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A correlative study on protein quantity with hip-waist circumference and lean body mass of sedentary women (40-60 Years)

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Abstract

The present study entitled “Effect of Protein Quantity on Hip-Waist Circumference and Lean Body Mass of Sedentary Women” was conducted to assess pre and post intervention on nutrition knowledge, activity pattern and dietary practice among sedentary women.

Purposive sampling was done to select 100 adult women subjects of age group (40-60 years) from Hauz Khas, South Delhi, North India to conduct the present study. The study was conducted in 3 phases- Pre Intervention Phase, Intervention Phase and Post Intervention Phase. A structured questionnaire was used to collect the data on knowledge and dietary pattern of respondents during Pre and Post Intervention. Dietary data was collected by 24 hour dietary recall method. The study revealed that the mean waist circumference, mean hip circumference and mean lean body mass at 60th day were, 37.79 ± 3.04 , 46 and 64 ± 4.29 respectively, showing no statistical significant difference in measurements when compared to 0 day. During the study the change regarding mean hip-waist circumference was observed in few subjects, the changes were found to be very few due to time constraint. Further, more changes would have been possible if the research study would have been carried forward for longer duration.

Keywords: hip circumference, waist circumference, lean body mass

1. Introduction

According to India’s constitution, women are legal citizens of the country and have equal rights with men (Indian Parliament). Because of lack of acceptance from the male dominant society, Indian women suffer immensely. Women are responsible for bearing children, yet they are malnourished and in poor health. India is a society where the male is greatly revered ^[1]. Currently, women in India have to face numerous health issues, which ultimately affect the aggregate economy’s output ^[2]. Health is complex and dependent on a host of factors. The dynamic interplay of social and environmental factors has profound and multifaceted implications on health ^[3]. Nutrition plays a major role in an individual’s overall health, psychological and physical health status is often dramatically impacted by the presence of malnutrition. India has one of the highest rates of malnourished women among developing countries ^[2]. Sufficient intake of protein can help build and repair muscles or torn tissues. Protein also plays the role of producing enzyme and hormone, supports the immune system and helps to keep the energy and stamina level high. The DRI (Dietary Reference Intake) is 0.8 grams of protein per kilogram of body weight, or 0.36 grams per pound. ^[4]

2. Material and Methods

Study Duration: December 2017 to February 2018.

Sample size: 50 sedentary women (40-60years).

Sample size calculation: Purposive sampling was done to select 50 adult women subjects of age group (40-60 years).

Subjects & selection method

Inclusion criteria

1. Subject engaged in walking and jogging activity.
2. No supplement intake

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3. Subjects willing to participate in the study

Exclusion criteria

1. Males were excluded
2. Subjects not willing to participate

Procedure methodology

To conduct the present study, 20 subjects were selected and were assessed on their hip-waist circumference, lean body mass and nutrient intake. The subjects were given diet counselling and personalized diet plans for two months. Anthropometric measurements was done by using standardized tools. Nutrient intake were calculated by dietcal software. Statistical analysis was done by SPSS 24 version.

Statistical analysis

Data was analyzed using SPSS version 24. Independent *t*-test was used to ascertain the significance of differences between mean values of anthropometric measurements and NAR of the subjects after intervention phase. The level $P < 0.05$ was considered as the cutoff value or significance

3. Result

Table 1: Mean age of the respondents

Group	Mean	Std. Deviation
40-60 Years	47.1600	4.62186

Table depicts that the mean age for the age group 40-60 years of sedentary women taken as the subjects for the study was 47 years.

Table 2: Distribution of the respondents on the basis of their protein intake.

	Pre- Intervention 40-60 Yrs (N=50)	Post-Intervention 40-60 Yrs (N=50)
Consumption Of Protein In A Day:		
Less than 20 grams	-	-
20-30 grams	30(60)	-
30-40 grams	20(40)	-
40-50grams	-	-
More than 50 grams	-	50(100)

With respect to protein intake, the present study highlights that 60% of subjects (40-60 years) were taking 20-30 grams of protein in a day, 40% women were consuming 30-40 grams

of protein in a day. After imparting diet counselling to the women, 100% of subjects (40-60 years) were consuming more than 50 grams of protein.

Table 3: Mean Height, Weight, BMI, of the respondents

Women (40-60 years) n=50				
	0 Day	30 th Day	60 th Day	P Value
HEIGHT (cm)	160.37± 2.61	160.37± 2.61	160.37± 2.61	1.000
WEIGHT (kg)	56.49± 3.50	56.37± 3.46	56.47± 3.47	.982
BMI(kg/m ²)	21.98± 1.42	21.93± 1.38	21.95± 1.39	.983

Table depicts that on comparing the data of 0 day and 60th day of the subjects in respect to their height, weight and BMI, height remained constant in the two months and showed no statistical significant difference ($P > 0.05$). On comparison with ICMR standards the mean weight of the subjects i.e., 56.47 was found to be high as per their mean height in the

study i.e., 160.37 and ($P > 0.05$) showing that there wasn't statistical difference in the weight of the subjects after the intervention stage. Subjects had 21.95 as their mean BMI signifying normal category as per WHO guidelines but BMI did not showed any statistical significant difference after two months ($P > 0.05$).

Table 4: Mean Hip Circumference, Waist Circumference, Lean Body Mass of the respondents (40-60years)

Women (40-60 years) n=50				
	0 Day	30 th Day	60 th Day	P Value
Waist Circumference	37.80± 3.03	37.80± 3.03	37.79± 3.04	1.000
Hip Circumference	46.63± 4.29	46.63± 4.29	46.64± 4.29	1.000
Lean Body Mass	41.96± 1.64	41.93± 1.65	41.99± 1.61	.982

Table depicts that at 0 day, the mean waist circumference of the subjects (40-60 years) was found to be 37.80± 3.03, on the other hand it was 37.80± 3.03 at 30th day and 37.79± 3.04 at 60th day. And the differences were not statistically significant ($P > 0.05$) i.e., the mean waist circumference of the subjects measured did not had any statistical difference at 60th day as compared to 0 day.

The mean hip circumference of the subjects (40-60yrs), at 0 day the hip circumference was 46.63± 4.29 on the other hand it was 46.63± 4.29 at 30 day and at 60 day was 46.64± 4.29. And the differences were not statistically significant ($P > 0.05$) i.e., the mean hip circumference of the subjects measured did not showed any statistical difference at 60th day as compared

to 0 day.

The mean lean body mass of the subjects (40-60yrs), at 0 day was 41.96± 1.64 on the other hand LBM was 41.93± 1.65 at 30 day and 41.99± 1.61 at 60 day. And the differences were not statistically significant ($P > 0.05$) i.e., the mean lean body mass of the subjects measured did not showed any statistical difference at 60th day as compared to 0 day.

During the study the change regarding mean of hip-waist circumference was observed in few subjects i.e., 4%. The number of subjects with changes were found to be very few due to time constraint. Further, changes would have been possible if the research study would be carried forward for longer duration.

Table 5: Mean nutrient intake of respondents of age group 40-60 years

Women (40-60 Years) n=50				
Dietary Assessment	0 Day	30 Day	60 Day	P Value
Energy	1234.30±164.15	1236.00±77.61	1236.00±77.61	.996
Protein	33.84±8.84	53.140±3.20	53.14±3.20	.000
CHO	129.50±26.53	121.76±51.22	121.76±51.22	.606
Fats	64.00±16.17	47.14±8.89	47.14±8.89	.000

The dietary data was collected through 24 hours dietary recall and analysed through DIETCAL software. Statistical significant difference ($p < 0.05$) was observed for protein and fats i.e., the mean protein intake of the subjects showed drastically increased levels from 0 day (33.84g) to 60th day (53.14) and mean fat intake showed drastically decreased

levels from 0 day (64g) to 60th day (47.14g) respectively. On the other hand there was no statistical significant difference observed for energy and carbohydrate ($P > 0.05$) i.e., the energy and carbohydrate levels did not changed much in the two months of the study.

Table 6: Distribution of respondents on the basis of nutrient adequacy ratio (40-60 years) Pre-Intervention

Women (n=50) 40-60 years			
Pre- Intervention			
	High Adequate (>1)	Adequate (0.66-1)	Low Adequate (<0.66)
Energy	-	27(54)	23(46)
Protein	1(2)	20(40)	29(58)
Carbohydrate	-	-	50(100)
Fat	50(100)	-	-

Table depicts that before intervention, energy intake of 54% respondents were adequate i.e. (0.66-1) and 46% subjects were under 0.66. Protein intake was found to be highly adequate i.e. (>1) in 2% subjects, 40% were adequate and

58% were under 0.66. Carbohydrate intake was found to be under 0.66 in 100% subjects. Fat intake was found to be highly adequate i.e. (>1) in 100% subjects.

Table 7: Distribution of respondents on the basis of nutrient adequacy ratio (40-60 years) Post-Intervention

Women (n=50) 40-60 years			
Post- Intervention			
	High Adequate (>1)	Adequate (0.66-1)	Low Adequate (<0.66)
Energy	-	9(18)	41(82)
Protein	2(4)	48(96)	-
Carbohydrate	-	-	50(100)
Fat	50(100)	-	-

Table depicts that after intervention, energy intake of 18% respondents were adequate i.e. (0.66-1) and 82% subjects were under 0.66. Protein intake was found to be highly adequate i.e. (>1) in 4% subjects and 96% were adequate.

Carbohydrate intake was found to be under 0.66 in 100% subjects. Fat intake was found to be highly adequate i.e. (>1) in 100% subjects.

Table 8: Association between Protein NAR with Hip-Waist Circumference, BMI and Lean Body Mass (40-60 years)

	Protein NAR	Hip Cir.	Waist Cir.	BMI	LBM	
Protein NAR	R Value	1	-.151	-.066	.711**	.807**
	P Value		.295	.648	.000	.000

** . Correlation is significant at the 0.01 level (2-tailed).

Table depicts that Protein NAR is highly positively significant with lean body mass and BMI i.e., with the increase of protein intake the LBM and BMI of the women increase. It is founded that Protein NAR is not correlated with hip-waist circumference. The P value signifies that protein NAR showed statistically significant differences with Lean body and BMI ($p < 0.05$) and did not showed statistically significant differences with hip and waist differences ($p > 0.05$).

The data revealed that protein NAR showed no correlation with waist-hip circumference till 60th day of intervention, it may be due to time constraint and may show positive/negative correlation if the study is further continued for six months.

4. Conclusion

The present study concluded that the protein NAR had no correlation with hip-waist circumference, may be due to the

time constraint and possibly can show correlation if continued for six months or more. Whereas it was highly positively correlated with lean body mass and BMI of the sedentary women (40-60 years).

5. Acknowledgment

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