.99±9.20	5.41*
Weight (Kg)	55	56.5±10.10	1.47NS	52.93±11.08	1.86NS
BMI	21.2	23.4±4.94	4.40*	21.91±5.02	1.41NS

NS- not significant, * - significant at 5% level
Source : ICMR, 2010

measurements are useful criteria for assessing nutritional status[9]. Table 1 represents the anthropometric measurements of day shift and night shift subjects.

The statistical analysis revealed that the mean height, weight and BMI of day and night shift subjects was found to be 156.13±7.58, 56.5±10.10, 23.4±4.94 and 155.99±920, 52.93±11.08, 21.91±5.02 respectively.

While comparing the anthropometric measurements of the day shift and night shift subjects with the standard values (ICMR), it showed that there was a significant difference at 5% level in their heights, no significant difference in their weights and 5% significant difference in the BMI of day shift subjects and no significant difference was noted in the BMI of night shift subjects.

3.2 Bio-chemical Parameters of the Subjects

Table 2 presents the haemoglobin levels of the day shift and night shift respondents.

From the Table 2, it was found that majority (48% and 47%) of the day shift and night shift subjects were grouped under the mild grades of anemia, about 36% (DS) and 9% (NS) of them were normal, about 16% (DS) and 44% (NS) of them were under the moderate grades of anemia and none of them were affected with severe anemia.

Note : Day Shift - DS, Night Shift - NS

3.2.1 Mean Haemoglobin Levels of the Respondents

Table 3 indicates the mean haemoglobin level of the subjects.

From the above Table 3, the mean haemoglobin levels of day shift and night shift subjects was found to be 10.82 ±1.20g/dl and 9.97±1.14g/dl and it was noticed that the haemoglobin levels of both groups were well below than the standard value. The statistical analysis of "t" value between standard and subjects showed significant difference at 5% level.

The mean haemoglobin levels of all the day shift and night shift subjects were compared with ICMR standard in (Figure 1).

Table 2. Haemoglobin levels of the subjects

(N = 200)

Grades of Anemia	Day Shift		Night Shift	
	No.	%	No.	%
Normal (12-15.5)	36	36	9	9
Mild (10-11.9)	48	48	47	47
Moderate (7.1-9.9)	16	16	44	44
Severe (<7)	-	-	-	-
Total	100	100	100	100

Source : ICMR (1989)

Table 3. Mean haemoglobin levels of all the subjects

(N = 200)

Subjects	Mean ± SD	T value	Reference range
Day shift	10.82±1.20	9.67*	12-15.5g/dl
Night shift	9.97±1.14	17.54*	

*- significant at 5% level

3.3 Bio-physical Measurement of the Respondents

Mean blood pressure level of the day shift and night shift subjects are given in Table 4.

Table 4 indicates that the mean value of the systolic pressure of day shift and night shift subjects were 116.2±9.74 and 116.97±5.25 mm/Hg. The diastolic pressure of them was 74.98±8.99(DS) and 76.5±7.07(NS) mm/Hg. The systolic and diastolic pressure was found to be significantly(at 5% level) lower than the normal values. Personal life-style habits, especially sodium rich foods and limited exercise patterns, play large roles in creating risks for heart disease and hypertension problems[10].

Comparison of the mean pressure level of the day shift and night shift subjects with the normal values are represented in (Figure 2).

3.4 Mean Nutrient intake of the Subjects

The nutrient intake of the selected subjects were assessed by 24 hour recall method for the three consecutive days and the mean nutrient intakes is presented in Table 5.

Table 4. Mean blood pressure of the sujects

(N = 200)

Parameters	Mean ± SD		"t" value	
	Day Shift	Night Shift	Day Shift	Night Shift
Systolic (120mm/Hg)	116.2 ± 9.74	116.97 ± 5.25	3.88*	5.73*
Diastolic (80mm/Hg)	74.98 ± 8.99	76.5 ± 7.07	5.55*	4.92*

Source : (Walsh, 2007), *- Significant at 5% level

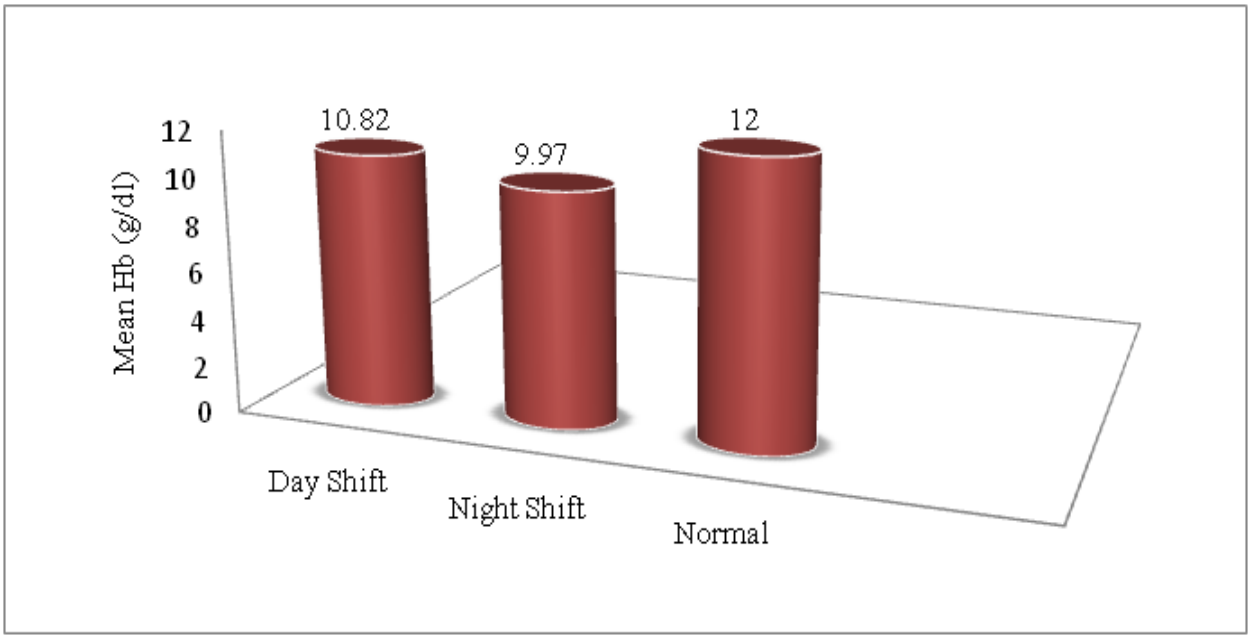


Figure 1. Comparison of mean haemoglobin levels of the subjects.

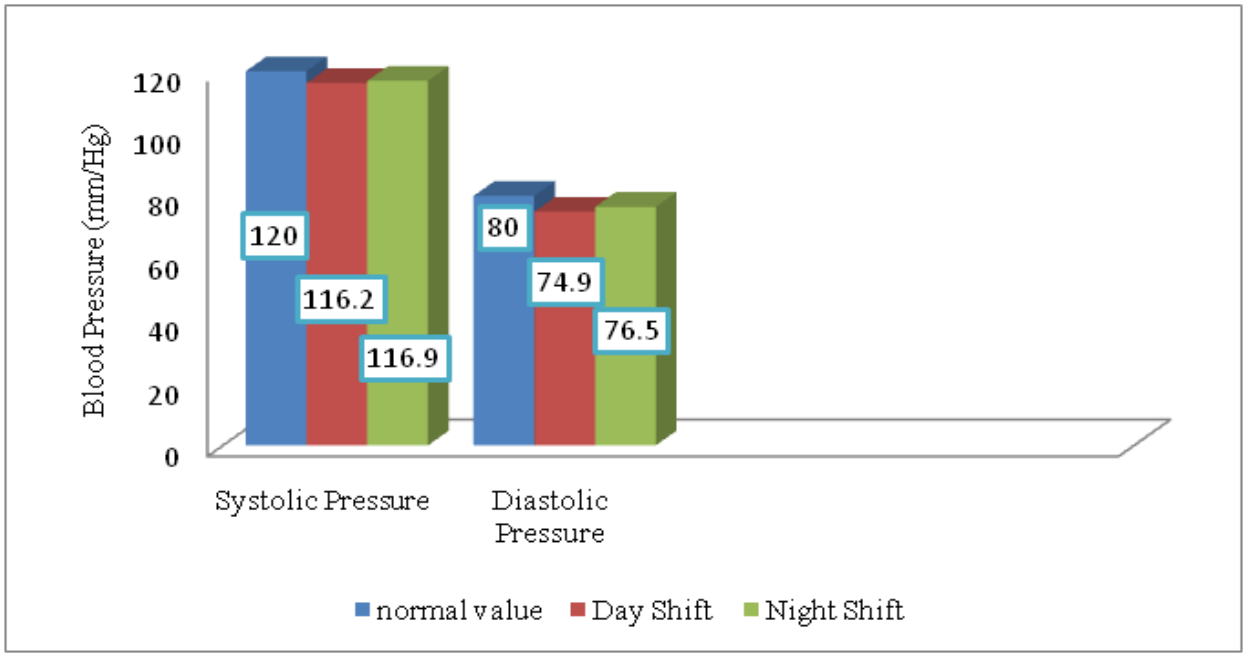


Figure 2. Comparison of blood pressure level of the subjects.

Table 5. Mean nutrient intake of the subjects

(N = 200)

Nutrients	RDA	Day Shift			Night Shift		
		Mean ± SD	Excess/ Deficit (%)	't' value	Mean ± SD	Excess/ Deficit (%)	't' value
Energy (Kcl)	1900	1727.14 ± 266.27	-9.09	6.45*	1332.31 ± 309.95	-29.87	17.13*
Protein (g)	55	48.79 ± 13.40	-11.29	4.60*	32.22 ± 11.07	-41.41	20.45*
Fat (g)	20	72.16 ± 16.14	+260.8	32.14*	49.01 ± 19.52	+145.05	14.78*
Calcium (mg)	600	488.58 ± 193.83	-18.57	5.71*	376.32 ± 204.48	-37.28	10.88*
Iron (mg)	21	14.47 ± 36.11	-31.09	1.79NS	8.12 ± 17.01	-61.33	7.53*
Vitamin C (mg)	40	41.53 ± 24.20	+3.82	0.62NS	38.15 ± 77.95	-4.62	0.23NS

Source : ICMR(2010)

NS- Not Significant, *- significant at 5% level

The intake of various nutrients present in the three days diet was calculated using Ntuitive Software and the mean nutrient intake was compared with RDA.

Table 5 indicates that the mean energy intake of day shift and night subjects was 1727.14 and 1332.31 K cal. Comparing with RDA, the subjects had a 9.09% deficit (DS) and 29.87% deficit (NS) in energy intake. The mean protein intake of them were 48.79g(DS) and 32.22g (NS). According to RDA reference standards, they had a 11.29% deficit (DS) and 41.41% deficit (NS). The mean fat intake of all the day shift and night shift subjects were 72.16 and 49.01g which had a 260.8% (DS) and 145.05% (NS) in excess. The mean calcium intake of them were 488.58 and 376.32 mg. On comparison with RDA, the subjects had a 18.57% (DS) and 37.28% (NS) deficit. The mean iron intake of the day shift and night shift subjects were 14.47 and 8.12 mg while comparing with RDA, the subjects had a 31.09% (DS) and 61.33% (NS) deficit. Vitamin C is important as it reduces the risk of blood clots, so eat plenty of red, green and yellow pepper, kiwi fruit, oranges and black currents. The mean vitamin C intake of day shift and night shift subjects were 41.53 and 38.15mg. On comparison with RDA, day shift subjects had 3.82% excess whereas night shift subjects had 4.62% deficit.

The energy, protein, calcium and iron intake of all the day shift and night shift subjects were below the RDA except the fat intake. Vitamin C intake was above the RDA in day shift subjects whereas in night shift subjects it was below.

The statistical analysis revealed that there was a 5% level of significance in energy, protein, fat and calcium between the standard (RDA) and sample (DS and NS). There was a 5% significant difference in iron intake of night shift subjects whereas in day shift subjects, it did not show any significant differences. There was also no significant difference at 5% level in their (DS and NS) vitamin C intake.

The mean nutrient intake of day shift and night shift subjects were compared with RDA from the (Figure 3).

3.4.1 Energy Balance of the Respondents

The energy intake and output of all the day shift and night shift subjects are indicated in Table 6.

Functional foods are generally considered to be those food products which provide a specific health benefit over and above their basic, traditional nutritional value[11]. The above table revealed that the mean energy intake of day shift and night shift subjects were 1727.14±266.27 and 1332.31±309.95. Their mean energy output per day were 2010.57±124.38 (DS) and 2076.03±75.20 (NS). Using energy input and output, energy balance was also evaluated. Their mean energy balance were found to be -278.72±309.74 (DS) and -743.82±321.68 (NS). This shows that there was a negative energy balance in the subjects.

3.5 Stress Index of the Respondents

Mental health is the balanced development of the individual's personality and emotional attitude which enables a person to live harmoniously with himself and his fellowman. Mental health is influenced by biological, social and spiritual factors[12]. Stress level of all the day shift and night shift subjects assessed using Perceived Stress Scale (PSS) and it is presented in Table 7.

Table 7, it was found that about 88% (DS) and 43% (NS) were having very low health concerns, 2% (DS) and 5% (NS) had low health concerns, 3% (DS) and 5% (NS) were with average health concerns, 6% (DS) and 2% (NS)

Table 6. Mean energy balance of the subjects

(N = 200)

Subjects Particulars	Energy Input	Energy Output	Energy Balance
Day Shift	1727.14 ± 266.27	2010.57±124.38	-278.72±309.74
Night Shift	1332.31 ± 309.95	2076.03±75.20	-743.82±321.68

Table 7. Stress index of the subjects **(N = 200)**

Stress Level	Day Shift		Night Shift	
	No.	%	No.	%
Very Low Health Concern	88	88	43	43
Low Health Concern	2	2	5	5
Average Health Concern	3	3	5	5
High Health Concern	6	6	2	2
Very High Health Concern	1	1	45	45
Total	100	100	100	100
Mean ± SD	5.87 ± 4.17		15.68 ± 11.00	

were having high health concerns, only 1% (DS) and 45% (NS) were showing very high health concerns. Their mean values were evaluated as to be 5.87±4.17 (DS) and 15.68±11 (NS). The mean comparison of stress index of day shift and night subjects are represented in (Figure 4).

3.6 Impact of Nutrition Education of the Subjects

Nutrition education is one of the effective strategies employed to alleviate the ignorance and malnutrition in the society[13]. Impact of nutrition of the day shift and night shift subjects were assessed by statistical analysis and are given in Table 8.

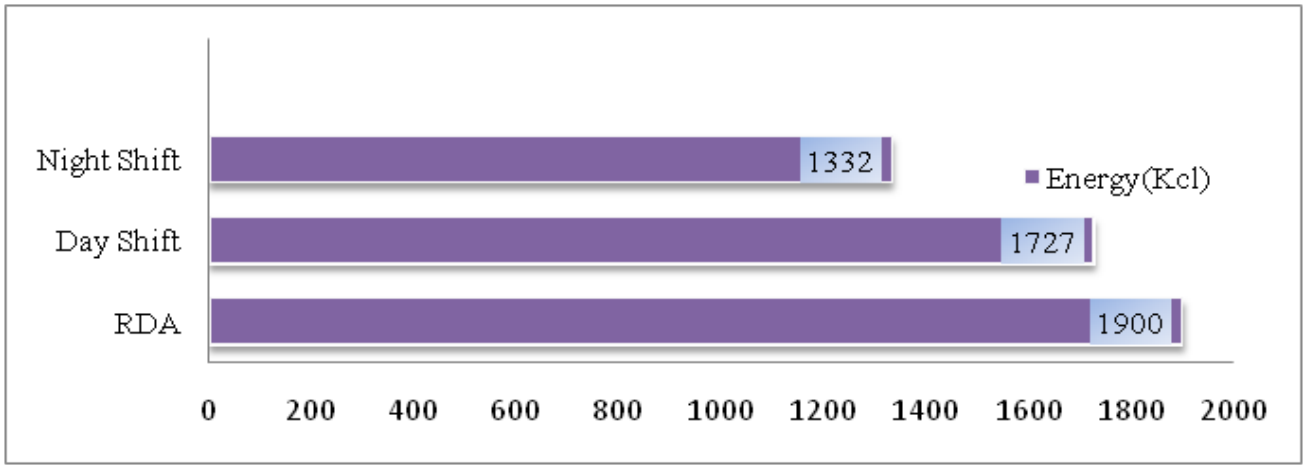
Table 8 indicated that the mean impact of day shift and night shift subjects nutrition education was found to be 4.7±2.05(DS) and 3.6±2.23(NS). The statistical analysis revealed that there was a significant difference at 5% level between before and after nutrition education. Hence the imparted nutrition education was successful and useful to all the subjects.

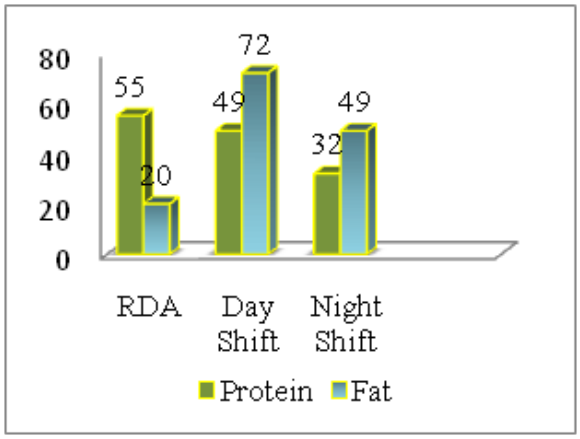
The mean impact of nutrition education of day shift and night shift subjects were compared in the (Figure 5).

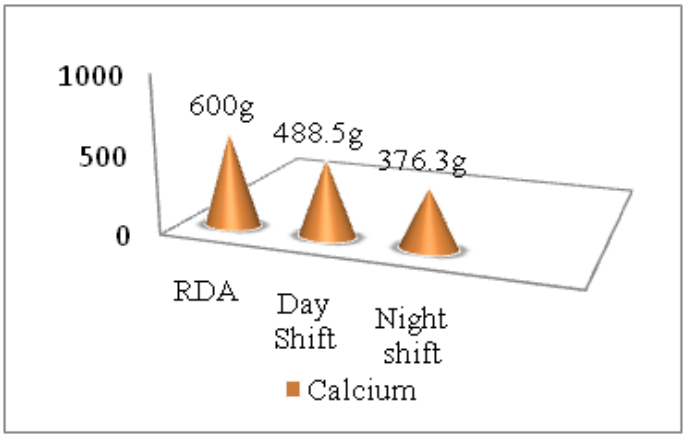
Table 8. Mean impact of nutrition education of the subject **(N = 200)**

Subject Particulars	Mean ± SD	't' value
Day Shift	4.7 ± 2.05	23.38*
Night Shift	3.6 ± 2.23	15.72*

*- Significant at 5% level







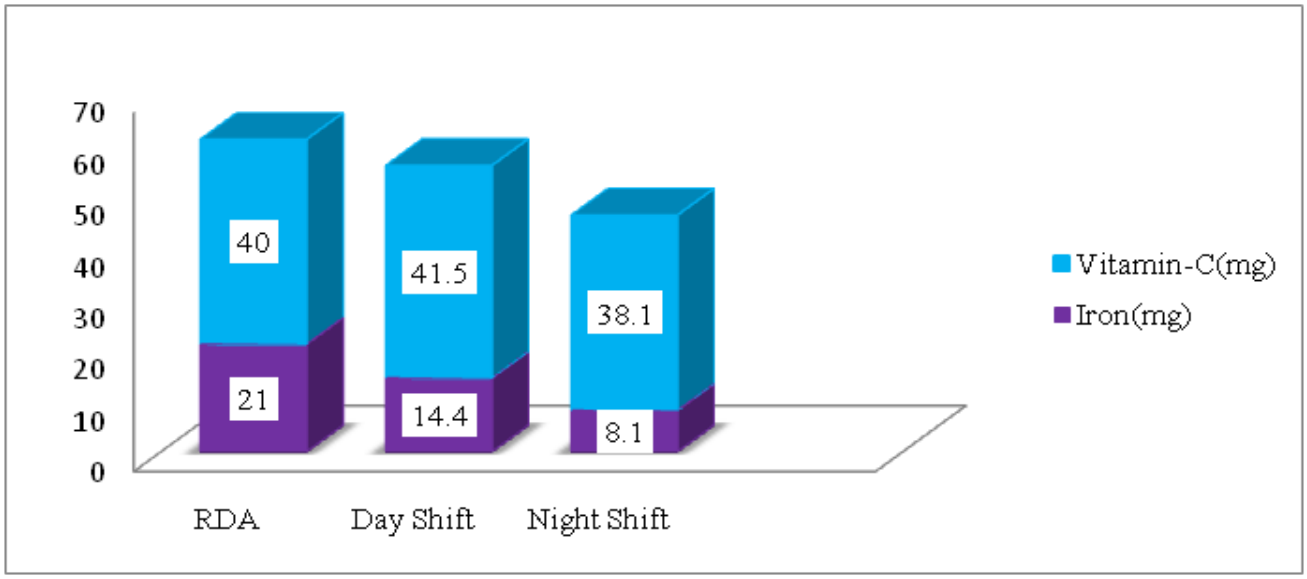


Figure 3. Comparison of mean nutrient intake of the subjects.

Figure 4. Comparison of mean stress index of the subjects.

Figure 5. Comparison of mean impact of nutrition education of the subjects.

4. Conclusion

It can be concluded from the above findings, that there is a noticeable improvement in the nutritional knowledge of day shift and night shift subjects due to nutrition education programs. This study also explores that the monotonous tasks women had to encounter everyday in their work place lead them to face many health related problems. And so, adequate energy, protein, fat, calcium, iron and vitamin-C should be provided to maintain normal health and to prevent health complications. In particular, physio-psycho problems are high among women employees of corporate companies. So that they should widen the concept about their diet in a holistic way by incorporating rainbow diets in their food through supplements and regular exercises like yoga, meditation should be followed to overcome their day-to-day stress and to stay healthy and fit.

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