



Prevalence and Patterns of Sport Supplements Use among Gym Attendants and Competitive Athletes in North Cyprus

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aims: The purpose of this study was to analyze and compare the prevalence, motivation for use, information and purchase sources of supplements among male competitive team sports athletes and recreational gym users in North Cyprus.

Study Design: The sample size was calculated based on the total population size according to the reports obtained from the gyms and the records of the related federations (soccer, basketball, volleyball) of TRNC. For a confidence level of 95 % and a confidence interval of 2.5 %; the required sample size was calculated as 804. The study covered more participants to ensure the statistical power to remain over 80 %. Calculations were performed with G*Power (for Mac Version 3.1.9.3).

Place and Duration of Study: 8 gyms located in 6 different districts in Northern Cyprus between June 2020 and July 2020.

Methodology: A structured questionnaire measuring prevalence and patterns of supplements was administered to 902 participants (329 gym attendants, 562 team sports athletes, 18-40 years old, men). Statistical differences between sex, age group and sports participation were done by using a Chi-square analysis. Differences were considered significant at a p-value <0.05.

Results: Overall, 54% of all subjects reported use of dietary supplements, showing a significantly higher percentage among gym attendants (62%) compared to team sport athletes (50%). The most popular dietary supplement among all subjects was protein (46.9%), followed by amino acids

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(22.6%), multivitamins (20.7%) and creatine (18.8%). Overall, the most important reasons for using supplements were increasing strength (52%), increasing energy (37.6%), insufficient nutrition (32.4%) and increase durability (32.4%). Trainers were the most common source of information for both groups and overall (33.5%), followed by gym friends for the gym attendants and pharmacies for the team sport athletes (30.2%).

Conclusion: The prevalence was higher among the gym attendants compared to competitive athletes. This finding is in conflict with the related literature. It might be explained by the low level of competition and athletic performance in North Cyprus. The most popular source of information was trainers in our study and these findings were in compliance with the related literature.

Keywords: Nutritional supplements; gym user; motivation; attitude.

1. INTRODUCTION

The US Food and Drug Administration (FDA) defined a dietary supplement as: "a product intended for ingestion that contains a 'dietary ingredient' intended to add further nutritional value to (supplement) the diet" [1]. The use of dietary supplements has rapidly increased all over the world over recent decades. It is estimated that the supplement market will reach USD 300 billion by [2].

Although the role of supplements on athletic performance is very small compared to genetics, training, talent, nutrition etc., athletes at all levels of competition commonly use supplements.

In competitive sports opponents are generally evenly-matched to keep the competition as fair as possible. In this case the smallest advantage can be determinant of the result. That is why the athletes are willing to use any chance to get an advantage over their rivals [3]. In addition to the special diets arranged according to the specific needs of the individual sport [4] athletes commonly use dietary supplements with different reasons [3,5].

Considering the factors for using supplements for general population are also valid for the athletes, higher prevalence of supplement use among athletes can be predictable [5,6]. Despite of the fact that the prevalence of the use of supplements in elite athletes is higher than the general population according to studies [3] their part in this enormous industry is still very small compared to fitness enthusiasts [7]. For each competitive athlete there are thousands of recreational athletes as potential customers.

It was shown that supplement use prevalence increases with age, higher training volume and performance levels and in athletes compared to non-athletes [3,5].

Gyms are one of the places that the highest amount of supplement use can be seen [8]. Many gym users are willing to use supplements to have bigger muscles quickly, even without the advice of health professionals [9].

Although supplement use by athletes was widely studied [5,10], data on recreational athletes is very limited [9]. Since the existing data shows that the prevalence of supplement use of recreational gym users might be affected by country [6,11], it is important to plan country specific studies [9].

Studies from wide variety of countries among different athletic populations have shown different prevalence of use [5]. Results of existing literature is suggesting a variability in the use of supplements according to countries and athletic populations [6,9].

In the light of this information, the aim of this study was to analyze and compare the prevalence, motivation for use, information and purchase sources of supplements among male competitive team sports athletes and recreational gym users in North Cyprus.

2. MATERIALS AND METHODS

2.1 Sample

We conducted a self-administered questionnaire survey to a total of 902 participants. We separated to participants to 2 groups. The first group was 329 'male gym attendants' from 8 gyms located in 6 different districts in Northern Cyprus. The second group was 573 'male competitive team athletes. 417 soccer players from 32 teams in the Super and 1st league, 106 basketball players from major league and 50 volleyball players from super league teams. The sample size was calculated based on the total

population size according to the reports obtained from the gyms and the records of the related federation of TRNC. For a confidence level of 95 % and a confidence interval of 2.5 %; the required sample size was calculated as 804. The study covered more participants to ensure the statistical power to remain over 80 %. Calculations were performed with G*Power (for Mac Version 3.1.9.3).

The sample size was calculated as described in the manuscript. Selection of the individuals and establishing the randomness in both were ensured by appropriate sampling methodologies: for the first group of individuals (gym attendants), a two-stage clustering sampling method was applied. Firstly, 6 gyms from Northern Cyprus were randomly selected and then the gym attendants were randomly selected from each. For the second group (competitive team athletes), random sampling approach was performed. From each sports branch (soccer, basketball and volleyball), samples were randomly selected proportional to the total number of registered team athletes.

Inclusion criteria: All male gym attendants and athletes in the major league teams who accepted to join the study and who were between 18-40 years old.

Exclusion criteria: The limitation of our study is the absence of individuals under the age of 18 and over the age of 40 and women. The reason for this is that the team sport athletes we chose as the subject group are at the major league team level, and in this respect, there are very few athletes under the age of 18 and over the age of 40. In addition, there are no women's teams operating in the team sports we selected at the major league team level. Therefore, these subjects were also excluded from the gym attendant group to make the comparisons more rational.

Empty or partially completed questionnaires were excluded.

2.2 Study Survey

A questionnaire was developed based on the questionnaires used in previous studies to collect data about dietary supplements [12,13]. The questionnaire was self-administered to all the participants and answered anonymously. The questionnaire was exploring the following domains: use of dietary supplements, commonly

used dietary supplements, source of information, source of purchase and the motivations behind the use of dietary supplements. To conduct the survey in all gyms and training fields, official permissions were received from the gym and team managements.

Repeated but rephrased questions were not used to check the reliability and validity of the results. Furthermore, we do not have any questions covering why some subjects do not use dietary supplements and/or what they do to increase/maintain their performance in sports. These questions can be included in future studies.

Study was carried out in the 2019-2020 season. Study data were collected in a 1-month period between October and November 2019.

2.3 Statistical Analysis

The prevalence of dietary supplements use was reported by age group, education and sports participation. The characteristics of the participants were reported as supplements users and non-users. Statistical differences between age group, education and sports participation were done using a Chi-square analysis. Differences were considered significant at a $p < 0.05$. Throughout the text, data for all subjects were presented as mean \pm standard deviation (\pm SD), percentages and frequencies. Questionnaires with missing values were excluded from the present analysis. Statistical analysis was performed using Statistical Package for the Social Sciences 18.0 statistical software (SPSS Inc., Chicago, IL, USA).

3. RESULTS AND DISCUSSION

3.1 Results

In total, 329 gym attendants and 573 team sport athletes from 3 different branches (417 soccer, 106 basketball and 50 volleyball players) were included in the analysis, all subjects were men and in 18-40 years old age range. Average age for gym attendants was 26.8 ± 2.3 and 24.3 ± 3.1 for team sport athletes, representing no significant difference between the groups.

Overall, 54% of all subjects reported use of dietary supplements, showing a significantly higher percentage among gym attendants (62%) compared to team sport athletes (50%) ($p < 0.05$) (Fig. 1).

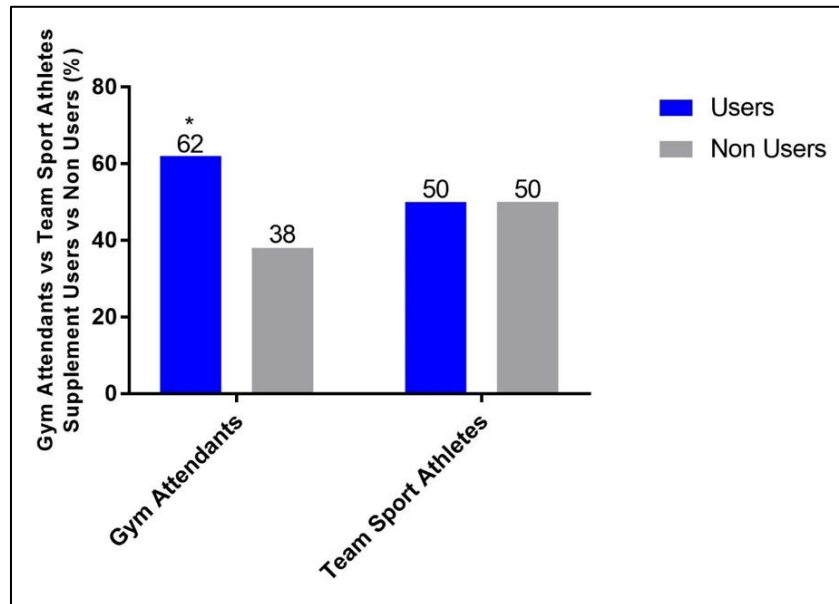


Fig. 1. Prevalence of dietary supplement use among gym attendants and team sport athletes

Table 1. Chi square comparison of dietary supplement users according to age group and education levels for supplement user gym attendants and team sport athletes

	Comparison		n (%)	p
Age Group	24 years old & Below	Fitness	93 (45.8 %)	0,012*
		Team Sports	163 (57.4 %)	
	25 years old & Above	Fitness	110 (54.2 %)	
		Team Sports	121 (42.6 %)	
Education	High School & lower	Fitness	58 (28.6 %)	0,788
		Team Sports	78 (27.5 %)	
	University & postgraduate	Fitness	145 (71.4 %)	
		Team Sports	206 (72.6 %)	

P<0.005

For supplement users, 54.2% of gym attendants were 25-40 years old and 45.8% were 18-25 years old while 42.6% of team sport athletes were 25-40 years old and 57.4% were 18-25 years old. That results showed significantly higher use of supplements in younger team sport athletes and older gym attendants ($p < 0.05$). (Table 1).

There was no significant difference for supplement use between any groups according to the education (Table 1).

The most popular dietary supplement among all subjects was protein (46.9%), followed by amino acids (22.6%), multivitamins (20.7%) and creatine (18.8%) (Fig. 2).

Protein, amino acids and creatine use were significantly higher in gym attendants compared

to team sport athletes ($p < 0.05$). There were no other significant results found for common dietary supplements between gym attendants and team sport athletes (Fig. 3).

Overall, the most important reasons for using supplements were increasing strength (52%), increasing energy (37.6%), malnutrition (32.4%) and increase durability (32.4%) (Fig. 4).

According to the groups; increasing strength was the most important reason to use supplements for gym attendants (40.7%) and it's found significantly higher compared to team sport athletes ($p < 0.05$). On the other hand, increasing energy was the most important reason for the team sport athletes (24.4%). There were no other significant results between gym attendants and team sport athletes (Fig. 5).

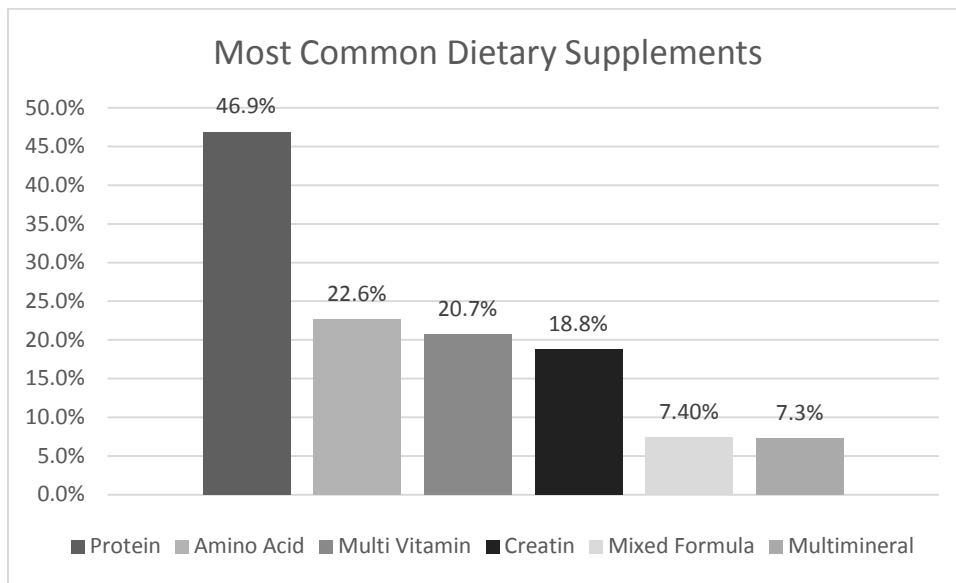


Fig. 2. Most common dietary supplements among overall gym attendants and team sport athletes

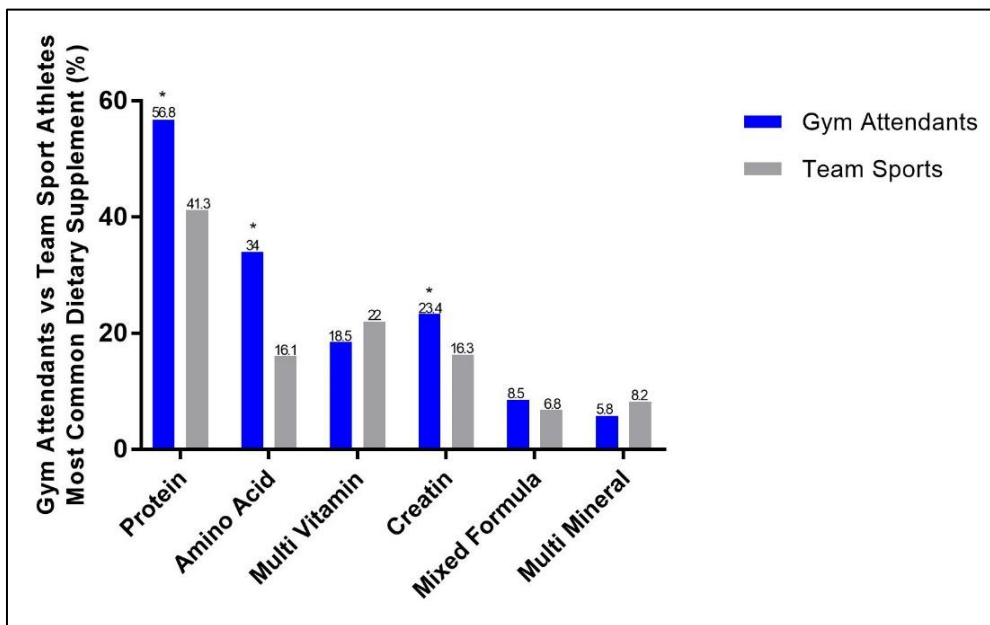


Fig. 3. Chi square comparison of most common dietary supplements between supplement user gym attendants and team sport athletes

Trainers were the most common source of information for both groups and overall, followed by gym friends for the gym attendants and pharmacies for the team sport athletes (Fig. 6).

According to the groups trainers was the most common source of information followed by co-athletes and pharmacies. Moreover, gym attendants liked to get information from co-

athletes compared to team sport athletes which was found significantly higher ($p < 0.05$) (Fig.7).

Pharmacies were the most common source of purchase for overall and both groups. This followed by supplement stores and trainers. Moreover, gym attendants tend to purchase from supplement stores compared to team sport athletes ($p < 0.05$). (Fig. 8, Fig. 9).

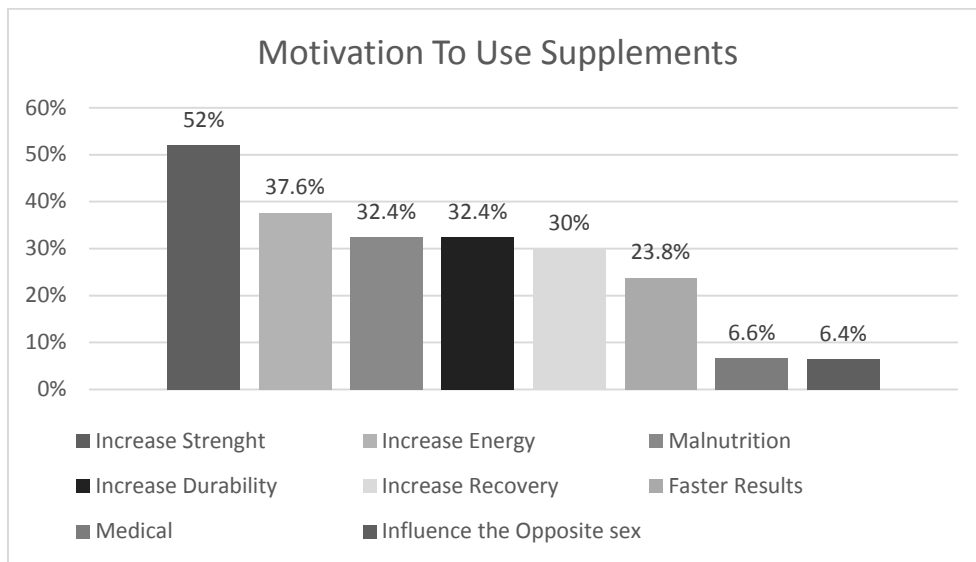


Fig. 4. Motivation behind dietary supplement use among overall gym attendants and team sport athletes

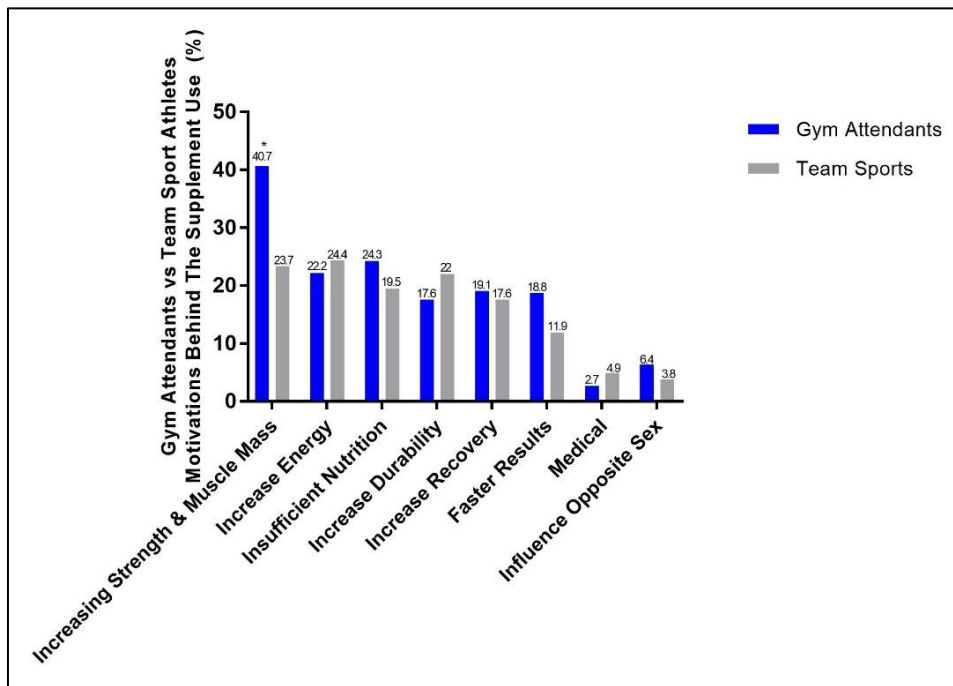


Fig. 5. Chi-square comparison of motivations behind the supplement use between supplement user gym attendants and team sport athletes

3.2 Discussion

The aim of this study was to analyze and compare the prevalence, motivation for use and information and purchase sources of supplements among male competitive team sports athletes and recreational gym users in North Cyprus.

Overall, 54% of all subjects reported use of dietary supplements, showing a significantly higher percentage among gym attendants (62%) compared to team sport athletes (50%).

The prevalence in different studies have shown variability according to countries or cultural regions, study protocols and level of the athletes

participated [5]. It might also be affected by the specific sport and training goals of the participants [14]. 100% prevalence rates were reported for competitive bodybuilders [15].

Prevalence estimates as a result of a meta-analysis suggested that supplement use in elite athletes were higher compared to non-elite counterparts with wide prevalence ranges among

studies, showing the heterogeneity of the results (5).

Braun et al. (2009) reported that the prevalence of supplement use affected by the age and performance level. Higher prevalence reported for international level athletes compared to national level [14]. There are many studies reporting similar findings in which rate, type and number of supplements increased with age and training loads [16-18].

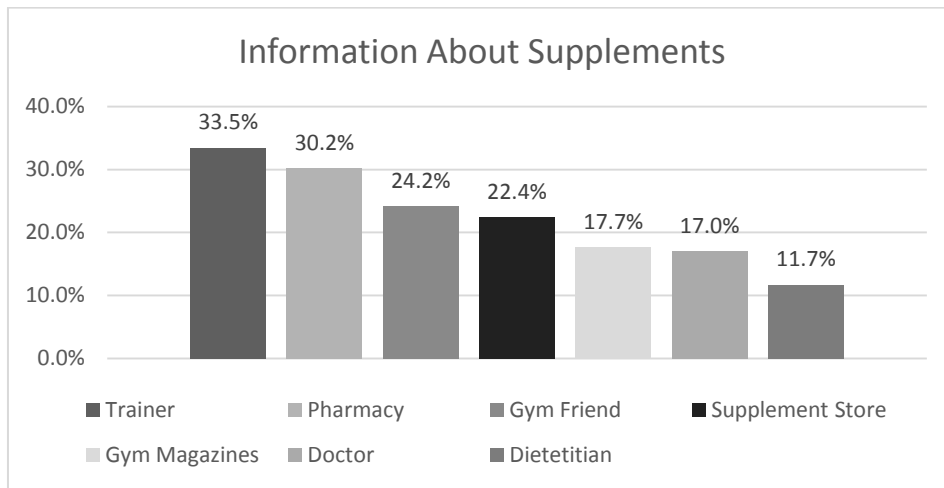


Fig. 6. Sources of information about supplements among overall gym attendants and team sport athletes

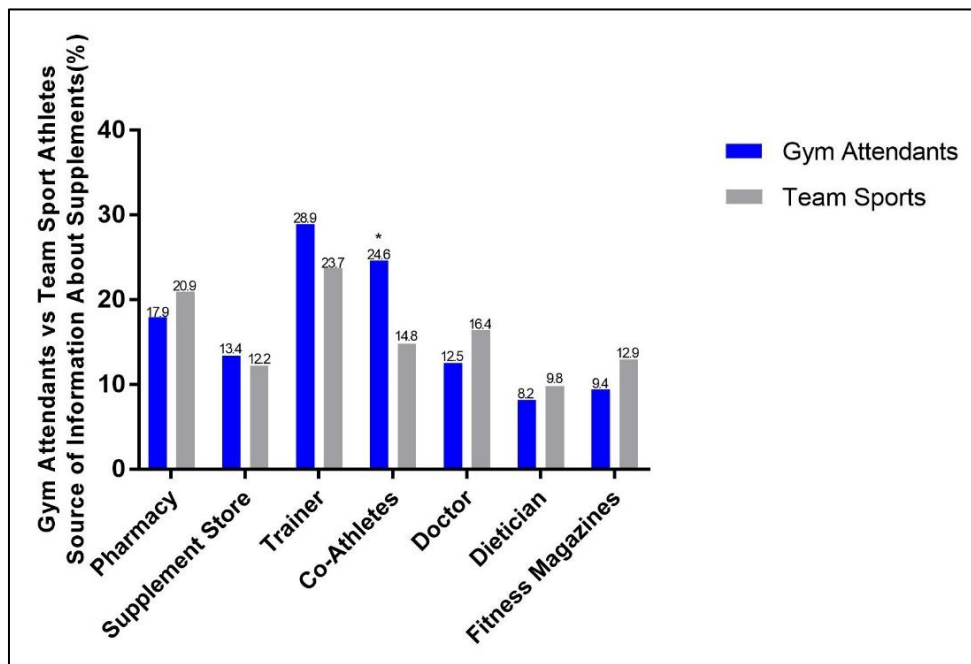


Fig. 7. Chi Square comparison of the source of information about supplements between supplement user gym attendants and team sport athletes

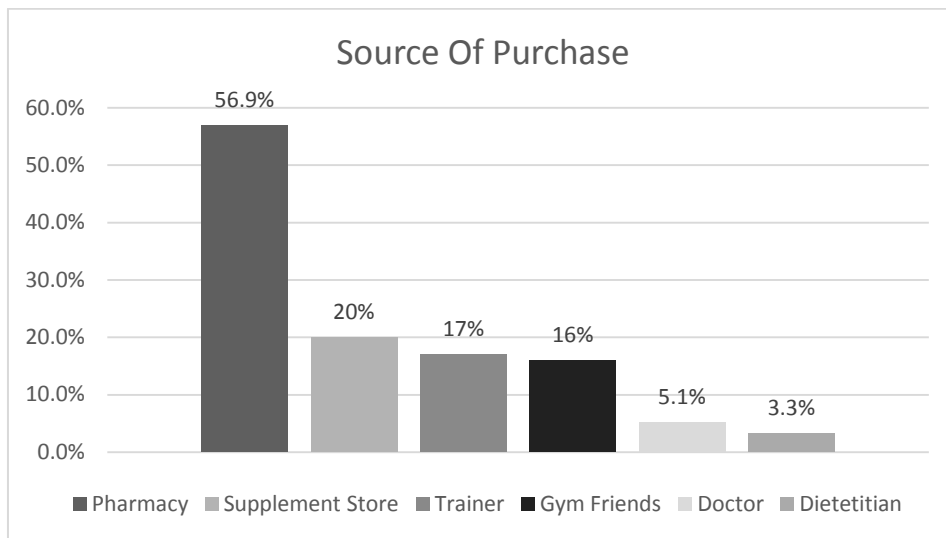


Fig. 8. Source of purchase of supplements among gym attendants and team sport athletes

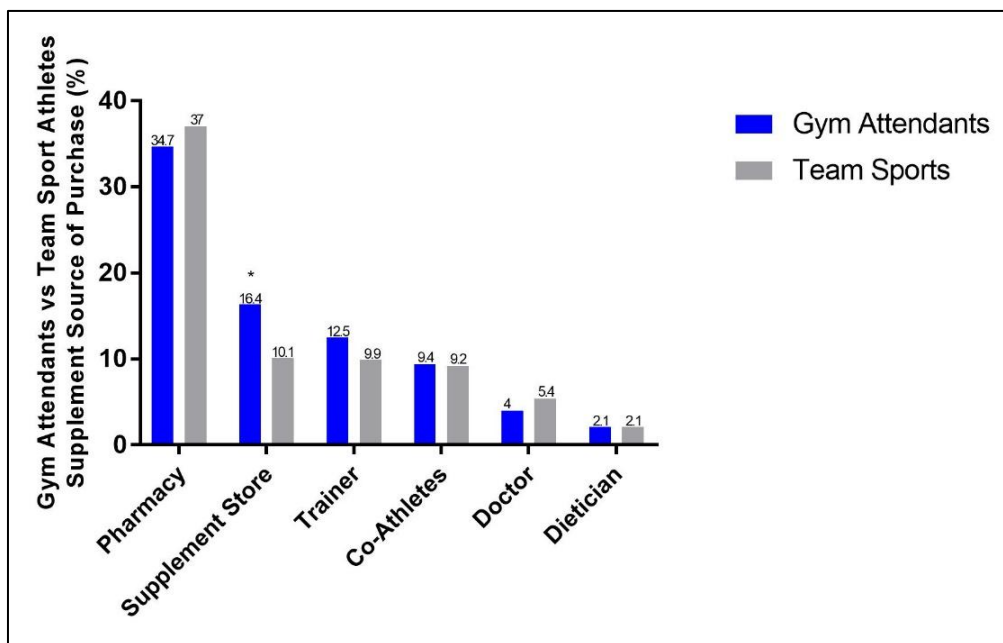


Fig. 9. Chi square comparison of the sources of purchase of supplements between gym attendants and team sport athletes

We have seen an increase in supplement use prevalence in gym users while a decrease in competitive athletes with age. Our results also showed a higher prevalence among gym users compared to competitive team sport athletes. This finding conflicts with the previous studies showing higher rate of supplement use in athletes than in regular gym members [9,19]. It might be because of the unique geo-political structure of the North Cyprus. Turkish Republic of Northern Cyprus where the study was held is a de facto country which is not known by any other

countries except for Turkey. Although there are well-structured federations for team sports, the teams are not allowed to participate to any international event or even friendly matches with teams from other countries. In this case the level of the competitions and therefore the athletes could be accepted as much weaker than the other studies participants. The expectations and the goals of the competitive athletes are diminished because of the current situation. This might be the reason of the relatively low level of

supplement use prevalence among competitive athletes compared to gym attendants.

In our study, the most popular dietary supplement among all subjects was protein (46.9%), followed by amino acids (22.6%), multivitamins (20.7%) and creatine (18.8%). These findings are in correlation with many other supplement monitoring studies [6,11, 20].

This finding can be explained by the studies showing the effect of protein intake in increasing muscle mass [21] and protein is a relatively safe and convenient supplement [22].

Protein, amino acids and creatine use were significantly higher in gym attendants compared to team sport athletes. The most popular supplement was protein for both groups but followed by amino acids and creatine in gym users, while followed by multivitamin and creatine in competitive athletes. These might be explained by the different reasons to use supplements between groups. The most common reason for using supplements was to increase strength and muscle mass in gym attendants while it was increasing energy for the competitive athletes. Competitive athletes are more focused on athletic performance rather than the muscle mass. This finding also correlates with previous studies [23].

Trainers were the most common source of information for both groups and overall, followed by other athletes for the gym attendants and pharmacies for the team sport athletes. This finding is in accordance with the related literature showing that most athletes get advices from trainers, co-athletes and friends for supplement use [24-26]. The reason behind this might be even elite athletes may not have a chance to get advice from sports nutrition professionals. It was reported that only 27% of 372 elite Finish athletes had a chance to access sport nutrition professionals [25]. This may partly explain the literature. But more interestingly it was reported that even if they have access to sport nutrition professionals, more athletes did not to use this opportunity and got advice from trainers (65%) over doctors (25%) and sports dietitians (30%) [24].

In our study pharmacies were more common source of information (30.2%) compared to doctors (17%) and dietitians (11.7%). It might be because of the fact that pharmacies are the most common source of purchase (56.9%), followed

by supplement stores (20%). Since it is easier and free of charge to get advice from the pharmacies. It might also be hard and expensive to access to doctors and dietitians who have knowledge about sport supplements.

Pharmacies and supplement stores are the two most common source of purchase for sport supplements mostly because of the legal regulations of nutritional supplements. The finding also showed that the participants bought supplements from trainers (17%) and co-athletes (16%) even if it is against the legal regulations.

4. CONCLUSION

In conclusion, our results show a high prevalence of sport supplements use among gym attendants and competitive team sports athletes in North Cyprus. The prevalence was higher among the gym attendants compared to competitive athletes. This finding is in conflict with the related literature. It might be explained by the low level of competition and athletic performance in North Cyprus which might be the result of embargo on sports over 40 years. The most popular supplement was protein while the most popular source of information was trainers in our study and these findings were in compliance with the related literature. Considering the potential risks with supplement use it is very important to be able to access and choose reliable and scientific evidence-based information about supplements.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

Informed consents were obtained from the subjects and their parents prior to the questionnaire being applied.

ETHICAL APPROVAL

The study was conducted according to the Declaration of Helsinki and approved by the Near

East University scientific researches, evaluation and ethics commission (YDÜ/57-553).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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