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Consumption pattern of protein supplements among gym goers

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Abstract
Dietary supplements use continues to increase in many countries. They are often used without a full understanding of the potential benefits and risks associated with their use, and without consultation with a healthcare professional. Active persons ingest protein supplements primarily to promote muscle strength, function, and possibly size. This study aimed to explore health beliefs and patterns of dietary Supplement usage among gym goers and fitness freaks. Urban population in India in general and youth among them in particular have become more health conscious. India where more than 65% of population is below the age of 35 years makes a lucrative market for the business of health related products. A big dietary supplement market which consists of local and imported dietary supplements is one such business. These supplements are used by adolescents primarily for enhancing their physical appearance. This research study attempts to get an insight into the use of dietary supplements among gym goers.

Keywords: Protein supplements, gym, gym goers, muscle gain

1. Introduction
Nutritional strategies of overfeeding, ingesting carbohydrate/protein before and after exercise, and dietary supplementation of various nutrients [e.g. protein, glutamine, branched-chain amino acid, creatine, leucine, beta-hydroxy beta-methyl-butyrate (beta-HMB), chromium, vanadyl sulfate, boron, prasterone Rahimi, M. H., Shab-Bidar, S., Mollahosseini, M., & Djafarian, K. (2017) [1]. dehydroepiandrosterone [DHEA]) and and rostenedione] have been claimed to promote gains in fat-free mass during resistance training. Most studies indicate that chromium, vanadyl sulfate and boron supplementation do not affect muscle growth. However, there is evidence that ingesting carbohydrate/protein prior to exercise may reduce catabolism during exercise and that ingesting carbohydrate/protein following resistance-exercise may promote a more anabolic hormonal profile. Also, glutamine, creatine, leucine, and calcium beta- HMB may affect protein synthesis. Creatine and calcium beta-HMB supplementation during resistance training have been reported to increase fat-free mass in athletic and nonathletic populations. Prasterone supplementation has been reported to increase testosterone and fat-free mass in nontrained populations. However, results are true, studies have yet to be conducted on athletes, and prasterone is considered as a banned substance by some athletic organizations. Although nutritional supplements claimed to increase muscle mass are widely available at health food stores, gyms, by mail order, and over the Internet, many of these supplements have little or no data to support their claims. This article reviews the theory and research behind popular nutritional supplements commonly marketed as muscle mass builders. These includes the minerals chromium, vanadyl sulfate, and boron, the steroid hormone dehydroepiandrosterone (DHEA), beta-methyl-hydroxy-beta-methylbutyrate (HMB), creatine, protein supplements, and amino acids. Research has shown that chromium vanadyl sulfate, and boron do not appear to be effective in increasing lean body mass. The few studies examining DHEA have not supported the claim of increased muscle gain. Preliminary work on HMB supports an anti catabolic effect, but only one human study is currently available. Many studies reported increased body mass and several have reported increased lean body mass following creatine ingestion. This weight gain is most likely water retention in muscle but could also be due to some new muscle protein. Although athletes have a greater protein requirement than sedentary individuals, this is easily obtained through the diet and the use of protein supplements is not much needed. Studies on amino acids have not supported their claim to increase growth hormone or insulin secretion. Nutritional supplements can be marketed without FDA approval of safety or effectiveness.

Athletes who choose to ingest these supplements should be concerned with unsubstantiated claims, questionable quality control, and safety of long-term use.

Supplement use was surveyed in a convenience sample of persons who exercised regularly at a gym. Participants, age at least 18 y, completed different questionnaires. A majority (84.7%) took supplements. Many consumed multivitamin/minerals (MVM; 45%), protein shakes/bars (PRO; 42.3%), vitamin C (34.7%), and vitamin E (VE; 23.4%) at least 5 times per week. Other dietary supplements were used less frequently or by fewer participants. Ephedra was consumed by 28% at least once per week. Choices and reasons for dietary supplement use varied with age of the participant. Most of the oldest consumed MVM or VE, while those 45 y or younger chose PRO. Those younger than 30 consumed creatine more frequently. The oldest participants took supplements to prevent future illness, while others took supplements to build muscle. The reason for committing to an exercise program influenced supplement use. Bodybuilders more frequently consumed PRO, creatine, and ephedra compared to those exercising for health reasons. Beta-hydroxy beta-methylbutyrate (HMB), a metabolite of the essential amino acid leucine, is one of the latest dietary supplements promoted to enhance gains in strength and lean body mass associated with resistance training. Unlike anabolic hormones that induce muscle hypertrophy by increasing muscle protein synthesis, HMB is claimed to influence strength and lean body mass by acting as an anti catabolic agent that minimizes protein breakdown and damage to cells that may occur with intense exercise. Research on HMB has recently tested this hypothesis, under the assumption that it may be the active compound associated with the anti catabolic effects of leucine and its metabolites. There is support for the claims that HMB supplementation, at least in young, previously untrained individuals. A mechanism by which this may occur is unknown, but research suggests that there may be a reduction in skeletal muscle damage, although this has not been assessed directly. The response of resistance trained and older individuals to HMB administration is not much clear. Of the literature reviewed relating to HMB administration during resistance training, only 2 papers are full manuscripts appearing in peer reviewed journals. The remaining 8 papers are published as abstracts only, making it difficult to critically review the research. There is clearly a need for more tightly controlled, longer duration studies to verify if HMB enhances strength and muscular hypertrophy development associated with resistance training across a range of groups, including resistance trained individuals. The purpose of this study was to quantify which dietary supplements augment lean mass and strength gains during resistance training. Peer-reviewed studies between the years 1967 and 2001 were included in the analysis if they met a predetermined set of experimental criteria, among which were at least 3-wk duration and resistance-training 2 or more times a week. Lean mass and strength were normalized for meta-analysis by conversion to percent change per week and by calculating the effect size for each variable. Of the 250 supplements examined, only 6 had more than 2 studies that met the criteria for inclusion in the meta-analysis. Creatine and beta-hydroxy-beta- methylbutyrate (HMB) were found to significantly increase net lean mass gains of 0.36 and 0.28%/wk and strength gains of 1.09 and 1.40%/wk ($P<$ 0.05), respectively. Chromium, dehydroepiandrosterone, and androstenedione, and protein did not significantly affect lean gain or strength. In conclusion, two supplements, creatine and HMB, have data supporting their use to augment lean mass and strength gains with resistance training. We investigated whether creatine (CR) and beta-hydroxy-beta-methylbutyrate (HMB) act by similar or different mechanisms to increase lean body mass (LBM) and strength in humans undergoing progressive resistance-exercise training**.**

2. Materials and Methods

2.1 Participants

Surveys were conducted from a representative number of commercial gyms located in Ludhiana, India. The gyms were identified using the closed envelope method and then randomly selected. More than one gym was selected for this location. The survey was administered to people attending strength, team or aerobic activities within the selected gym (Weightlifting, functional fitness, indoor cycling, calisthenics, Step Aerobics and other indoor gym activities). To reduce heterogeneity of the sample, people attending outdoor aerobic activities were excluded. Based on such inclusion/exclusion criteria a total number of 399 participants (males and females, age 18-50 years old, weight and height on the random were selected.

2.2 Questionnaire procedure

In order to evaluate the frequency of dietary supplement consumption and weekly food intake a questionnaire was adopted. Common and commercial names were used to describe and define the foods and the nutritional supplements included within the definition of supplement: product intended to supplement the diet and that contains one or more dietary ingredients. The completion of the questionnaire was considered as consent to participate in the study. The questionnaire was prepared as a Google form and a hard copy of that. The questionnaire was administered by the same investigator, for each geographical area, using the face-to-face interview method in order to reduce bias from a self-administered questionnaire.

2.3 Type of supplement consumption, type and frequency of physical activity, source of information

The weekly supplement and food intake, the type and frequency of physical activity and the source where the participants obtained orientation on supplement use were asked in the questionnaire. The frequency of supplement taken was on the basis of 2 times, 3 times and 1 time a day. The type of practised activity within: gym activity, team activities, indoor aerobic activities, the combination of gym and aerobic activities and “other” were asked. Concomitantly, weekly training frequency was reported. If a participant reported the use of protein supplements a question regarding the source of information was asked. The possible answers as source of information were: The coach, myself, internet, a physician, a nutritionist, a friend or other.

2.4 Statistical analysis

Data analysis was performed using the SPSS software for frequency distribution and descriptive analysis. Frequency distribution of food consumption, protein users, type of physical activity and source of information were performed. A D’Agostino-Pearson Test was used to test for normality of distributions. Differences were assessed by a one-way

ANOVA to compare replicate means by row for parameters. Pearson partial correlations were used to evaluate any association between protein consumption and the demographic characteristics of the sample. A logistic regression model was created to understand the associations between protein consumption and other variables related to protein consumption.

3. Result and Discussion

Descriptive characteristics of the sample are described in Table 1. Characteristics of protein and non-protein users for the three geographical regions are described in Table 2.

Table 1: Descriptive characteristics of the samples

Factor	Total	Male	Female
Age	34.3 ± 9.216	34.1 ± 10.3	30.8 ± 10.2
Height	175.2 ± 8.45	176.7 ± 7.8	165.6 ± 5.8
Weight	84.35 ± 14.441	86.7 ± 11.9	68.2 ± 7.5
Gender	399	295	104
Weekly exercise	3.67 ± 0.87	3.68 ± 0.87	3.61 ± 0.87

Values are expressed as mean ± st. Dev

Table 2: Descriptive characteristics of the protein and non-protein users

	Users (%)	Non-users (%)
Total	246	153
Male	198	97
Female	48	56

The results of the present study confirm that males use protein supplements more than females and that the geographical area and the level of education are not determining factors for the use of protein supplements. Results also highlight the importance of the fitness trainer as the main person suggesting the use of protein supplements. Given the current evidence of protein over-supplementation in recreational gym users this demonstrates the need for coaches to be adequately trained in order to provide accurate nutritional advice. A higher training frequency and a diet richer in protein foods are factors responsible for increasing the odds of resistance trainers being protein supplement users notwithstanding that this population does not have such a nutritional need. A limitation to the present study was the administration of the questionnaire. Even though the researchers applied the face-to-face method as well as online method it is not possible to know exactly how many people responded correctly or provided inaccurate information (Acquiescence bias). However, the results provided seem to be in line with those of other studies. Another drawback was the limited number of female participants compared to the male population analyzed. Notwithstanding the results have been analyzed through percentages in order to normalize the findings, it will be necessary to increase the sampled population to effectively estimate the consumption of protein supplements in females.

4. Conclusion

Supplement use is widespread in sport, even though most supplements used are probably ineffective. Athletes who take supplements should only do so after carrying out a careful cost–benefit analysis. Although these supplements are mostly benign, this is not always the case. Routine iron supplementation, for example, can do more harm than good, and the risk of iron toxicity is very real. Athletes are therefore cautioned against the indiscriminate use of dietary supplements. Supplement use can have a role when food intake or food choice is restricted, or as a short-term remedy where a deficiency syndrome has been shown to exist. Supplement use does not compensate for poor food choices. For a few supplements, the balance of evidence supports a beneficial effect on some types of performance; these supplements include creatine, caffeine and bicarbonate. There is no evidence that androstenedione and similar prohormones are anabolic agents, and these supplements may pose serious health risks. The risk of a positive drugs test resulting from the use of sports supplements contaminated with prohibited compounds is also very real. The evidence for a performance benefit must be very strong to outweigh the well-established risks. Protein supplements are indispensable for the maintenance of life under normal and pathological conditions. Genetic expression modifications induced by increasing supply of EAA suggest beneficial effects of chronically modifying the ratio with non-essential AAs. Therefore, supplementing diet with EAA is an efficient method to increase efficiency of nitrogen supply and maintain integrity of the largest reservoir of amino acids, skeletal muscles, while optimizing urea synthesis. It is widely believed that intake of protein can lead to better and faster gain of muscle, especially among bodybuilders. Not many studies have found correlation between increased protein intake and better performance at the gym or in sports. Although the pros and cons of protein supplementation is a widely debated topic, not many studies have been conducted regarding the same. The few studies that exist either provide insufficient evidence or have not employed proper conditions for the conduct of the tests, as many of the studies have small sample numbers and lack of dietary control. However, it should be considered that protein supplements are processed materials and often do not contain other essential nutrients required for the sustenance of a healthy lifestyle. It is suggested that the required protein intake should be obtained from natural food sources, and protein supplementation should be resorted to only if sufficient protein is not available in the normal diets.

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