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ORIGINAL STUDY

Comparative Study on Nutrition Knowledge and Consumption of Dietary Supplements Among Athletes and Fitness Practitioners

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Abstract

Background: **The use of dietary supplements, in the form of protein powders, branched chain amino-aids, multi-vitamins and minerals is widespread in the field of nutrition, fitness and aesthetics to boost nutrition levels, enhance athletic performance or assist in weight loss. The present survey was carried out to study the nutritional knowledge and consumption of dietary supplements among athletes and gym-goers.**

Methodology: **A cross-sectional study was conducted among athletes and gym-goers (n = 100) selected from various gym and stadium in the city of Mysore using semi-structured pre-tested questionnaire.**

Results: **The knowledge and consumption of dietary supplements was higher among gym-goers when compared to that of athletes. Majority (52%) of the gym-goers consumed supplements which included Whey protein in powder form (80%) from past one year. The side effects of supplement consumption was observed among 9.5% athletes.**

Conclusion: **The use of supplements among gym goers was very high which can further lead to health illness eventually. Therefore, this study recommends that users should be sensitized on the importance, protective measures and side effects of using excess nutritional supplements without the consultations of nutritionists/dietetians.**

Keywords: Nutritional supplements, Consumption, Athletes, Gym-goers, Whey protein

1. Introduction

Balanced diet, active exercise programs and adequate recovery period are essential for athletes and gym-goers to improve performance and physical appearance. The most important component of successful sports training and performance is to ensure adequate calorie intake to support energy expenditure and maintain strength, endurance, muscle mass, and overall health. Many athletes believe supplements are an essential component for sports success and it has been estimated that the majority of elite athletes are using some form of performance-enhancing agent [2].

In 1994, Dietary Supplement Health and Education Act (DSHEA) placed dietary supplements in a special category of "foods" and also signed DSHEA into a law which defined "dietary supplement" as a product taken by mouth that contains a "dietary ingredient" intended to supplement the diet [4]. Dietary supplements are made up of protein, amino acids, vitamins and minerals in different amounts and combinations, available in different forms, such as powders, capsules, tablets, and liquids.

Supplements are known to maintain good health by providing the required intake of specific nutrients including macro and micronutrients, which are difficult to achieve through the dietary intake alone. Widespread use of supplements are prevalent in general population and with specific focus on athletes and gym-goers to achieve peak performance, muscle building and physical appearance has popularized the supplement consumption as reported by many research studies. Supplements such as vitamins, minerals, protein, creatine, and various

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"ergogenic" compounds are widely used by athletes and gym-goers, without the consultation of dietician or expert and not understanding the potential benefits and risks associated with their consumption [3]. Hence, a survey was conducted to assess the knowledge and consumption of supplements among athletes and gym-goers.

2. Materials and methods

2.1. Materials

A semi-structured questionnaire was developed to elicit information on general characteristics, anthropometric measurements, dietary habits, training regime, and knowledge and consumption of dietary supplements.

2.2. Methods

2.2.1. Selection of the subjects

A cross-sectional study was conducted among hundred participants (athletes and gym goers, n = 50 each), from Gym's and Stadiums situated in Mysore city. The athletes and gym goers both men and women of age group 18–25 years, and those willing to participate were included.

2.2.2. Development of tool

A pilot study was conducted to develop questionnaire and pre tested for its adaptability using sample size of n = 10. The standardized questionnaire was used to obtain information from the participants.

2.2.3. Demographic data of the subjects

Demographic characteristics such as age and gender was collected as a part of survey.

2.2.4. Training regime

Training regime included type of activity/exercise performed and training schedule. Current activity was recorded to know their physical activity level.

2.2.5. Consumption of supplements

Information on knowledge, consumption, type, form, duration, benefits and side effects of supplement consumption was also recorded.

2.2.6. Endurance test

Participants were subjected to endurance test by asking them to perform push-ups for 60 s. Number of push-ups an individual can perform in 60 s was recorded and the score was compared with the standard to know the endurance level [13] (Table 1).

Table 1. Scoring system for endurance test (No. of push ups).

	Males	Females
Poor	Less than 10	Less than 7
Fair	15	12
Good	20	15
Very good	25	18
Excellent	30	21

Source: Nutrition and Dietetics (With Indian Case Studies).

3. Results and discussion

The age distribution of the athletes and gym-goers selected for the study is presented in Table 2. In the present study, subjects belonged to the age group of 18–25 years old were included to collect the data. More number of gym-goers (14) were in the age of 23 years old, whereas, athletes (12) were of 21 years age.

The gender distribution among participants shows that number of female athletes (46%) is lower than male athletes (54%) and there is no female gym-goers among the participants selected for study (Table 3). As reported by European Union on Gender Equality and Participation in Sport states that men tend to practise sports or other physical activities more often than women. [31].

The types of exercise performed as reported in Table 4 included running (92%), aerobics (18%), strength training (64%), free weights (42%), yoga

Table 2. Age distribution of subjects.

Age (years)	Athletes (n = 50)	Gym-goers (n = 50)
	%	%
18–21	76	28
22–25	24	72

Table 3. Gender distribution of subjects.

Gender	Athletes (n = 50)	Gym-goers (n = 50)
	%	%
Male	54	100
Female	46	–

Table 4. Type of activity/exercise performed among subjects.

Type of activity/exercise	Athletes (n = 50)	Gym-goers (n = 50)
Running	92	82
Aerobics	18	–
Strength Training	64	84
Free weights	42	54
Yoga	20	04
Swimming	38	–
Sports or Other Activity	50	–

Note: More than 1 response.

(20%), swimming (38%) and other sports (50%) as reported to be engaged by athletes. Gym-goers reported to be engaged in running (82%), strength training (84%), free weights (54%), and yoga (4%). According to a study conducted by [7]; the highest percentage of exercisers mainly performed strength training (65.4%) and treadmill (63.5%) in gyms.

The knowledge and consumption of supplements by the participants is represented in Fig. 1. More number of the gym-goers (92%) were aware of supplements when compared with athletes (82%) and the rate of consumption of supplement was found to be high in gym-goers (48%) than athletes (58%). Whey protein was consumed at higher rate [(gym goers (65.3%) and athletes (47.6%)] followed by BCAA and creatine monohydrate among the consumers who were consuming supplements (Fig. 2). Of those participants using supplements stated that supplements had the benefit of boosting of energy (47.6% and 30.7%), performance enhancement (28.5% and 34.6%), strength enhancement (28.5% and 34.6%) and enhanced physical appearance (19% and 50%) respectively by athletes and gym-goers (Fig. 3). Around 9% of those athletes consuming supplements experienced side effects like hair loss, mood swings, irritability and acne. Majority of the athletes (71%) and gym-goers (80%) had been taking supplements for a year and majorly in the form of powder (85.7% of athletes and 88.4% of gym-goers) (Fig. 4).

Present study showed that more number of gym-goers consumed supplements when compared with athletes, which was in line with findings of a study carried out in Brazil, who found that intake of supplement was high (36.8%) among people exercising in gyms, was usually self-prescribed, and the supplements consumed were rich in proteins and amino acids (58%). Further, [9]; reported that almost half (46.4%) of the respondents used food supplements for sport, which was on par with the present results of the study. The study also found that food supplement users were most frequently ($p < 0.05$) male (61.9%), young (48.9%) between 20 and 30 years old) and had been using supplements for more than a year (4.1%).

A Canadian study of 440 elite male and female athletes (87%) used supplements regularly (Lun et al., 2012), while another Canadian study revealed that 98% of young athletes aged 11–25 years used supplements either regularly or intermittently [5].

In the current study, consumption of whey protein was high among gym-goers compare to athletes [6]. found that proteins (21.4%) as the most type of dietary supplements consumed, followed by vitamins (14.0 %) and stated that relationship between supplement type and gender existed as males used protein supplement and females consumed vitamins and minerals. Weins et al., (2014) also found that male gym members tend to consume protein powders. The results of the study by Mazilli et al., (2021), found that whey protein (59.2%), vitamin integrators (43.4%) and BCAA's (39.2%) as the three most widely used supplements by fitness practitioners, which was similar to the present study.

Espinosa et al., (2018) reported that the main reasons for the consumption of nutritional supplements was to gain muscle mass (31.6%), improve recovery (21.1%) and lower body fat (14.3%) both in men and women. A study suggested that 4-day supplementation of Whey protein hydrolysate was beneficial in reducing symptoms of exercise induced muscle damage and improving recovery of muscle

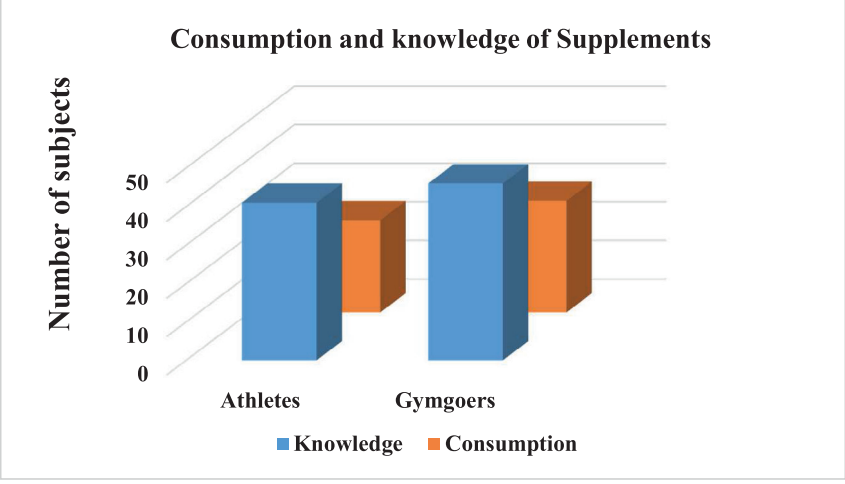

Fig. 1. Consumption and knowledge of supplements among subjects.

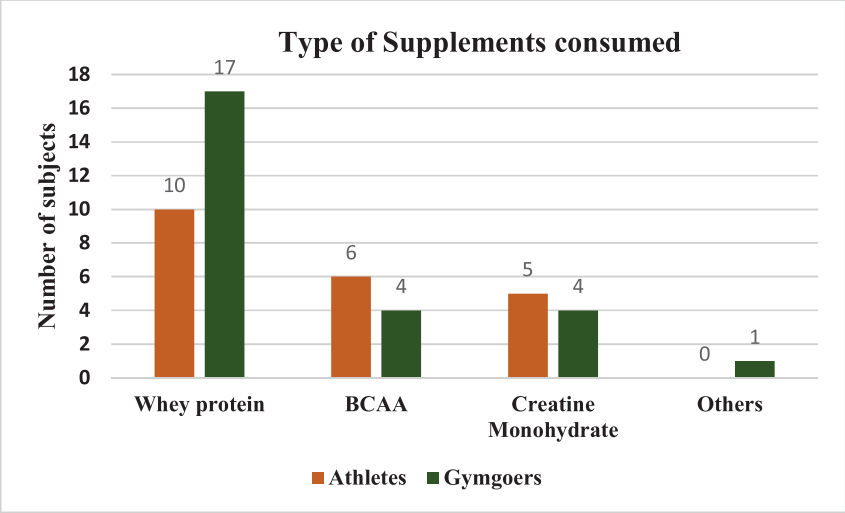

Fig. 2. Type of supplement consumed among subjects.

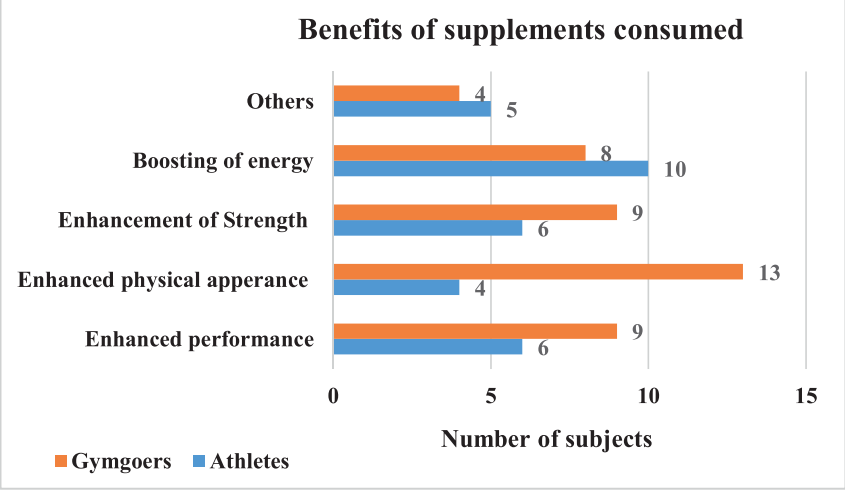

Fig. 3. Benefits after consumption of supplement among subjects.

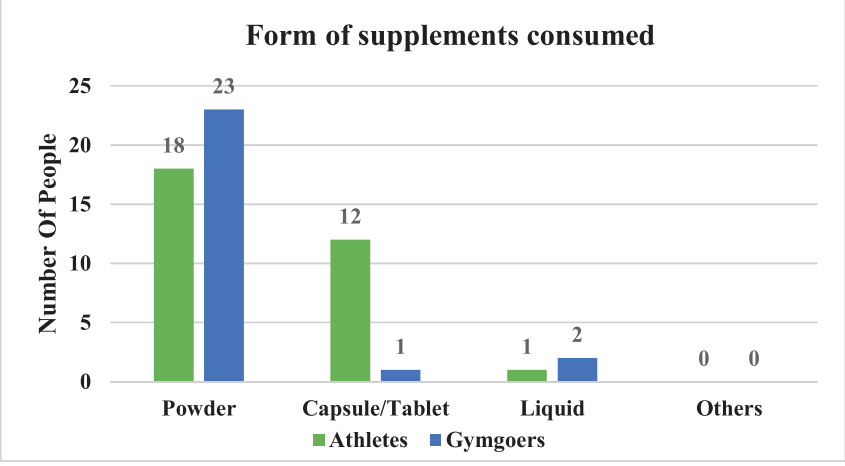

Fig. 4. Form of supplement consumed among subjects.

Table 5. Usage of supplements.

	Intake		Non intake		Chi square value (χ^2)	P value
	n	%	n	%		
Athletes	21	44	29	55	1.004	0.316
Gym-goers	26	55	24	45		

Table 6. Comparison of endurance level of subjects.

	Endurance		Independent two sample test
	Mean	SD	
Athletes	36.16	8.68	$1.6747 \times 10^{-7} = <0.001$ *
Gym-goers	28.12	5.13	

*p < 0.005 – Statistically significant.

function in physically active females [1]. Increasing strength and resistance, gaining muscle mass, accelerating recovery and improving the performance were the reasons quoted for consuming supplements [8,10,11].

Dietary supplements are available in various forms in the market with various composition such as powder, ready-to-drink liquid, gel, tablet, and bar, can be used in pre, during and post exercises to aid in the performance and recovery [12]. In the present study, powder form was most used by athletes and gym-goers because of easy storage and usage.

The Table 5 shows that the Gym-goers had higher intake of supplements than athletes, no significant ($p > 0.05$) difference was observed.

The most important test of physical fitness is endurance. Endurance is the ability to sustain a specific activity for a prolonged period. Endurance is the body's ability to withstand stress for an extended period of time: the shorter the time, the less endurance; the longer the time, the more endurance. The number of times a person can repeat a movement is used as a factor for measuring endurance. Push-ups, pull-ups (chin-ups), dips on parallel bars, sit-ups, and squat jumps are used to

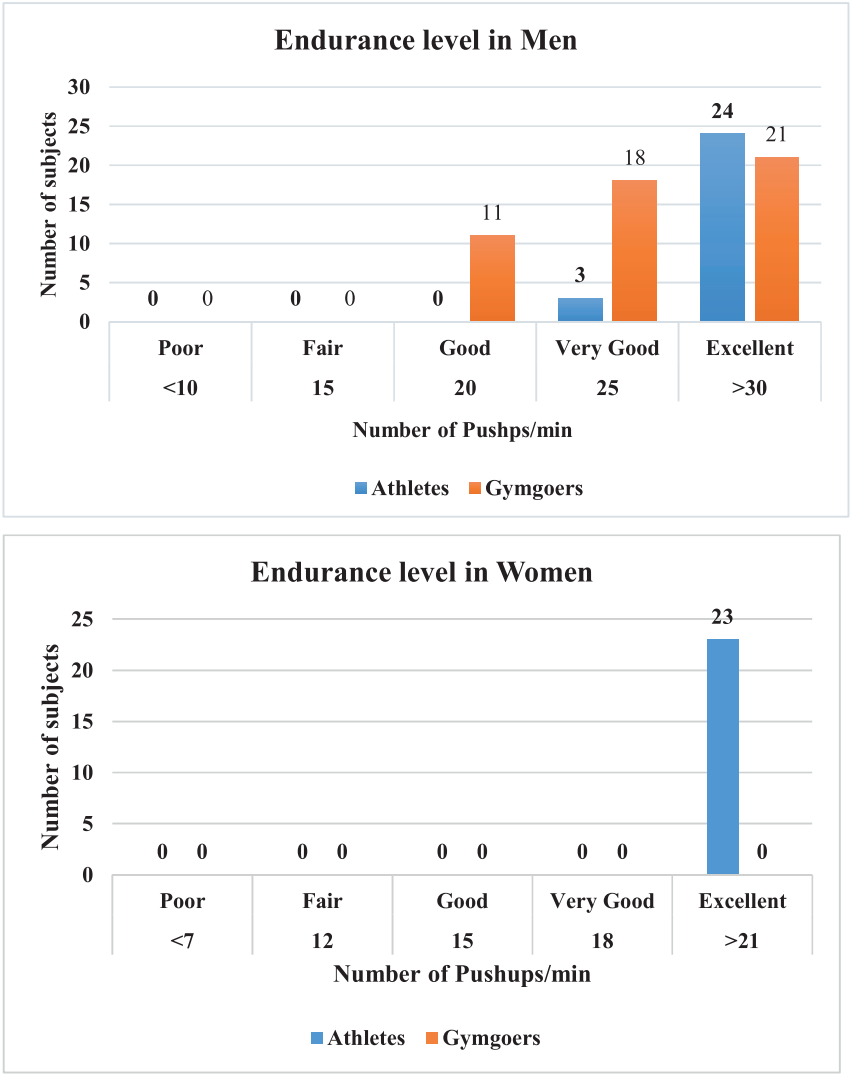

Fig. 5. Endurance level of subjects.

measure endurance. Strength of the body and type of movement determines the score [13].

Female athletes had excellent endurance level (>21/min). The endurance level among 88% and 11% male athletes was found to be excellent and very good respectively. While 42% of gym-goers had excellent endurance level, 36% had very good endurance level and 22% had good endurance level (Fig. 5).

When endurance level was compared among the groups significant ($p < 0.05$) difference was observed between athletes and gym goers (Table 6). Endurance exercises are an important part of fitness and participation in endurance has increased. Few dietary supplements in the fitness world have shown to benefit endurance by reducing the cost of oxygen and improving the time for exhaustion, thus enhancing the cardiorespiratory performance at anaerobic threshold, and even VO2max [14].

4. Conclusion

Consumption of supplements is prevalent among youths especially those in the fitness and sports industry to aid in muscle building, improve physical appearance and performance. Present study concluded that gym-goers had higher rate of consumption compared to athletes. Gym-goers and athletes emphasis on the consumption of dietary supplements available in the market. Protein powders, BCAA supplements, and creatine monohydrate were the major supplements consumed in powder form the most. Majority of the consumers have reported to benefit from the supplement consumption.

Endurance is an important aspect of fitness industry, especially athletes for better performance and success in the field. Athletes in the present study had better endurance level when compared to gym-goers because of high activity level and the training they undergo. Further, studies need to be carried out to analyse the relationship between supplement consumption, physical activity and endurance level.

Conflict of interest

The authors declare there is no conflict of interest.

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