

Assessment of Dietary Intake of Adult Females (18-30 years), Residing in Urban Area of Ajmer City

¹Prof. Sr. Pearl D'Souza* and ²Dr. Swati Mathur

Author's Affiliation:

¹Principal Sophia Girls College (Autonomous), Ajmer, Rajasthan 305001, India.

E-mail: srpearlsophia@gmail.com

²Academic Guest Faculty, Department of Food Science and Nutrition, M.D.S. University, Ajmer, Rajasthan 305009, India.

E-mail: smathur0027@gmail.com

*Corresponding author:

Dr. Swati Mathur,

Academic Guest Faculty, Department of Food Science and Nutrition, M.D.S. University, Ajmer, Rajasthan 305009, India.

E-mail: smathur0027@gmail.com

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ABSTRACT:

The present research study was conducted on a sample of 147 young adult females falling in the age group of 18-30 years. The subjects were selected through convenience sampling from academic institutions of Ajmer city. The subjects were divided into 3 groups on the basis of objective of weight management. Group I consisted of subjects attempting to lose weight. Group II consisted of subjects attempting to maintain weight and group III consisted of subjects attempting to gain weight. The assessment of dietary intake of the subjects was done through the 24-hour recall method and the analysis of the nutrient intake was done through an automatic software namely "Dietcal, version 9." The assessment of nutrient intake data showed that the mean intake of nutrients were always highest in subjects attempting to gain weight, while the mean intakes were lowest in subjects attempting to lose weight. The difference in the nutrient intake was found to be significant both within and between subjects of different groups ($P < 0.001$). The Mean energy intakes were found to be 76.15% of RDA, while the mean Protein intake was 102.30% of the RDA. The Mean fat intake was 137.14% of the RDA, while the Mean Carbohydrate intake was 60.65% of the RDA. Thus, the Protein and Fat intake were higher than the RDA. Such trends of food intake are found in urban areas which have been reported in other studies also. The assessment of the conscious limitation of the food intake on the Cognitive restraint subscale of the Three Factor Eating Questionnaire showed that the subjects attempting to Lose weight scored higher than the subjects attempting to maintain weight. Thus, subjects attempting to lose weight consciously tried to limit food intake. Hence in order to lose or maintain weight appropriate guidance by a trained Nutritionist is desirable.

Keywords:

Assessment, Dietary Intake, Adult females, Urban area, Weight management, Lose weight, Maintain weight, Gain weight.

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1. INTRODUCTION

A double burden of malnutrition is being observed due to the coexistence of chronic energy deficiency and overweight in the population

driven by influences of urbanization (Singh *et al.*, 2015). Thus any study conducted on Health status or Nutritional status is incomplete without an assessment of dietary intake of individual. Food Records, 24-Hour Recall and the Food

Frequency are the most common dietary assessment methods (Willett, 1998). The 24-hour dietary recall method is suitable for large scale surveys (Karvetti, 1998). A 24-hour dietary recall method is advantageous as it is easy to administer with fast completion with the major disadvantage being the need of an experienced interviewer (Magkos, 2003). The errors of measurement are small when the interviewers are well trained and provided with written protocols. Therefore, this tool is considered to be an accurate and well-established method (Frank, 1977). During a 24-hour recall, respondents are asked, by a nutritionist or a dietitian to recall and report all foods and beverages consumed over the preceding 24 hours. Quantitative information on food intake, as described using portion size, allows for the calculation of Energy and nutrient intake. Estimation of portion size is facilitated by the use of measurement aids such as standard household measures, food models etc. To calculate the energy and nutrient intake, the estimated portion size, or the amount of food intake is multiplied by the values on nutrient content in foods, as found in the food composition tables (FAO, 2018).

Factors like imbalanced Energy consumption, physical activity, socioeconomic differences and environmental conditions significantly influence Obesity. Women as compared to men are more likely to develop nutritional complications like Overweight/Obesity, at the same time women of reproductive age are also severely affected by malnutrition (deficiency of Iron, Zinc and Iodine) (Kalra, 2012).

Body weight reflects the Energy Balance in human body. Individuals who manage body weight, follow dietary modification practices along with Exercise. The most common dietary practices followed by such individuals may be to take complex Carbohydrates, increase Protein and decrease the intake of fat along with the increase in Fiber intake. An assessment of dietary intake of individuals managing weight is extremely important both to achieve the goal of weight management, and simultaneously to avoid any deficiency or imbalance of either macro or micronutrients.

2. OBJECTIVES OF THE STUDY

- 1) An assessment of dietary intake of females (18-30 years) falling in different categories of weight management:
 - a) Conscious for weight but not managing weight
 - b) Group I- Lose weight
 - c) Group II- Maintain weight
 - d) Group III- Gain weight.
- 2) An assessment of conscious limitation of food intake by subjects attempting to lose weight or maintain weight by "The Three Factor Eating Questionnaire".

3. METHODOLOGY

- 1) **Selection of area:** The study was conducted in the urban area of Ajmer city.
- 2) **Selection of sample:** Females of the age group 18 to 30 years, Non-pregnant, Non-Lactating were selected for the study. The subjects were selected from reputed academic institutions of Ajmer city. The method of convenience sampling was followed to select the institution as well as the study samples from the institution. The subjects were asked to fill a consent form and thus those who were willing to share data were only included. The subjects were assured that this data would not be communicated to any other person, and will not be utilized anywhere other than the purposes of research. Through a Questionnaire the subjects were enquired about the targets for weight management, if any.

The subjects were then classified into three groups

Group I- Those attempting to Lose weight (n=46)

Group II- Those attempting to Maintain weight (n=26)

Group III- Those attempting to gain weight (n=9)

Remaining subjects were classified as "Conscious not managing" (n=66). A total number of 147 samples were included for study.

- 3) **Collection of information in reference to dietary intake and conscious limitation of food intake:** The information in reference to

dietary intake was collected through the 24-hour recall method. The intake of cooked food by the subjects was collected using a standardized katori set and standardized glass and spoons. The cooked amounts were then converted into raw equivalents. After collecting the food and beverage intake, the intake amounts were fed in a software namely "Dietcal", version 9. The following nutrients were then calculated, Energy, Protein, Fat (Visible and Invisible), Carbohydrate and Fiber. The intake of nutrients was then compared with the Recommended Dietary Allowances (RDA) as per Indian Council of Medical research (ICMR), 2020 (ICMR, 2020). The calculation of the mean intake of the nutrients specified above was done along with calculation of intake in terms of per cent RDA.

Dietary Restraint or Dieting (that is attempted restriction of food intake in order to maintain or lose weight) contributes to overeating and eating disorders (Herman, 2005). In the present study, information in reference to conscious limitation of food intake was collected through an already developed tool namely the "Three Factor Eating Questionnaire", originally developed by Stunkard and Messick (Stunkard, 1985). The Three Factor eating Questionnaire is a self-assessment scale used widely in studies of eating behaviour in Overweight and Normal weight individuals (Lindroos *et.al.*, 1997, Svendsen *et.al.*, 2008, Yeomans, 2008, Annunziato, 2008)

Karlsson *et. al.*, (2000), developed a reduced version of the "Three Factor Eating Questionnaire", consisting of 18 items. The three-factor eating questionnaire consists of 18 items on a 4-point response scale (definitely true/mostly true/mostly false/definitely false). Responses to each of the 18 items are given a score between 1 and 4 and item scores are summated into scale scores for cognitive restraint, uncontrolled eating, and emotional eating. The raw scale scores are transformed to a 0-100 scale [(raw score-lowest possible raw score)/possible raw score range) ×100]. Higher scores in the respective scales are indicative of greater cognitive restraint, uncontrolled or emotional eating (Karlsson, 2000).

In short, the formula can be stated as (S-L)/Rs ×100

1. S stands for raw score
2. L for the lowest possible raw score
3. Rs lowest possible raw score range⁷

In the present study a cognitive restraint score of ≤50 was considered as "Low", while a score >50 was considered as "High"

4. RESULTS

a) Dietary Survey: The intake of different nutrients was first assessed in terms of mean intake and then to compare the mean intake with the RDA the mean intake was calculated as percentage of RDA.

Table 1: Mean intake of nutrients by subjects in various groups in terms of per cent RDA

Macronutrient / group	Energy	Protein	Carbo-hydrate	Total fat	Visible Fat	Invisible Fat	Fiber
Overall	76.15	102.03	60.65	137.14	179.44	97.40	123.06
Conscious not managing	81.03	104.93	57.29	150.44	200.08	101.65	116.83
Group I (lose weight)	69.90	97.41	48.88	120.42	152.25	88.89	128.13
Group II (maintain weight)	74.35	101.71	52.87	132.42	175.48	100.93	120.8
Group III (gain weight)	92.48	122.63	61.78	178.31	238.85	117.78	148.63

***- Significant at 0.1% **- Significant at 1% *- Significant at 5% NS- Not Significant

(i) Energy:

The overall mean Energy intake was found to be 1622.04 Kcal/day. When compared with the RDA the intake was found to be 76.15% of RDA. When the intake of Energy was assessed for different groups of subjects that is Group I, Group II, Group III and Conscious not managing group, it was found that the mean Energy intake (1969.86 Kcal/day) was highest in subjects attempting to gain weight, which was calculated as 92.48% of the RDA. In contrast to this the mean Energy intake (1488.91 Kcal/day) was found to be least amongst subjects attempting to lose weight, this was calculated as being 69.90% of the RDA. Amongst subjects attempting to maintain weight the mean energy intake was found to be 1583.84 Kcal/day which was 74.35% of the RDA. Other than this for subject's conscious for weight but not attempting to manage weight, the mean Energy intake was 1726.15 Kcal/day which was 81.03% of the RDA. This intake was "acceptably adequate" with respect to the RDA. The mean Energy intake was significantly different both within and between subjects of different groups ($P < 0.001$).

(ii) Protein:

Proteins are essential components of the diet, which help the body grow and maintain. An

assessment of Protein intake by the subjects showed that the overall mean Protein intake of all the subjects was 47.06 grams/day. This intake was calculated as 102.30% of the RDA for Protein as suggested by ICMR, 2020. The intake of Protein was "Quite Adequate" with respect to RDA. When the intake of Protein was assessed for different groups of subjects that is Group I, Group II, Group III and Conscious not managing group, it was found that the mean Protein intake was again highest in subjects attempting to gain weight (Group III), where the mean intake was 56.41 gram/day, which was higher (122.63%) than the RDA. For subjects attempting to lose weight (Group I) the mean Protein intake was found to be 44.81 grams/day which was 97.41% of the RDA. Other than this the mean Protein intake was found to be 46.79 grams per day which was 101.71% of the RDA for subjects of group II that is those attempting to maintain weight. Lastly for subjects who were "weight conscious", but did not follow any regime to manage weight the mean Protein intake was found to be 48.27 gram/day which was 104.93% of the RDA.

The mean value of Protein intake did not differ significantly both within and between subjects of different groups ($P > 0.05$).

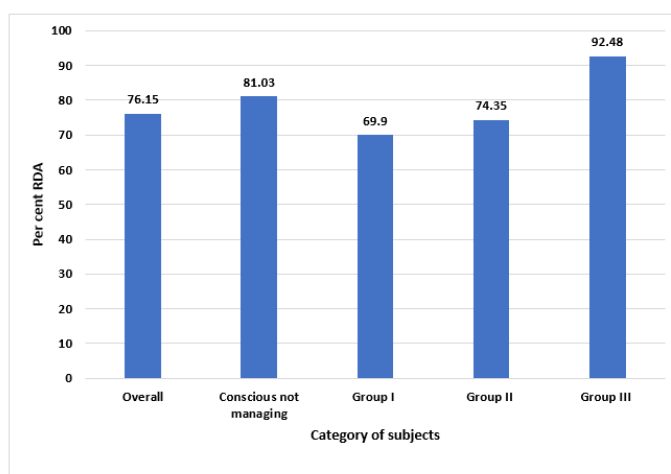


Figure 1: Mean Energy intake in terms of per cent RDA amongst subjects of different categories

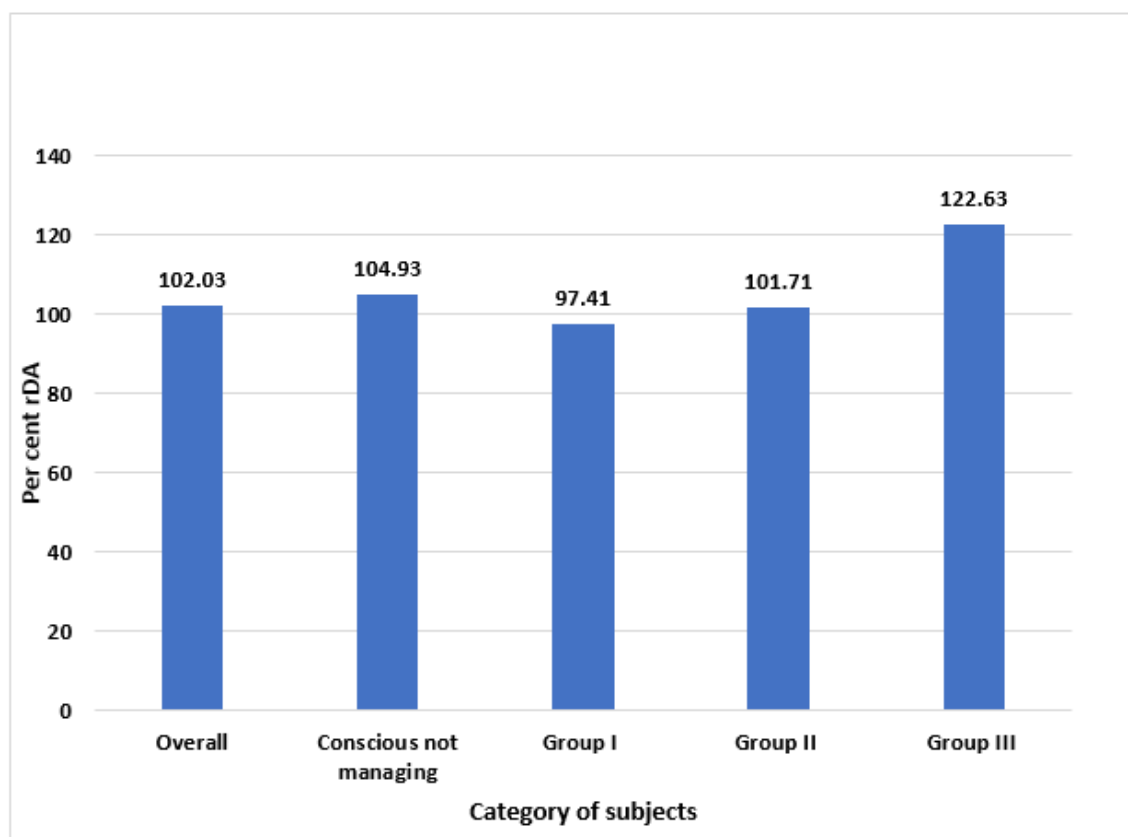


Figure 2: Mean Protein intake in terms of per cent RDA amongst subjects of different categories

(iii) Fat:

In the present research study, the mean Fat intake was always higher as compared to the RDA, in subjects of all the groups. In the present research study, the mean overall fat intake by the study subjects was 64.46 gram/day. When compared to the RDA for Fat as by ICMR 2020, this intake was 137.14% of the RDA. This intake was "Remarkably High". When analyzed as intakes of visible and invisible fats the visible fat intake was 42.17gram/day while the intake of invisible fat was 22.89 gram/day. The visible fat intake was very high as compared to the RDA. For subjects who were "Conscious for weight, but not managing weight", the mean intake of fat was 70.71 gram/day which was 150.44% of RDA. The intake of visible fat was 47.02 gram/day, which was calculated as 200.08% of the RDA. Here the intake of invisible fat was 101.65% of the RDA (23.89 gram/day). Thus, the intake of visible fat was very high with respect to RDA.

For subjects attempting to lose weight that is those belonging to group I, the mean fat intake was 56.60 gram/day, which was 120.42% of the RDA. The intake of visible fat was 35.78 gram/day being 152.25% of the RDA. The intake of invisible fat was 20.82 gram/day being 88.89% of the RDA. The intake of visible fat was again very high with respect to RDA. For subjects being members of group II (Maintain weight), the mean fat intake was 62.24 gram/day. This was found to be 132.42% of the RDA. The intake of visible fat 41.24 gram/day, which was 175.48% of the RDA. The intake of invisible fat was 23.72gram/day, which was 100.93% of the RDA. For subjects attempting to gain weight that is those belonging to group III, the mean fat intake was 83.81 gram/day, which was 178.31% of the RDA. When the total fat intake was analyzed as visible fat and invisible fat intake, the visible fat intake was 56.13 gram/day which was 238.85% of the RDA. The intake of invisible fat was found to be 27.68 grams/day, this was 117.78% of the

RDA. The intake of visible fat was "Extremely High" with respect to RDA.

The intake of fat was highest in subjects attempting to gain weight, and least in subjects attempting to lose weight. Similar results of a

higher than recommended intake of Fats and oils and Milk and sugars have been reported by Daniel *et. al.*, 2011 and Chopra *et. al.*, 2012. The intake of Fat was significantly different amongst subjects of different categories ($P < 0.001$).

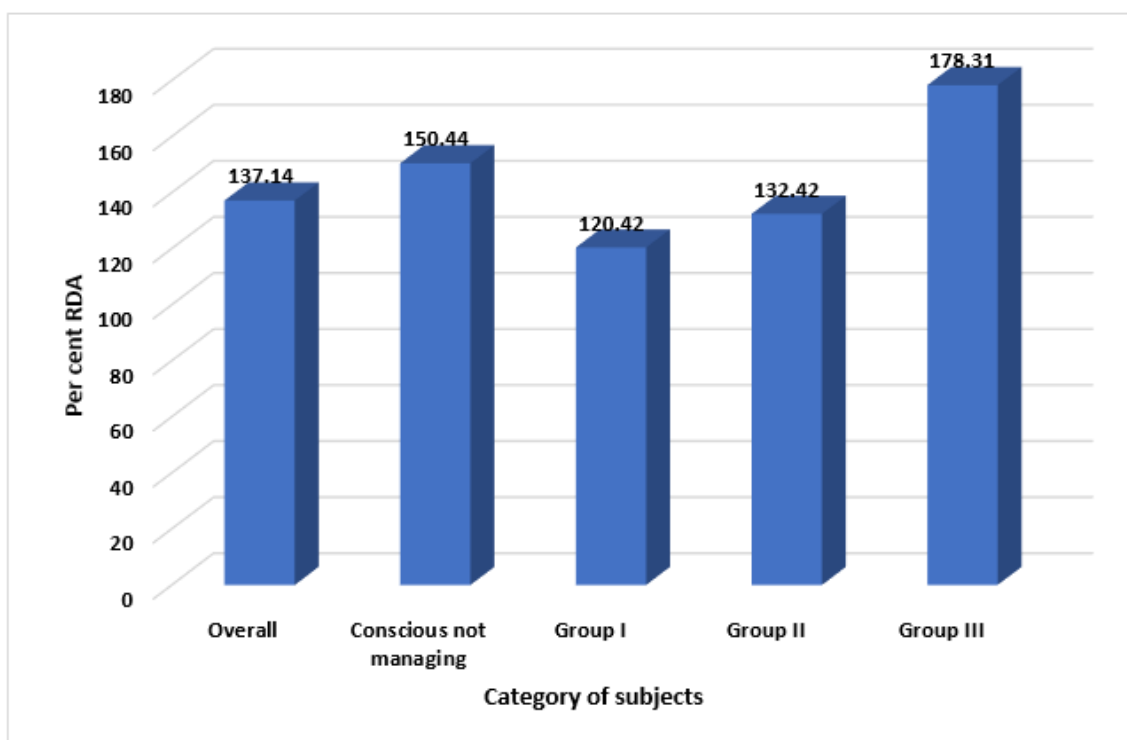


Figure 3: Mean Fat intake in terms of per cent RDA amongst subjects of different categories

(iv) Carbohydrate:

The mean Carbohydrate intake by the study subjects was 203.50 gram/day. This intake was 60.65% of the RDA. For the subjects who were conscious for weight but not managing weight, the mean Carbohydrate intake was found to be 217.71 gram/day. This intake was found to be 57.29% of the RDA. For subjects who were attempting to Lose weight, that is group I the mean Carbohydrate was found to be 185.78gram/day. This intake was found to be 48.88% of the RDA. For subjects who were belonging to group II, that is subjects maintaining weight, the mean Carbohydrate intake was found to be 200.92 gram/day, this was 52.87% of the RDA.

For subjects belonging to group III, that is subjects attempting to gain weight, the mean Carbohydrate intake was found to be 234.78 gram/day, this was 61.78% of the RDA. The intake of Carbohydrate was significantly different both within and between subjects of different categories. ($P < 0.01$)

(v) Fiber:

The mean fiber intake amongst the study subjects was found to be 36.92 grams/day, which was 123.06% of the RDA. A fiber intake greater than RDA was also seen amongst subjects who were Conscious for weight but did not attempt to manage weight. Here the mean Fiber intake was

found to be 35.05 gram/day which was found to be 116.83% of the RDA. Next to this for subjects included in group I that is those attempting to lose weight the mean fiber intake was 38.44 gram/day which was 128.13% of the RDA. For subjects belonging to group II, that is those attempting to maintain weight, the mean Fiber intake was 36.24 gram/day which was 120.80%

of the RDA. Lastly for subjects belonging to group III that is those attempting to gain weight the mean fiber intake was 44.59 gram/day, which was calculated as being 148.63% of the RDA. Thus, the Fiber intake was highest amongst those attempting to gain weight. The mean Fiber intake was significantly different amongst different groups of subjects ($P < 0.05$).

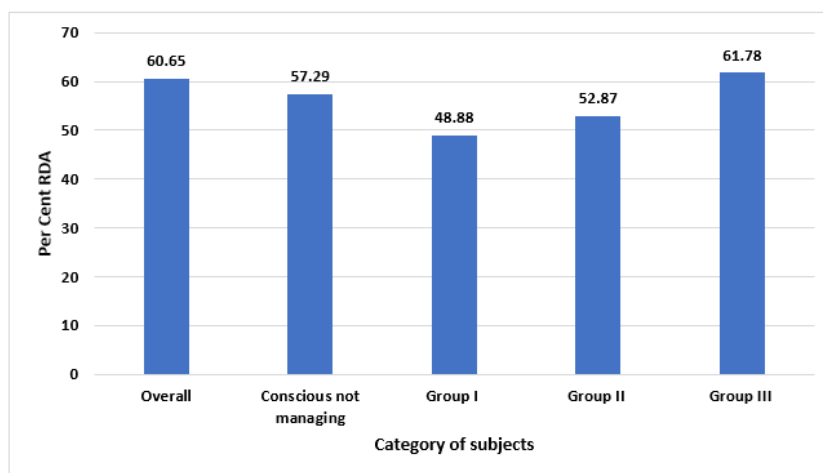


Figure 4: Mean Carbohydrate intake in terms of per cent RDA amongst subjects of different categories

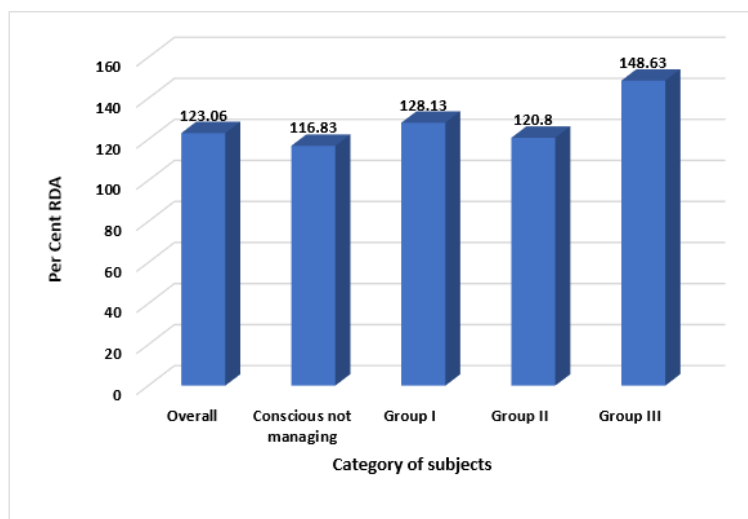


Figure 5: Mean Fiber intake in terms of per cent RDA amongst subjects of different categories

Table 2: Mean intake $\pm$ SD of Macronutrients in different groups of subjects

Macronutrients	Overall	Conscious not managing n=66	Group I Lose weight n=46	Group II Maintain weight n=26	Group III Gain weight n=9	F ratio	P value
Energy (Kcal)	1622.04 $\pm$ 324.93	1726.15 $\pm$ 276.11	1488.913 $\pm$ 329.97	1583.84 $\pm$ 311.68	1969.86 $\pm$ 236.45	7.054***	P<0.001
Protein (gm)	47.06 $\pm$ 10.58	48.27 $\pm$ 10.55	44.81 $\pm$ 11.31	46.79 8.55	56.41 $\pm$ 7.88	2.24 ^{NS}	P>0.05
Fat (gm)	64.46 $\pm$ 18.43	70.71 $\pm$ 16.55	56.60 $\pm$ 18.41	62.24 $\pm$ 16.78	83.81 $\pm$ 7.09	7.513***	P<0.001
Carbohydrate (gm)	203.50 $\pm$ 45.66	217.71 $\pm$ 38.75	185.78 $\pm$ 48.47	200.92 $\pm$ 42.98	234.78 $\pm$ 42.83	5.028**	P<0.01
Fiber (gm)	36.92 $\pm$ 8.51	35.05 $\pm$ 8.01	38.44 $\pm$ 7.96	36.24 $\pm$ 9.45	44.59 $\pm$ 9.26	2.75*	P<0.05
Visible fat (gm)	42.17 14.33	47.02 $\pm$ 13.38	35.78 $\pm$ 11.58	41.24 $\pm$ 15.93	56.13 $\pm$ 13.52	7.29***	P<0.001
Invisible fat (gm)	22.89 $\pm$ 10.88	23.89 $\pm$ 8.82	20.82 $\pm$ 11.79	23.72 $\pm$ 12.78	27.68 $\pm$ 11.16	15.53***	P<0.001

Assessment of conscious limitation of food intake:

To assess the conscious limitation of food intake the Three Factor Eating Questionnaire was employed. A scale of 0-100 was used where scores upto 50 were classified as "Low", while scores greater than 50 were classified as "High". The mean scores of the study subjects falling in group I was 55.06 which was classified as "High". The mean scores of the subjects falling in group II, was 44.22, which could be labelled as "Low". When the percentage of subjects scoring "High" or "Low" in each group (Group I and Group II) was done it was seen that for group I, 15 subjects (32.60%) scored "Low" on the scale while 30

subjects (65.21%) scored "High" on the scale. A single subject employing only Exercise for weight management scored "Zero" on the scale. Other than this for subjects of group II, 13 subjects (50%) scored "High" on the scale while, 12 subjects (46.15%) scored "Low" on the scale. Again, a single subject employing only Exercise for weight management scored "Zero" on the scale.

Hence it can be said that subjects attempting to Lose weight scored "high" on the Cognitive Restraint subscale of the "Three Factor Eating Questionnaire", and consciously limited food intake. However, the difference between the scores was not significant.

Table 3: Classification of Three Factor Eating Scores for subjects with the objective to lose weight and maintain weight (losing weight/maintaining weight)

	Category for weight management	Mean
TFE Score	Lose weight	55.06
	Maintain weight	44.22

5. DISCUSSION

When a comparison of the intake of different nutrients was done amongst different groups of subjects managing weight, it was seen that the mean intakes were always highest in subjects attempting to gain weight, and least in subjects attempting to lose weight. This helped to decipher that the subjects had an appropriate body image perception and attempted to limit food intake in order to manage weight. The protein and Fat intake were quite higher as compared to the RDA, while the mean Carbohydrate intake or the intake of Carbohydrate as compared to the RDA was found to be low in all the groups. Similar results have been obtained by Bowen *et. al.*, 2011, where urban residents had a higher proportion of Energy from Fat, saturated fat, and Protein and a lower proportion from Carbohydrates. Other studies like those conducted by Gupta *et.al*, 2010 on a sample of females aged 13 to 25 years from different schools and colleges in New Delhi also showed a total Energy intake and Protein intake more than the RDA in 23 % and 28% of the subjects respectively and a Fat intake greater than the RDA in all (100%) the subjects.

The subjects however were consciously trying to limit their food intake for weight control. Subjects attempting to Lose weight scored high on the Cognitive Restraint subscale of the "Three Factor Eating Questionnaire", while subjects attempting to maintain weight scored low on the Cognitive Restraint subscale of the "Three Factor Eating Questionnaire". Similar results have been reported by Lauzon *et. al.*, 2004 where females scored high on the cognitive restraint subscale of the Three Factor Eating Questionnaire as compared to boys and these females had lower Energy intakes. Thus it can be inferred that females may follow practices for weight management but appropriate information about the type and quantity of food consumed in each meal should be provided to them by an expert so that the target of weight management may be achieved along with the maintenance of an appropriate health status.

6. CONCLUSION

Weight consciousness and health consciousness is increasing in masses. Females who handle dual responsibility of work both within and outside home are conscious for their weight and body physique. However the intake of Fats still continues to be high in the Indian diet. This can be due to the traditional Indian taste and methods of cooking. Thus knowing about the parallel problem of weight consciousness and dietary pattern in India, guidance in reference to Nutrition, dietary management, exercise can be given to masses. Curriculum for nutrition can be a subject of study right from schools since it is an integral aspect of health. The country is in need of more specialists for health for preventing and managing increasing numbers of obese people gripped into the clutches of non-communicable diseases. Weight management and health management is a critical branch and needs attention.

Conflict of Interest: None

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