



Research Article

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Prevalence and Patterns of the Use of Protein Supplements Among Gym Users in Riyadh, Saudi Arabia

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ABSTRACT

Supplementary protein use in gym users is increasing worldwide. In this study, we investigated the prevalence and patterns of the use of protein supplements among Saudi gym users, comparing differences in protein supplement usage between medical students and the general population. Furthermore, we evaluated the knowledge and attitudes of the groups about the potential harms and hazards of the use of protein supplements.

This was a cross-sectional study conducted in Riyadh, Saudi Arabia over a 6-month period. Subjects were randomly recruited from large gyms in Riyadh and were stratified into medical students versus the general population attending gyms. A self-administered questionnaire about protein supplementation was administered to participants. It investigated prevalence and patterns of supplementation, and, doses, types consumed, and general knowledge about protein supplementation.

Overall, 185 participants were enrolled in the study; 39% reported using protein supplements. The prevalence of protein use did not significantly differ between medical students and the general population ($P > 0.05$). "Whey" protein was the most commonly used protein supplement among participants who used protein supplements (91% and 85% of medical students and the general population, respectively). Nine percent of medical students reported that they used more than the daily recommended dose (< 2 g/kg/day) compared to 28% of general population gym visitors ($P < 0.05$).

We determined that 39% of gym users used protein supplements; this is much higher than the prevalence rate of 20% reported in previous studies. There was no significant difference in knowledge about protein supplementation between medical students and general population gym users.

Keywords: Bodybuilding, Gym, Knowledge, Protein supplements, Questionnaire

INTRODUCTION

The use of dietary supplements has significantly increased worldwide in recent years. People use dietary supplements for various reasons: increasing the whole body fat-free mass (i.e., bodybuilding) [1], general improvement of health [2], improvement of energy and general performance [3], prevention of specific diseases [4]. Although the use of dietary supplements is more common in older individuals (> 25 years of age) [5] it is becoming more frequent among younger individuals (< 25 years of age). In an effort to improve their muscle mass and general looks, many gym users take different types of protein supplements [6-8]. Morrison et al. revealed that 84% of gym users took dietary supplements [7], proteins were the most commonly ingested supplements among gym users [9].

Protein is one of the most important nutrients; it plays a significant role in increasing muscle mass and fat loss [1, 10]. There are numerous sources of dietary protein including, regularly ingested food products such as eggs, animal meat, dairy products, and vegetables (natural protein sources), as well as protein supplements. According to a recent study, gym visitors prefer “whey” protein supplements (extracted from milk) over natural protein sources because they seem to be more effective in increasing post-exercise muscle protein synthesis rates [11]. “Whey” protein can be rapidly digested and absorbed and its specific amino acid composition aids in synthesizing muscle proteins.

Various factors are associated with supplement usage including sex, ethnicity, and economic status. One study found that men were more likely to use nutritional supplements in order to gain muscle mass or improve gym performance [9]. Bianco et al. compared the use of protein supplements among gym members in the city center and suburbs; 30% and 29% of city center and suburban gym members used dietary supplements, respectively [12]. This study suggests that place of residence does not have an impact on protein supplement use.

In order to ascertain the beneficial effects of and to avoid complications associated with protein supplementation, users, particularly the youth should be aware of the potential risks of supplementation and the importance of appropriate dosage. High protein diets might interfere with vitamin and mineral intake and have been associated with increased risk of coronary artery disease, as well as renal, bone, and liver abnormalities [13, 14]. In order to design such educational campaigns, individuals must first understand the frequency of protein supplement use. The aim of this study was to determine the prevalence and patterns of protein supplement’s use in Saudi gym users and to compare the differences in protein supplement usage between medical students and the general population. Furthermore, we aimed to evaluate the knowledge and attitudes of medical students and the general public about the potential harms and hazards of protein supplement usage.

METHODS

This was an observational cross-sectional study conducted in gyms in Riyadh, Saudi Arabia, over a six-month period between October 2014 and April 2015. The study population included medical students from two different medical colleges (King Saud University, College of Medicine and Alfaisal University, College of Medicine) who were gym users and all other gym users from five gyms across the city. In order to assess the knowledge regarding protein supplementation in each group in the targeted populations, simple random sampling was used to recruit the study subjects.

A structured self-administered questionnaire was designed and distributed by hand to these subjects. The questionnaire had four focus areas: general demographic information including age, body weight, marital status, and level of education; gym use such as the frequency of gym visits and hours spent in the gym during each visit; protein use including the amount of protein ingested, protein type, and time of protein consumption; knowledge of participants regarding protein supplement use such as perceived necessity for protein supplements for body building, the relationship between protein supplements and bodybuilding, muscle mass, and body weight, and potential hazards.

The outcome of interest in this study was to determine the prevalence of protein supplementation among medical students and general population gym users, making comparisons between the two groups. We defined that the daily recommended dose of protein intake as <2 g/kg/day [15]. We conducted power calculations to achieve 80% power; we assumed a difference in protein supplementation consumption of approximately 25% between medical students and regular population gym users, with a significance level of 5%, and a type II error of 20%.

Data analyses were conducted using SPSS (SPSS Inc., Chicago, IL, USA, version (22)). Descriptive analyses were performed; means and standard deviations were calculated for continuous data and frequencies and proportions were calculated for categorical data. Differences were assessed using student t tests; the non-parametric data were tested using Chi-squared tests. P-values less than 0.05 were considered statistically significant.

All study participants provided a written informed consent, and the ethics review board of the King Saud University approved the study design and conformed to the tenets of the Declaration of Helsinki.

RESULTS

In total 185 gym users were included in the study; 102 (55%) were from the general population and 83 (45%) were medical students. The majority of participants were between 20-25 years of age (87% and 48% of medical students and the general population, respectively, $P<0.001$, Table 1). Additionally, the majority of the participants went to the gym more than 4 times per week (82% versus 95% of medical students and general population gym users, respectively, $P=0.182$) and exercised for 1-2 hours each session (37% and 34% of medical students and the general population,

respectively, $P < 0.05$) (Table 2). We determined that 40% and 38% of medical students and the general population were protein supplement users ($P = 0.045$). The distribution of protein supplement usage (grams) significantly differed based on age category ($P = 0.028$). We found that those 20-25 years old most frequently used protein supplements (68%).

The majority of the participants from both groups (>90%) claimed that they were concerned about their general appearance. Additionally, 89% of protein supplement users reported that they used supplements because they were bodybuilding. Among medical students, 9% reported that they used more than the daily recommended dose compared to 28% of general population gym users ($P < 0.05$). "Whey" protein was the most commonly used supplement among supplement users, reaching up to 91% and 85% consumption in medical students and the general population gym users, respectively. In contrast, soy protein was the least commonly used supplement among protein users from both groups.

Knowledge on proper protein intake did not vary between the groups; 88% of medical students had good knowledge regarding the use of protein supplements compared to 80% of general population gym users. Additionally, there were no significant differences in the beliefs regarding the ability of natural proteins to build muscle and the inability of protein supplements to increase muscle mass without training ($P > 0.05$). Of those medical students, 57% and 9% reported that the use of supplements induced weight gain and body fat loss, respectively; while 44% and 21% of general population gym users reported that the use of supplements induced weight gain and body fat loss, respectively. Overall, there were no significant differences in knowledge about protein supplementation between medical students and general population gym users.

DISCUSSION

To our knowledge, this is the first study in Saudi Arabia that compares gym users from the general population and medical colleges. We found that protein supplements were used by various participants of different ages, with an overall prevalence of almost 40% in both groups. In contrast to our prediction, there were no significant differences in protein supplement use between the two groups. These results are suggestive that medical education did not affect the knowledge and behaviors regarding protein supplement consumption. Alternatively, there might be other demographic confounders such as age (the majority of users were between 20-25 years of age), affecting the lack of differences between the groups. In various other studies, the level of education was correlated with the use of supplements [16]. It is likely that education about supplement usage is necessary to guide protein supplement users as to correct frequency of use and dosage. However, Bianco et al. compared the prevalence of protein supplement consumption between gym users from the city center and those from suburbs and found no significant differences [12].

In contrast, we found that there was a significant difference between medical students and general population gym users with regards to the recommended dose used (28% versus 9%, respectively). Previous studies indicated that 1.4-2.0 g/kg/day are needed for physically active individuals [17]; intake more than the recommended dose may be associated with hazardous effects and might be more harmful than helpful. Excess protein is metabolized into urea and excreted in the urine, therefore excessive supplementation can lead to dehydration, gout, calcium loss, and liver or renal damage [18]. The fact that medical school knowledge did not impact the prevalence of the protein supplements used, while it impacted the dose used among medical students compared to the general population cannot be explained. This in part might be owing to the fact that there was a direct correlation between older age and the frequency with which the daily-recommended dose was exceeded.

The reasons for supplement use are different. Morrison et al. revealed that 49% of their subjects consumed supplements in order to build muscles, 38% to prevent future illness, 36% to increase energy levels, 24% to improve performance in a sport, 22% to gain strength, and 21% to aid in recuperation [7]. Bianco et al. described that dietary supplements were taken to improve health, physical appearance, and performance, increase strength, gain muscle mass, and prevent illnesses and diseases [19]. Our findings were similar to those from previous studies; we determined the most common reasons for protein supplement intake were bodybuilding, to aid in recuperation, to reduce hunger, and to prevent muscle loss.

It is well known that the majority of gym users obtain their knowledge on protein supplements from non-professional sources such as personal trainers, gym instructors, friends, supplement instructions, the internet, and sometimes they even use their "common sense." Very few consult physicians and nutritionists [8, 9, 12]. Eliason et al. found that dietary supplement users did not rely on physicians or other health professionals for information on supplement use

[20]. While many nutritional supplements users may be checking the labels of products they consume, unfortunately, supplement claims on the labels can be inaccurate and misleading, causing the misuse of supplements.

Study Limitations

This study was subject to several limitations. Our study population consisted of only male subjects because gyms, like many places in Saudi Arabia, follow a mandated gender segregation law.

While the aim of this study was to determine the relationship between the use of protein supplements between medical student and general population gym users, gym users ingest various types of supplements. The use of other hormonal supplements and differences in use between the different groups, should be investigated in future studies.

CONCLUSION / RECOMMENDATIONS

In conclusion, we determined that the use of protein supplements among gym members in Saudi Arabia is common and did not vary between medical students and the general population. These findings indicate that education directed towards gym users should be provided by health care professionals to alert the community as to the potential hazards of protein supplement use. Since a significant number of users consumed more than the daily-recommended dose, we advise that campaigns targeted at gyms, places of youth congregation, and at social media should be established to educate the general population, particularly the younger age groups.

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Tables

Table 1. Demographic characteristics of study population stratified by the type of gym user between October 2014 and April 2015

Indices	Medical students	General population	
	n=83 (100%)	n=102 (100%)	P-value
Age Category (yr)			
<20	8 (10%)	17 (17%)	P<0.001
20-25	72 (87%)	49 (48%)	P<0.001
25-30	3 (4%)	25 (25%)	P<0.001
>30	0	11 (11%)	P<0.001
Mean Age ±SD	21.5 ± 1.8	25.4 ± 5.0	P<0.01
Mean Body weight (kg)	80.4 ± 15.4	77.0 ± 12.1	P=0.036

Abbreviations: SD, standard deviation

Table 2. Frequency of gym visits per week and hours spent per visit stratified by the type of gym user between October 2014 and April 2015

	Medical students	General Population	
	n=83 (100%)	n=102 (100%)	P-Values
Gym visits/week			
>5	13 (16%)	31 (30%)	0.182
4-5	34 (41%)	56 (55%)	0.182
2-3	22 (26%)	12 (12%)	0.182
Irregular	14 (17%)	3 (3%)	0.182
Hours/visit			
>3	2 (2%)	9 (9%)	<0.05
1-2	65 (78%)	86 (84%)	<0.05
<1	16 (19%)	7 (7%)	<0.05
Irregular	1 (1%)	0	<0.05

NS, not significant

Table 3. Prevalence of protein supplement intake, amount, and time of consumption stratified by the type of gym user between October 2014 and April 2015

	Medical students	General Population	
	n=83 (100%)	n=102 (100%)	P-Values
Prevalence of protein supplement intake	34 (41%)	39 (38%)	<0.05
Protein amount (g/kg/day)			
<0.8	12 (35%)	23 (59%)	<0.05
0.8-1.1	10 (29%)	2 (5%)	<0.05
1.2-2	9 (26%)	3 (8%)	<0.05
>2	3 (9%)	11 (28%)	<0.05
Time of consumption			
Early morning	11 (13%)	31 (30%)	<0.05
Before exercise	14 (17%)	27 (26%)	<0.05
Immediately after exercise	39 (47%)	31 (30%)	<0.05
Other time	8 (10%)	7 (7%)	<0.05

Table 4. Knowledge about protein supplement use stratified by the type of gym user between October 2014 and April 2015

	Medical students	General Population	P-Values
	n=83 (100%)	n=102 (100%)	
Total protein knowledge score	(88%)	(79%)	NS
Natural sources of protein are enough for muscle building			
Agree	24	26	
Neutral	7	12	
Disagree	1	1	
Protein supplements are essential for muscle building			
Agree	21	27	
Neutral	7	11	
Disagree	6	1	
Protein supplements aid in loosing fat			
Agree	3	8	
Neutral	7	13	
Disagree	24	18	
Protein supplements cause weight gain			
Agree	19	17	
Neutral	12	14	
Disagree	3	8	

NS, not significant