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THE EFFICIENCY OF DIETARY SUPPLEMENTES FOR IMPROVING ANTHROPOMETRIC MEASUREMENTS AND BODY COMPOSITION WHO EXERCISE REGULARLY AT THE COMMERCIAL GYM IN PUDUCHERRY

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ABSTRACT

Objective: Anthropometric Measurements and Body Composition by the use of Dietary Supplements among People Who exercise regularly at the commercial gym In puducherry supplement use was surveyed in a convenience sample of persons who exercised regularly at a commercial gym. Study Design: A the study is quasi experimental in nature. 300 samples were taken using simple random sampling assessment was taken using questioners above 22 years, completed anonymous questionnaires. **Materials and Methods**: Gym users (N=300) belonging to pondicherry formed the population of this study. A simple percentage technique with 95% confidence interval was adopted to study the prevalence. The variables selected for the study under Anthropometric measurements were Standing Height, Sitting Height, Total Arm Length, Total Leg Length, Upper Arm Girth, Hand Girth, Thigh Girth, Calf Girth and Chest Girth while under Body Composition the variables under taken were body Weight, Percentage of Body Fat and Lean Body Mass. To determine the significant difference between the mean of subjects belonging to pre and post workout on Anthropometric measurements and Body **Results**: A majority (86.7%) took supplements. Many consumed multivitamin/minerals (MVM; 45%), protein shakes/bars (PRO; 46.3%), vitamin C (37.7%), and vitamin E (VE; 24.4%) at least 5 times per week. Other dietary supplements were used less frequently or by fewer participants. sa was consumed by 28% at least once per wk. Bodybuilders more frequently consumed PRO, creatine, and fruit and nuts salad compared to those exercising for health reasons. **Conclusion**: In conclusion, many people who exercised extensively at a commercial gym took dietary supplements. A wide variety of vitamin and mineral supplements as well as other herbs and botanicals were chosen. At the time of this study 48% of the participants reported taking fruit salad and 7 additional subjects did not realize that they were doing so. Age of the respondent influenced the choice of supplement and the reason for taking supplements. Participants also chose different supplements, depending on their main reason for exercising. Gyms, such as the one included in this study, may well need to have qualified health professionals such as nutritionists available to members. These professionals can provide accurate information about supplements and assist members to be aware of both positive as well as adverse health effects of dietary supplements. on selected Anthropometric measurements and Body Composition, however a significant difference in Total Leg Length, Total Arm Length and Standing Height was obtained.

***KEYWORDS**: Anthropometric measurements and Body Composition athletic training, ergogenic aids, nutrient supplementation.*

INTRODUCTION

Anthropometry is the branch of anthropology that is concerned with the measurement of human body. The definition has confined to the kind of measurements commonly used in associating physical performance with body build. Anthropometry involves the measurement of external part of the body, including body diameters, body circumferences somatotypes.Specific anthropometric characteristics are needed to be successful in certain sporting events. is also important to note that there are some differences in body structure and composition of sports persons involved in individual and team sports. The tasks in some events, such as shot put or high jump, are quite specific and different from each other and so are the successful physiques. This process whereby the physical demands.

Since the passage of the Dietary Supplement Health and Education Act (DSHEA) in 2004, a wide variety of compounds have become readily available in the MARKET. A dietary supplement, according to DSHEA, includes one or more of the following ingredients:

vitamin, mineral, herb or other botanical, amino acid, concentrate, metabolite, constituent, and/or extract. Examples of these compounds include creatine, chromium picolinate, protein or carbohydrate bars/shakes, and glutamine.

There are numerous factors which are responsible for the performance of a sportsman. The physique and body composition, including the size shape and form are known to play a significant role in this regard. At present, sportsman for superior performance in any sports is selected on the basis of physical structure and body size. Structural measurement include anthropometric measurements which consist of objective measurement of structures such as height, weight, width, depth and the circumference of the various part of body
.
Studies have measured the extensive use of vitamin and mineral supplements by Indians. Few studies have examined the use of the other products included in DSHEA, and little information is available regarding supplement use among selected groups. Survey results have shown that dietary supplements have been taken to improve performance, increase strength, gain muscle mass, lose weight, prevent illness and disease, treat medical problems, boost immunity, compensate for inadequate diet, provide extra energy, meet special nutrient demands for high levels of physical activity, improve fitness, increase alertness or mental activity, reduce stress, and feel better.

While some supplements may be beneficial, others have been shown to have no effect or to be dangerous. Many adverse effects from the use of various supplements have been reported to the FDA.People that frequent commercial gyms may use particular supplements for a variety of reasons. Differences may exist in the choice of supplement depending on age, gender, or reason for exercise. It is important to determine what supplements people who exercise take, why they take them, and their sources of information in order to help health professionals educate this population. Some people may learn about supplements from unqualified sources rather than health professionals. Eliason et al. (6) found that participants who purchased supplements at a health store did not rely on physicians or other health professionals for supplement information. This study examined the use of supplements by people who exercise and determined the source from which these people obtained information.

Study design

A study is quasi experimental in nature. 300 samples were taken using simple random sampling assessment was taken using questioners age at least 22 years, completed anonymous questionnaires.

Subjects

Anthropometric Measurements and Body Composition by the use of Dietary Supplements Among People Who exercise regularly at the commercial gym In puducherry Supplement use was surveyed in a convenience sample of persons who exercised regularly at a Pondicherry gym. A study is quasi experimental in nature. 300 samples were taken using simple random sampling assessment was taken using questioners age at least 22 years, com- pleted anonymous questionnaires.gym users (N=300).

METHODOLOGY

Selection of Population

To be included in this study, subjects attending a commercial gym in a suburb of Pondicherry exercised at least 4 times per wk at 1 h per session, and had been exercising at this intensity for at least 1year. A preliminary questionnaire was administered, regarding the above criteria. A convenience sample of 300 people, 22 y and older, met qualification standards and completed the survey.

The variables selected for the study under Anthropometric measurements were Standing Height, Sitting Height, Total Arm Length,Total Leg Length, Upper Arm Girth, Hand Girth, Thigh Girth, Calf Girth and Chest Girth while under Body Composition the variables under taken were body Weight, Percentage of Body Fat and Lean Body Mass.

Sl.No	Name of the gym	No.of gym users
1.	Kanagachetikulam	40
2.	Periyakalapet	40
3.	Chinnakalapet	40
4.	Solai nagar	40
5.	Vaithikuppam	40
6.	Kurusukupam	50
7.	Vamabakeerapalayam	50
Total		300

Questionnaire

The survey included questions concerning demographic characteristics such as age, gender, education, employment, and health status. Data concerning type and frequency of supplement use, reasons for supplement use, main reason for exercising, and sources of supplement information were collected. The anonymous survey, consisting of 25 questions, was developed based on previously published studies. It was reviewed and evaluated by faculty, colleagues, and registered dietitians for readability and content validity. A similar population at various different gyms on Pondicherry pilot study had conducted by using the questionnaire.

DATA ANALYSIS AND RESULTS

Data Analysis

Analyses of data were performed using SPSS for Windows (v. 10.0, SPSS Inc., Chicago, IL). Descriptive statistics including frequency distribution were developed. When data were incomplete, a reduced *n* was used. Comparisons were made by chi square. Differences were considered significant if the *P* value was < 0.05. Group-by-group comparisons were considered

significant at $P < 0.016$.

Surveys were distributed and collected on the same day by the researcher. Following completion of the questionnaire, each participant was given an energy bar and asked if they had forgotten to list any supplements. If so, they were given the opportunity to make the appropriate revisions. Data were collected over a period of 3 d by 1 researcher.

Demographic

Participants of the study were primarily male (95.0%). A majority of the subjects (86.4%) attended or had graduated from college, and 59.0% had started or completed advanced degrees. Almost half (46.5%) of the subjects reported working in business, while 21.7% had other, unspecified occupations. Participants considered themselves to be healthy; excellent health was reported by 50.7% and good health by 43.9%. The population tended to be young; 52.3% were 30 y or younger (Table 1A). For comparative purposes, 3 age groups were established: Group 1, participants who were 22 to 30 y (n = 200); Group 2, 31 to 45 y (n = 70); and Group 3, 46 y and older (n = 30).

The types of exercise reported in Table 1B included weightlifting by 86.4% of participants, endurance/cardiovascular exercise by 73. 6%, and strength training by 53.6 %. Few (16.8%) reported engaging in circuit training.

Table 1. A Age of Subjects Exercising at a Commercial Gym.

Age of subjects	*N*
22–30	200
31–35	60
36–40	20
41–45	20

Table 1. B Types of Exercise at a Commercial Gym.

Type of exercise	*N*	%
Weightlifting	90	76.4
Endurance/cardiovascular	60	63.6
Strength training	40	43.6
Circuit training	10	13.8

Table 1. C Main Reason for Exercising at a Commercial Gym.

Reason	*N*	%
Bodybuilding	80	26.7
Health reasons	50	18.6
Endurance/cardiovascular	20	7.7
Weight loss	26	7.2
Improve performance in a sport	24	6.3

Supplement use

A majority (84.7%) of the subjects reported taking at least 1 supplement, and 93.4% of these persons had been taking them for at least 1 y. Of those using these products, 94.5% consumed supplements throughout the year, and only 5.5% took them during specific seasons. Participants were asked to reveal the types and frequency of use of all the supplements they were consuming at the time of the study (Table 2).

The four that were taken "regularly" (more than 5 times per wk) by the largest proportion of the participants included: multivitamin and minerals (MVM; 45.0%), protein shakes/bars (PRO; 42.3%), vitamin C (34.7%), and vitamin E (23.4%). Also used on a regular basis were calcium (17.1%), B complex vitamins (16.2%), carbohydrate shakes/bars (14.4%), glutamine (14.0%), fruit salad/Ma Huang(13.1%), and creatine (12.6%).

When comparing supplement use by age group (Table 3), more of those in Group 3 (46 y and older) consumed multivitamin and mineral supplements com- pared to participants in Group1 (ages 18 to 30 y; P = 0.006). A higher percentage of those in Group 3 regularly consumed vitamin E compared to those in either Group 2 (P = 0.0003) or Group 1 (P = 0.0001).

Supplement use was also categorized as taken or not taken. Taken included the categories regularly, occasionally, and seldom. Protein shakes/bars were taken by 54.9% of participants, creatine (33.3%), carbohydrate shakes/bars (30.2%),fruit salad/Ma Huang (27.9%), glutamine (27.1%), chromium picolinate (18.9%),carnitine (16.7%), ginseng (16.2%), arginine (14.9%), ornithine (13.5%), and androstenedione (13.1%).

Reasons for Supplement Use.

Participants who could list as many reasons as desired indicated that supplements were chosen to build muscle (49.1%), prevent future illness (38.4%), increase energy. (36.1%), improve performance in a sport (24.4%), gain strength (22.4%), and aid in recuperation (20.5%). Other reasons for taking supplements were reported less frequently.

Three reasons for taking supplements varied significantly by age group (Table 5). More in Groups 1 (P = 0.0002) and 2 (P = 0.0001) took supplements to build muscle compared to the older participants of Group 3. More of the oldest participants in Group 3 consumed supplements to prevent future illness or disease compared to the youngest participants in Group 1 (P = 0.009). There was some trend that more of the youngest participants (Group 1) chose supplements to gain strength compared to Group 2 (P = 0.028) and Group 3 (P = 0.027). Although the overall comparison of the 3 groups indicated a significant difference by age group, group-by-group comparisons were not significant at the $P < 0.017$ level. Participants (15.3%, n =34) who reported not taking supplements believed that they do not work (38.2%) and that enough nutrients were obtained from their diet (35.3%).

Table. 2 Supplements used by subjects who exercise at a commercial gym.

Supplement	Regularly		Occasionally		Seldom		Never	%
	n	%	*n*	%	*n*	%	*n*	%
Multivitamin/ mineral	30	40	24	10	10	6	7	34
Multivitamin/ nomineral	16	6.6	14	6	10	4	15	72
B-complex	12	14	13	5	10	5	16	70
Vitamin C	21	31	22	10	11	5	10	45
Vitamin E	12	21	17	8	14	6	15	60
Other antioxidants	11	6	1	4	6	31	18	85
Iron	21	11	8	3	21	9	16	75
Calcium	23	17	10	4	15	5	14	70
Carbohydrate shakes/bars	20	14	14	8	16	7	14	69
Protein shakes/bars	91	41	20	9	8	3	10	45.0
Creatine	5	12	23	10	22	9	13	65
fruit salad/Ma Huang	20	13	18	8	5	6	11	73
Other	10	6	2	2	0	2	27	88

Note. Regularly = greater than 5 times per wk; occasionally = 2 to 4 times per week; seldom = 1 to 2 times per wk or less; never = not taken

Table. 3 Comparison by age for supplements taken regularly versus occasionally, seldom, or never.

Supplement	Group 1		Group 2		Group 3		*P*
	(age 22 to 30		(age 31 to 45;		(age 46+;		
			n = 68)		*n* = 35)		
	n	%	*n*	%	*n*	%	
Multivitamin and mineral[c] Regularly	50	38	34	54	19	62	
Sometimes, occasionally, never	66	62	29	46	16	44	.110
Vitamin E							
Regularly	17	10	11	21	17	54	.0001
Sometimes, occasionally, never	93	52	51	82	14	44	

Note. Regularly = greater than 5 times per wk, occasionally = 2 to 4 times per wk, seldom = 1 to 2 times per wk. [a]Comparisons for all other supplements not significantly different; [b]chi square. [c]Group 1 significantly different from Group 3 ($P = 0.006$); [d]Group 3 significantly different from Group 1 ($P = 0.0001$) and Group 2 ($P = 0.0003$).

Table. 4 Supplements "taken" compared by age.

Supplement	Group 1		Group 2		Group 3		*P*
	(age 18 to 30 *n* = 120)		(age 31 to 45; *n* = 110)		(age 46+; *n* = 70)		
	n	%	*n*	%	*n*	%	
Vitamin E Taken	41	37	26	34.8	23	58.1	048
Protein shakes/bars[d]							
Regularly	77	69.3	44	61.3	14	33.4	.009
Creatine							
Regularly	67	53.6	24	33.4	5	13.4	004

Note. "Taken" = the categories regularly, occasionally, and seldom. [a]Comparisons for all other supplements are not significantly different; [b]chi square. [c]Group 3 significantly different from Group 1 (P = 0.017); [d]Group 3 significantly different from Group 1 (P = 0.004) and Group 2 (P = 0.005); [e]Group 3 significantly different from Group 1 (P = 0.001).

Table. 5 Reason for taking supplements compared by age.

Supplement	Group 1		Group 2		Group 3		*P*
	(age 18 to 30 *n* = 120)		(age 31 to 45 *n* = 110)		(age 46+; *n* = 70)		
	n	%	*n*	%	*n*	%	
Vitamin E Taken	63	56.3	37	55.2	6	17.1	
Protein shakes/bars							
Regularly	35	31.3	29	42.6	19	55.9	.026
Creatine							
Regularly	34	30.1	10	15.4	4	11.4	.018

Note. More than one response possible. [a]Comparisons for all other reasons are not significantly different; [b]chi square. [c]Group 3 significantly different from Group 2 (P = 0.0001) and Group 1 (P = 0.0002); [d]Group 3 significantly different from Group 1 (P = 0.009); [e]Group 1 comparedto Group 2 (P = 0.028) and Group 3 (P = 0.027).

Main Reason for Exercise

One item in the questionnaire asked subjects to indicate their main reason for exercise; however, 22.5% (n = 64) reported more than 1 reason so that data from these participants could not be further analyzed. The main reason for exercise reported by the 165 participants who correctly answered this question (Table 1C) was body-building (28.7%) followed by health reasons (18.6%). Other responses were less frequently reported, and thus data were not further analyzed [endurance/cardiovascular (9.7%), weight loss (8.9%), improve performance in a sport (8.3%)].

As shown in Table 1(c), of those participants who exercised for bodybuilding (n= 65): 72.3% selected protein, 61.5% multiple vitamin and mineral supplements, 51.3% creatine, 48.2% fruit salad, 50.2% vitamin C, 42.1% glutamine, and 37.9% carbohydrates. For those subjects who exercised for health reasons (n = 150), 70.5% chose multiple vitamin and mineral supplements, 44.2% protein, 41.9% vitamin C, 37.2% vitamin E, 27.9% calcium, and 25.6% creatine. Comparison of supple- ment use by those who exercised for bodybuilding or health reasons indicated that significantly more of those who took supplements for bodybuilding took protein. Shakes/bars (P = 0.003), creatine (P = 0.006), or fruit salad (P = 0.0001).

Table. 6 Main reason for supplementation.

Supplement	Bodybuilding reasons (n = 150)	Health reasons (n = 150)		
	n	%	*n*	%
Multivitamin with minerals	50	63	20	63
Multivitamin without minerals	14	24	10	18
B-complex	16	27	16	27
Vitamin C	33	48	20	43
Vitamin E	20	27	15	36
Other antioxidants	8	9	7	17
Iron	18	26	13	22
Calcium	14	25	16	28
Carbohydrate	31	37	14	29
Protein shakes/bars[a]	46	78	23	41
Carnitine	20	27	8	18
Arginine	14	21	7	16
Other amino acids	9	98	7	9.3
fruit salad	31	50	6	17
Dehydroepiandrosterone (DHEA)	15	13	6	11
Other	6	6	4	12

Note. More than 1 response for supplementation possible per reason. [a]Significantlydifferent: protein shakes/bars (P = 0.003), creatine (P = 0.006), fruit salad/Ma Huang (P = 0.0001).

Personnel at a vitamin/health food store (56.7%), and books (55.5%). Many subjects (46.5%) relied on the media and 38.7% on personal trainers. A third or fewer of the participants indicated consulting a physician (33.8%), registered dietitian/certified dietitian/nutritionist (29.4%), pharmacist (18.1%), and/or chiropractor (17.4%) for supplement information. Approximately 49% of subjects who took supplements.

Table. 7 Comparison of pre-test and post-test values of anthropometric measurements and body composition of the commercial drinks supplemented group.

SL.No	Variables	Units	Means		SD		SE	"t"
			PRE-TEST	POST-TEST	PRE-TEST	POST-TEST		
1	Leg Length	cm	81.60	96.63	5.33	7.55	2.02	4.68*
2	Calf Girth	cm	36.28	37.28	2.11	7.92	1.50	0.97
3	Thigh Girth	cm	53.53	54.53	2.81	3.82	0.86	1.14
4	Chest Girth	cm	89.22	91.22	3.86	4.77	0.98	0.19
5	Total Arm Length	cm	73.70	75.70	2.88	3.71	0.86	3.49*
6	Upper Arm Girth	cm	23.23	25.23	1.52	1.86	0.44	0.36
7	Hand Girth	cm	19.50	20.50	1.31	1.10	0.32	0.84
8	Standing Height	cm	157.72	167.72	5.69	5.76	1.43	3.41*
9	Body Weight	kg	60.23	61.23	5.26	6.01	1.46	1.01
10	Percent Body Fat	m	12.10	14.10	1.88	3.07	0.66	1.70
11	Lean Body Mass	kg	50.59	52.59	4.04	4.97	1.17	1.59

*Significant at 0.05 level

Bmi classification in anthropometry measurement of the selected population(N300)

BMI	No.	%
Underweight	20	7
Normal	210	60
Overweight	50	30
Obesity	30	3
Total	300	100

From the Table VIII(a) it could be noted that only 76.8 percent of the men in the age group of 22-40 years were having normal BMI according to WHO 2010, it was noted that 3.2 percent of the adult men were underweight.

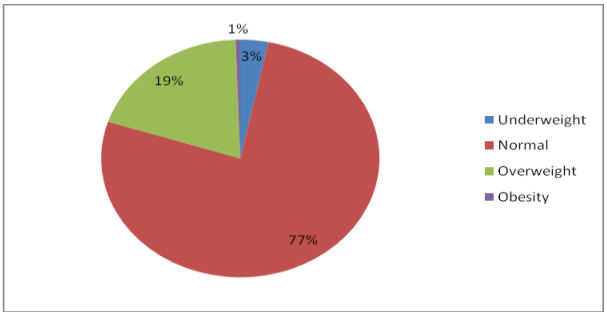

Table. viii (b) waist circumference in anthropometry measurement of the selected population. (N=300)

Waist circumference	No.	%
Normal	230	70.8
Abdominal obesity	70	29.2
Total	300	100.0

From the Table VIII, it could be viewed that the prevalence of abdominal obesity among selected adult men ranged from 29.2 percent and the 70.8 percent of the selected adult men were normal and absence of abdominal obesity according to waist circumference.

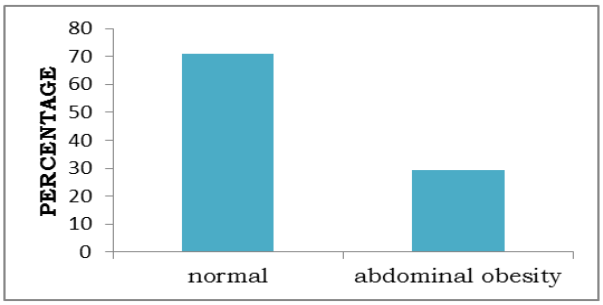

Figure: viii. Waist circumference in anthropometry measurement of the selected population.

TAble xii mean value for method of the selected population.

Nutrients	Calculated value	ICMR RDA value
Energy	1863	2875
Protein	52.91	60
Fat	18.06	20
Calcium	396.38	400
Iron	19.75	28

From the Table IX, shows the mean value intake of nutrients for the selected gym users (cu/day) and compared with RDA (ICMR 2010). The average intake of energy was 1863.72 Kcals/cu/day. The intakes of protein 52.91g/cu/day the intake were less than 6og/cu/day.

DISCUSSION OF FINDING

The Result and discussion pertaining to the study entitled "Anthropometry and Dietary Profile of the Gym users in Puducherry" is discussed under the following headings:

Nutritional Status Profile

1. Body mass index classification in anthropometry measurement of the selected population
2. Waist circumference in anthropometry measurement of the selected population
3. Dietary consumption pattern of the selected population.

B. Anthropometry and dietary profile of the gym users in puducherry.

The Findings of the present study indicative The "Anthropometry and Dietary Profile of the Gym users in Pudhucherry ". This survey summarizes about the socio-economic profile, nutritional status profile and lifestyle management profile of the selected population.

In this study, a higher percentage of subjects reported taking supplements (86.7%) compared to reports of other populations. Previous research and the results of the current study have shown that vitamins and minerals were the most frequently chosen supplements. Few studies have reported the use of supplements, such as protein or carbohydrate shakes/bars, glutamine, fruit salad/Ma Huang, creatine, chromium picolinate, or other botanicals. In this study, many participants (44.3%) consumed protein shakes/bars and from 8% to 14% reported selection of carbohydrate shakes/bars, glutamine, fruit salad, creatine, or chromium picolinate on a regular basis (greater than 5 times per week).

The results of the present study indicate that Pre-test and post-test differ much on selected Anthropometric measurements and Body Composition, however a significant difference in Total Leg Length, Total Arm Length and Standing Height was obtained. The comparison of the subjects did not reveal any significant difference between Soccer players and Track and Field Athletes.

Statistical analysis of the datag Length,revealsTotal thatArm Length and Standing Height is higher than the Soccer players. Probably the reason in case of Track and Field has some advantages in Standing Height,Total Leg Length and Total Arm Length. These factors are very less trainable. On realizing the advantages of body structure, the Athletes select Track and Field.

In case of Calf Girth, Thigh Girth, Chest Girth, Upper Arm Girth, Hand Girth, Sitting Height, Body Weight, Percent Body Fat and Lean Body Mass were not significant. It may be due to the training effect the Soccer players and Track and Field Athletes developed these variables equally.

Physical characteristics and body composition have been known to be fundamental to excellence in athletes performance (Mathur & Salokun, 1985). It has been found that the athletes with lower body fat percentage had higher maximum oxygen uptake (VO_2max). In other words, the athletes with lower body fat percentage seemed to utilize oxygen most efficiently (Heck, 1980), while the excess of body fat was reported to be a deterrent to physical performance (Leelarthae-pin, Chesworth & Boleyn, 1983). Minimum level of fitness is particularly advantageous for gymnasts, figure skaters, wrestlers, distance runners and other endurance athletes (Smith, 1984).

Thus in retrospect it seems justifiable to suggest that the distinct sports selected for this study did not differ significantly in their Anthropometric measurements and Body Composition.

CONCLUSION

In conclusion, the study clearly point out that many people who exercised extensively at a commercial gym took dietary supplements. A wide variety of vitamin and mineral supplements as well as other herbs and botanicals were chosen. At the time of this study 48% of the participants reported taking supplement and 17 additional subjects did not realize that they were doing so. Age of the respondent influenced the choice of supplement and the reason for taking supplements. Participants also chose different supplements, depending on their main reason for exercising. Health professionals were least frequently consulted for supplement information. Gyms, such as the one included in this study, may well need to have qualified health professionals such as nutritionists available to members. These professionals can provide accurate information about supplements and assist members to be aware of both positive as well as adverse health effects of dietary supplements.

Pre-test and post-test have significantly higher score in Total Leg Length, Total Arm Length and Standing Height as compared to pre-test .In case of Calf Girth, Thigh Girth, Chest Girth, Upper Arm Girth, Hand Girth, Sitting Height, Body Weight, Percent Body Fat and Lean Body Mass, there were significant differences between pre-test and post-test of the gym users.

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