

Nutritional status of university faculty as influenced by the nutrient intake

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ABSTRACT

The goal of this study was to determine the nutrient intake by the faculty of Punjab Agricultural University, Ludhiana. A random selection of 240 university faculty comprising of 80 Assistant Professors, 80 Associate Professors and 80 Professors was made. A questionnaire was designed to assess general characteristics, daily food intakes among university faculty. Dietary survey was carried out by using “24 hour recall method” for three consecutive days. From the dietary intake the average daily intake of nutrients was calculated using Indian Nutrition Software (DIET CAL). The nutrient intake was compared with the recommended dietary allowances for Indians and percentage adequacy of nutrients intake was calculated. The mean daily intake of nutrients like protein, fat, calcium and iron was more than adequate by both female and male respondents i.e. 59.54g (108.25%), 52.60g (263.00%), 1064.78mg (177.46%) and 21.94mg (104.48%) by females respectively and 61.50g (102.50%), 55.35g (221.40%), 1174.89mg (195.81%) and 22.87mg (134.53%) by males respectively. The mean daily intake of nutrients like energy, carbohydrates and beta carotene was inadequate by both female and male respondents i.e. 1736.06 Kcal (91.37%), 244.05g (81.35%), 3177.84µg (66.20%) respectively by female respondents and 1877.67 Kcal (80.93%), 262.12g (87.37%), 4051.38µg (84.40%) respectively by male respondents.

Key words: Nutrient intake, Percent adequacy, Recommended dietary allowances, 24 hour recall method, DIET CAL.

INTRODUCTION

Health is much more than the absence of disease. It is a positive quality, emphasizing physical, social, intellectual, emotional, and spiritual well being. Good eating habits are an essential part of a healthy lifestyle. A healthy and balanced diet provides foods in the right amounts and combinations that are safe and free from disease and harmful substances. Healthy nutrition is an important factor in preventing many specific health problems. Risk of chronic diseases including obesity, cardiovascular disease, osteoporosis, and cancer may increase as a result of unhealthy nutrition.

Traditionally, Indians like to have home-cooked meals – a concept supported religiously as well as individually. However, with times due to increasing awareness and influence of western culture, there is a slight shift in food consumption patterns among urban Indian families. With changing life style and aggressive marketing by fast food outlets, fast food is also becoming popular in small towns; therefore, success of existing fast food outlets and entry of more is inevitable (Goyal and Singh, 2007). Barker (2006) indicates that Indians are facing the problem of obesity and among kinds of food – fast food is one of the reasons for the same. Due to urbanization, many people replace healthy foods with fast foods which mainly consist of saturated and trans-fats with low content of massive portion sizes and fibres.

Over the last few decades, consumers have become more conscious of their health and of weight control, and tend to be more aware of daily energy intake requirements and food nutrients (e.g. dietary fat) (Niva, 2007). Good nutrition is an important part of leading a healthy lifestyle. Combined with physical activity our diet can help us to maintain a healthy weight and reduce risk of chronic diseases like heart disease and cancer and promote overall health.

MATERIALS AND METHODS

A statistically adequate sample of 240 Punjab Agricultural University faculty members with equal proportions of Assistant Professors, Associate Professors and Professors was selected. The respondents were selected from Krishi Vigyan Kendras and four colleges of university i.e. Home Science, Basic Sciences, Agriculture and Agricultural Engineering College. The data was collected by personally administering the questionnaire to the university faculty of Punjab Agricultural University. A well structured questionnaire was developed to elicit the general information, height, weight, income of family, background of the subjects, dietary intake (for 3 days), Dietary survey was recorded by using “24 hour recall method” for 3 consecutive days, using standardized containers for the experimental period. The average daily intake of nutrients was calculated using Indian Nutrition Software- DIET CAL (Kaur, 2014). The nutrient intake was compared with the recommended dietary

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allowances (ICMR, 2010) for Indians and percentage adequacy of nutrients intake was calculated.

RESULTS AND DISCUSSION

The mean daily nutrient intake of the subjects was calculated by feeding the values of food intake of the respondents in Indian Nutrition Software-DIET CAL.

Nutrients Intake by Female Respondents

Table 1 represent the mean nutrient intake of female university teachers and Fig. 1 represents their percent adequacy with respect to RDA, 2010 suggested by ICMR (2010).

Energy : The data revealed that the mean daily energy intake among female respondents was 1736.06 Kcal which was 91.37 % adequate when compared with the Recommended Dietary Allowances (2010) of 1900 Kcal for sedentary adult female. Further it was seen that the energy intake was highest in case of Associate Professors i.e. 1829.80 Kcal (96.30 %) followed by Assistant Professors i.e. 1790.23 Kcal (94.22 %) and then lowest intake by Professors i.e. 1519.60 Kcal (79.98 %). Goyal, (2003) also reported a lower energy in urban Punjabi women was 1444 to 1509 Kcal, which was inadequate. In another study Deepti *et al* (2006) reported a lower mean value of energy intake against recommended dietary allowances among 21-60 years old Punjabi women. According to Jain, (2012) the daily mean intake of energy by home garden group and non home garden women was 1117 Kcal and 1479 Kcal respectively during winter season.

Protein : From the Table 1 and Fig. 1 it can be seen that the mean daily protein intake was found to be 59.54 g among adult female respondents which was 108.25 percent adequate when compared with the Recommended Dietary Allowances (2010) of 55g for sedentary adult female This may be due to a high consumption of pulses and legumes, milk and milk products. It can be observed that the mean daily protein intake was highest in Assistant Professors followed by Associate Professors and Professors i.e. 63.79 g (115.98 %), 61.95 g (112.64 %) and 50.50 g (91.82 %) respectively. On the contrary Sodhi (2000) and Goyal (2003) reported a deficient protein intake (46.5g) among adults Punjabi women. Kaur (2011) found the percent adequacy of protein by 21-30, 31-40, 41-50 and 51-60 years old women being 69.6, 78.2, 80.0

and 66.3 respectively. Jain (2012) reported that mean daily intake of protein by home garden and non home garden group females was 32.1g and 42.5g, respectively during winter season.

Carbohydrates : The data revealed that the mean daily carbohydrates intake among female respondents was 244.05g which was 81.35 % adequate when compared with RDA of carbohydrates for adult females i.e. 300g. Further it can be seen that the mean carbohydrates intake was highest among Associate Professors i.e. 257.6 g (85.87 %) followed by Assistant Professors i.e. 243.29 g (81.10 %) and Professors i.e. 223.21g (74.40 %). Kaur (2011) reported the total mean daily intakes of carbohydrates by 21-30, 31-40, 41-50 and 51-60 years old women was 177.1, 190.03, 174.6 and 175.7g respectively. According to Jain (2012) the carbohydrates intake by women of home garden group and non home garden group was 163.0g and 180.8g respectively.

Fat: From Table 1 and Fig. 1 it can be seen that mean daily fat intake among adult female respondents was 52.60g which was high i.e. 263% adequate when compared with RDA of 20g for adult sedentary females. This could be due to the fact the calculated fat intake takes into account both the visible and invisible fat intake whereas the RDA concentrates on the visible fat intakes only. Thus the fat intake (both visible and invisible) accounts for more than double the RDA's of adult sedentary females. Further when the fat intake was segregated on the basis of 3 categories it was reported that the maximum fat intake was there in Associate Professors i.e. 56.42g (282.10 %), followed by Assistant Professors i.e. 55.44 g (277.20%) and Professors i.e. 43.03 g (215.15 %). Kaur (2011) also reported the total mean daily intakes of fat by 21-30, 31-40, 41-50 and 51-60 years old women was 49.1, 54.4, 57.7 and 50.2g, the percent adequacy being 245.5, 271.8, 288.4 and 250.8 respectively. The results revealed that Punjabi diets are high in total fat. According to Jain (2012) the mean daily intake of fat by women of home garden group and non home garden group was 38.8 and 59.1g during winter season.

Calcium : The data revealed that the mean daily calcium intake among female respondents was found to be 1064.78 mg which was 177.46 percent adequate when compared with RDA of 600 mg. The Probable reason for high calcium

Table 1: Mean daily nutrients intake by females

Nutrients	Assistant Professor Female (n=34) (Mean $\pm$ SD)	Associate Professor Female(n= 45) (Mean $\pm$ SD)	Professor Female (n=28) (Mean $\pm$ SD)	Total female (n= 107) (Mean $\pm$ SD)	RDA
Energy (Kcal)	1790.23 $\pm$ 342.82	1829.80 $\pm$ 488.15	1519.60 $\pm$ 484.75	1736.06 $\pm$ 460.88	1900
Protein (g)	63.79 $\pm$ 12.15	61.95 $\pm$ 14.63	50.50 $\pm$ 13.43	59.54 $\pm$ 14.51	55
Carbohydrates (g)	243.29 $\pm$ 41.48	257.6 $\pm$ 63.28	223.21 $\pm$ 63.42	244.05 $\pm$ 58.44	300
Fat (g)	55.44 $\pm$ 16.96	56.42 $\pm$ 17.56	43.03 $\pm$ 15.60	52.60 $\pm$ 17.68	20
Calcium (mg)	1048.90 $\pm$ 393.92	1188.84 $\pm$ 420.17	884.64 $\pm$ 447.93	1064.78 $\pm$ 433.46	600
Iron (mg)	25.69 $\pm$ 20.22	24.70 $\pm$ 25.69	12.95 $\pm$ 4.41	21.94 $\pm$ 20.87	21
Beta Carotene (μ g)	2595.12 $\pm$ 4510.25	3925.82 $\pm$ 5226.1	2683.3 $\pm$ 24660.85	3177.84 $\pm$ 4859.48	4800

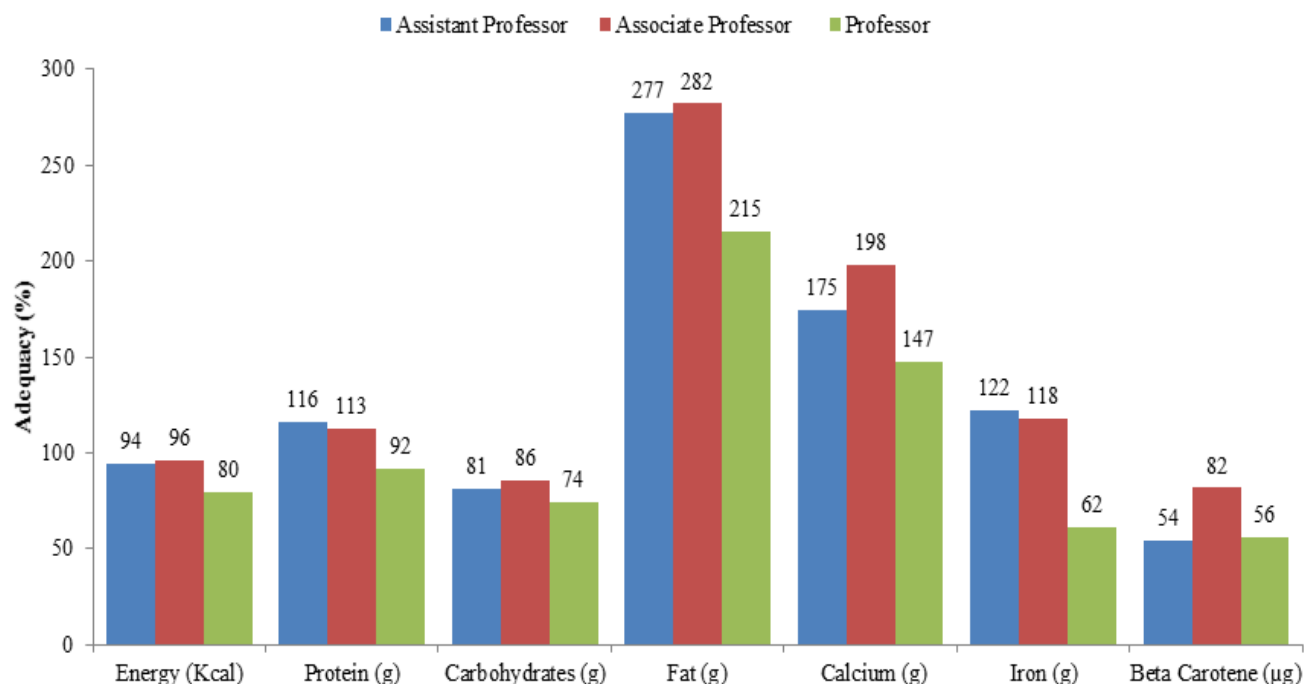


Fig 1: Percent adequacy of nutrients intake by female respondents

intakes could be due to the fact that the consumption of milk and milk products was around double the suggested dietary intake of 300ml/day. Further it was seen that calcium intake was highest among Associate Professors followed by Assistant Professors and Professors i.e. 1188.84 mg (198.14%), 1048.90 mg (174.82%) and 884.64 mg (61.67%) respectively. Aggarwal (2008) also reported higher intake of calcium among subjects.

Iron: It can be seen from Table 1 and Fig. 1 that mean daily iron intake among female respondents was 21.94 mg which was 104.48 percent adequate when compared with RDA of 21 mg. Further when the iron intake was segregated on the basis of 3 categories it was found that iron intake was highest among Assistant Professors followed by Associate Professors and Professors i.e. 25.69 mg (122.33 %), 24.70 mg (117.62 %) and 12.95 mg (61.67 %) respectively. The probable reason for high intake of iron was a good consumption of iron rich foods i.e. pulses, nuts, oilseeds and green leafy vegetables as the data was collected in winter season. Jain (2012) reported the mean daily intakes of iron by females of home garden group and non home garden group female was 14 and 9.9 mg during winter season.

Beta Carotene: The data revealed that the mean daily β Carotene intake was 3177.84 μ g which was 66.20% adequate when compared with Recommended Dietary Allowances of 4800 μ g for adult female. It can be seen that mean β carotene intake was highest among Associate Professors i.e. 3925.82 μ g (81.79%) followed by Professors i.e. 2683.3 μ g (55.90 %) and Assistant Professors i.e. 2595.12 μ g (54.06 %). β carotene intakes of Assistant and Associate Professors was

less than (RDA,2010). Jain (2012) reported that mean daily intake of β carotenes in home garden group and non home garden females was 8154 and 990 μ g during winter season.

Nutrients Intake by Male Respondents: Tables 2 represent the mean nutrients intake of male university teachers and Fig. 2 represents their percent adequacy with respect to RDA, 2010 suggested by ICMR (2010).

Energy : The data revealed that the mean daily energy intake among male respondents was 1877.67 Kcal which was 80.93% adequate when compared with the Recommended Dietary Allowances (2010) of 2320 Kcal for sedentary adult male. Further it was seen that the energy intake was highest in case of Associate Professors i.e. 1922.02 Kcal (82.84%) followed by Assistant Professors i.e. 1886.14 Kcal (81.30%) and then lowest intake by Professors i.e. 1840.25 Kcal (79.32%). A higher i.e. 2535 and 2583 Kcal of daily energy intake by in the low and middle income group men was reported by Batra (2014). Miglani *et al* (2014) also found a higher consumption of energy (2398 kcal) in the office workers category. According to NNMB (2005-2006) reported the overall median intake of energy was 1787kcal/CU/day, which was about 74% of recommended level. The intakes were less than the RDA in all the States and ranged from a low of 1594 kcal in Gujarat to a high of 2061kcal/CU/day in Andhra Pradesh.

Protein : The data revealed that the mean daily protein intake among male respondents was 61.50 g which was 102.50 % adequate when compared with RDA of protein for adult males i.e. 60g. Further it can be seen that the mean protein

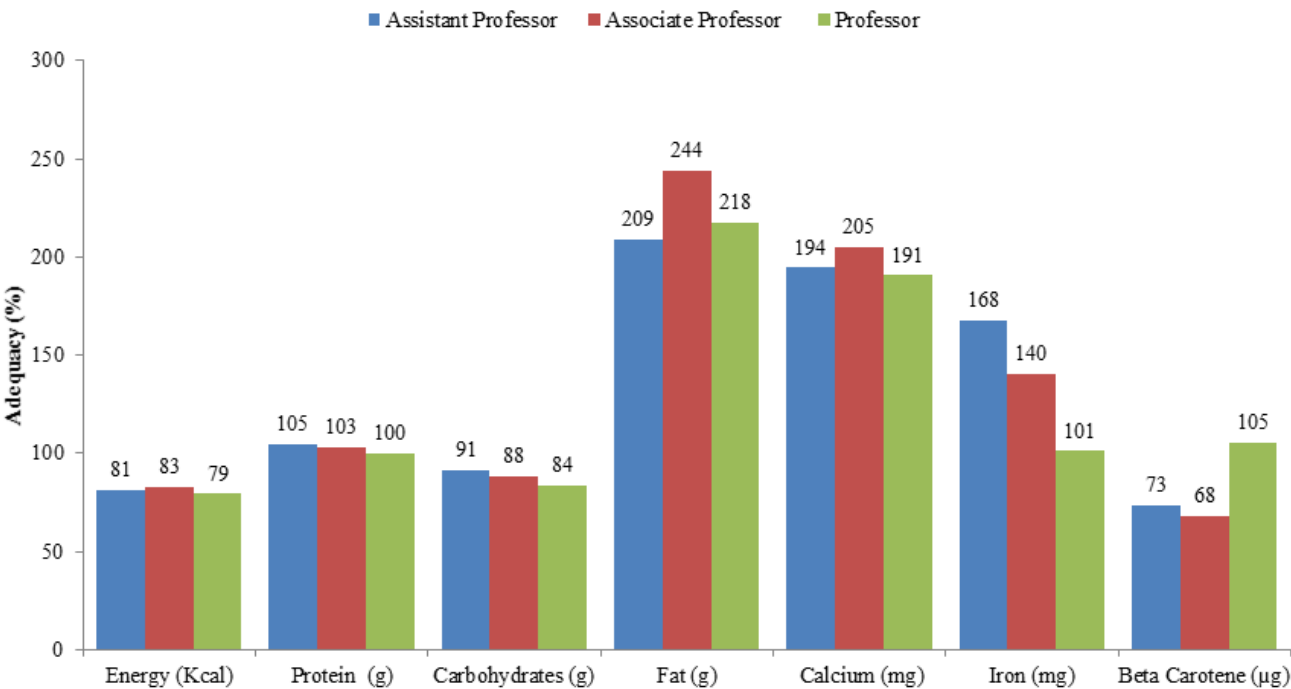


Fig 2: Percent adequacy of nutrients intake by male respondents

intake was highest among Assistant professors i.e. 62.83 g (104.71%) followed by Associate professors i.e. 61.97 g (103.28 %) and Professors i.e. 60.02 g (100.03%). On the contrary Batra (2014) observed that the protein intake was 41g and 67 g in low and middle income group men whereas Miglani *et al* (2014) found the protein intake of 53.1g in the office workers. According to NNMB report (2005-2006) the median intake of protein for the States pooled was 47 g. The intakes were less than RDI of 60g in all the States and ranged from a low 41g in Tamil Nadu to a maximum 53g in Gujarat.

Carbohydrates : From the Table 2 and Fig. 2 it can be seen that the mean daily carbohydrates intake was found to be 262.12 g among adult male respondents which was 87.37 percent adequate when compared with RDA of 300g. It was observed that the mean daily carbohydrates intake was highest in Assistant Professors followed by Associate Professors and Professors i.e. 273.40 g (91.13%), 264.05g (88.02%) and 251.06g (83.69%) respectively. Batra (2014)

observed reported that carbohydrates intakes by middle income group men was 272g which was close to the values of carbohydrates intake of teachers of Punjab agricultural university. A much higher intake of carbohydrates (380g) by the office workers was reported by Miglani *et al* (2014). Shriver *et al* (2013) reported that carbohydrate intakes were below the minimum recommended amount ($p < .001$), with only 9% of the participants meeting their energy needs. Seventy five percent of the participants failed to consume the minimum amount of carbohydrates.

Fat: From Table2 and Fig. 2 it can be seen that mean daily fat intake among adult male respondents was 55.35g which was quiet high i.e. 221.40% adequate when compared with RDA of 25g for adult sedentary males . This could be due to the fact the calculated fat intake takes in to account both the visible and invisible fat intake whereas the RDA concentrates on the visible fat intakes only. Thus the fat intake (both visible and invisible) accounts for more than double

Table 2: Mean daily nutrients intake by male respondents

Nutrients	Assistant Professor Male (n=46) (Mean $\pm$ SD)	Associate Professor Male (n= 35) (Mean $\pm$ SD)	Professor Male (n=52) (Mean $\pm$ SD)	Total Male (n=133) (Mean $\pm$ SD)	RDA
Energy (Kcal)	1886.24 $\pm$ 399.16	1922.02 $\pm$ 570.05	1840.25 $\pm$ 442.85	1877.67 $\pm$ 463.56	2320
Protein (g)	62.83 $\pm$ 12.04	61.97 $\pm$ 13.45	60.02 $\pm$ 15.14	61.50 $\pm$ 13.64	60
Carbohydrates (g)	273.40 $\pm$ 51.30	264.05 $\pm$ 56.17	251.06 $\pm$ 65.33	262.12 $\pm$ 58.80	300
Fat (g)	52.15 $\pm$ 13.10	60.97 $\pm$ 14.52	54.40 $\pm$ 16.29	55.35 $\pm$ 15.09	25
Calcium (mg)	1166.80 $\pm$ 373.42	1231.86 $\pm$ 414.53	1143.69 $\pm$ 550.40	1174.89 $\pm$ 458.38	600
Iron (mg)	28.53 $\pm$ 21.83	23.87 $\pm$ 15.78	17.19 $\pm$ 15.75	22.87 $\pm$ 18.62	17
Beta Carotene (µg)	3514.37 $\pm$ 5097.27	3260.17 $\pm$ 4708.52	5058.98 $\pm$ 6907.83	4051.38 $\pm$ 5802.67	4800

the RDA's of adult sedentary males. Further when the fat intake was segregated on the basis of 3 categories it was reported that the maximum fat intake was there in Associate Professors i.e. 60.97g (243.88 %) followed by Professors i.e. 54.40g (217.60%) and Assistant Professors i.e. 52.15g (208.60%). Tornaritis *et al* (2014) also reported that a large percentage of the subjects consumed exceeded the recommended intakes of total fat (42.4-83.8%), saturated fatty acids (90.4- 97.1%) while they failed to meet the recommended intake of all other nutrients. Gupta *et al* (2010) reported that the absolute daily intake of total fat was 84 ± 29 g/day in males and 72 ± 21 g/day in females, which was approximately 4 times the recommended dietary allowance for Asian Indians (20-22g/d). Similarly Batra (2014) also observed that the contribution of fat to total energy intake was higher in Punjabi men.

Calcium : The data revealed that the mean daily calcium intake was found to be 1174.89 mg which was 195.81 percent adequate when compared with RDA (2010) of 600 mg. Further it was seen that calcium intake was highest among all the male Associate Professors followed by Assistant Professors and Professors i.e. 1231.86 mg (205.31%), 1166.80 mg (194.47%) and 1143.69 mg (190.61%) respectively. The Probable reason for high Calcium intakes could be due to the fact that the consumption of milk and milk products was around double the suggested dietary intake of 300ml/day. Aggarwal (2008) also reported higher intake of calcium among subjects. Bhatt (2015) reported that calcium was marginally inadequate in (92%) in field workers, while adequate in lab workers (126%) and office workers (148%).

Iron: It can be seen from Table 2 and Fig. 2 that mean daily iron intake among male respondents was 22.87 mg which was 134.53 percent adequate. Further when the iron intake was segregated on the basis of 3 categories it was found that iron intake was highest among Assistant Professors followed by Associate Professors and Professors i.e. 28.53 mg (167.82%), 23.87 mg (140.41%) and 17.19 mg (101.12%) respectively. The probable reason for high intake of iron was a good consumption of iron rich foods i.e. green leafy vegetables, pulses, nuts and oilseeds as the data was collected in winter season. Batra (2014) reported that the adequacy of iron in low and middle income men was 66 and 76 percent.

Beta Carotene: The data revealed that the mean daily b Carotene intake was 4051.38 µg which was 84.40% adequate when compared with recommended dietary intakes. From the Table 2 and Fig. 2 it can be seen that mean b carotene intake was highest among Professors i.e. 5058.98 µg (105.39%) which is in the range of value given in RDA followed by Assistant Professors, 3514.37 µg (73.22%) and Associate Professors i.e. 3260.17 µg (67.92%). b carotene intakes of Assistant and Associate Professors was less than RDA (2010). Hanagi *et al* (2005) reported that the intake of vitamin A was less than 20 percent. The lowered consumption of quality foods including milk, leafy vegetables, animal foods, fruits might have resulted in this deficiency.

CONCLUSION

It can be concluded that the over all nutritional status of PAU faculty was good as the mean daily intake of nutrients like protein, fat, calcium and iron was more than adequate by both female and male respondents. Where as a few of the nutrients like energy, carbohydrates and beta carotene was inadequate by both the respondents .

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