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EXPLORE KNOWLEDGE AND MISUSE OF SUPPLEMENTS SUCH AS PROTEIN POWDERS, CREATINE, OR VITAMINS AMONG GYM GOERS

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Abstract:
Background: The use of dietary supplements such as protein powders, creatine, and vitamins has been common among people visiting gyms for improved body function and well-being[2]. However, inappropriate use as a result of misguidance, promotional effect, and peer influence has resulted in adverse health outcomes[3].
Objective: This study examines the understanding, usage practices, and inappropriate use of supplements by gym users[4].
Methods: A cross-sectional survey was conducted among 399 members of different gyms[5].
Results: Dietary supplement consumption was reported among 57.6% of respondents, with greater consumption noticed in males, youths, and individuals with university degrees[6]. While 83.2% showed sufficient information levels, 18.8% expressed wrong consumption practice involving overdoing or using uninformed sources to decide on consumptions[7].
Conclusion: Consequences reflect upon social influences coupled with non-favourable supervisory processes leading to tendencies among supplement usage[8]. This research emphasizes the necessity for better education, regulation, and awareness campaigns to encourage safe use of supplements[9].

Keywords: Dietary Supplements, Gym-Goers, Protein Powders, Creatine, Supplement Misuse, Health Risks, Fitness Trends, Nutritional Awareness, Regulatory Measures, Responsible Supplementation[10].

1 Introduction

Most gym enthusiasts consume supplements such as protein powders, creatine, and vitamins to improve their fitness and well-being. Although these supplements can be helpful if taken appropriately, most people lack the right information regarding their impact, dosage, and side effects. Some people abuse them, thinking they will yield quicker results, which can result in health complications. Knowledge of correct usage and potential side effects will enable safe and efficient

supplementation. In this context, the prevalence and abuse of the supplements in health-conscious users is investigated herein as a motivating force for ensuring right guidance and training.

Usage of nutritional supplements among gym goers

A dietary supplement must include one or more of the following ingredients, according to the Dietary Supplement Health and Education Act (DSHEA): vitamins, minerals, botanicals, herbs, amino acids, concentrates, metabolites, constituents, and/or extracts [1]. According to the American Dietetic Association, supplementation may only be necessary for those with inadequate dietary intake who are following strict dietary regimens or cutting out a small number of foods from their diets. Despite these guidelines, a large percentage of athletes and those who regularly work out utilize supplements [2]. According to study results, people have used nutritional supplements for a variety of reasons, including immunity, physical and mental strength, exercise, illness treatment, and health-related conditions. In a nutshell, they attract customers with their "magical" or "miraculous" effects [3]. In addition to these advantages, there is a lot of media influence and idols for better physical appearance. Dietary supplement intake has expanded as a consequence of consumers' constant attention to marketing in glitzy publications and online [4]. Although the goal of intake has already been discussed, there are still potential hazards associated with supplement usage. People have a lot of misunderstandings about using nutritional supplements. There is many health risks associated with the careless use of nutritional supplements, including depression, gastrointestinal disorders, and hypertensive reactions. Nevertheless, despite the potential negative consequences, supplement usage has remained prevalent among gym patrons [5]. This results from a lack of knowledge about the requirements, appropriate dosages, and how to use them. The producers of the supplements are responsible for the quality control that ensures the products are safe and devoid of illegal or contaminated substances [6]. It is not subject to strict restrictions, nor are they well recorded. The number of people going to gyms and fitness facilities in India has also increased recently in an effort to live a fit and healthy lifestyle [7]. Every every corner has a gym, and more young people are following in their footsteps. Personal spending capacity has increased in tandem with the global market's rise in recent years [8]. As a result, consumers are spending more money on supplements. The use of supplements varies according to age, gender, information source, and exercise goal. Unfortunately, there isn't much data to support the use of dietary supplements or community knowledge of them. As a result, the study of gym-goers' use of nutritional supplements will provide valuable insight into a topic that has not received much attention in this area [9].

Misuse and Overconsumption of Supplements

The misuse and overuse of food supplements, such as protein powders, creatine, and vitamins, has become a significant issue among gym-goers[1]. These supplements are often taken in high doses, believing they will build muscle faster, increase endurance, and improve performance. However, research shows that taking more than recommended amounts can lead to serious health complications, such as kidney malfunction, liver damage, gastrointestinal upset, cardiovascular defects, and endocrine disturbances. The lack of adequate information about proper consumption is a major reason for misuse, with many relying on lay sources and advertising techniques[10]. Peer pressure also contributes to excessive use of supplements. The quality and regulation of supplements are another significant issue, with the supplement industry being poorly regulated in most nations. Producers can market products with unsafe additives, unlisted ingredients, or banned performance-enhancing substances, posing serious health threats to consumers. There is an urgent need for heightened awareness and education on the safe usage of supplements, with fitness professionals, healthcare practitioners, and policymakers working together to drive evidence-based messaging and promote balanced nutrition[11]. Adequate education campaigns should be aimed at bodybuilders, especially the younger ones, who are easily influenced by advertising and peer groups.

2 LITERATURE REVIEW

Sr. N.	Purpose	Methodology	Dataset	Findings	Remark	Ref
1	To identify the relationship between commercial gym attendees and nutritional supplements, specifically with regard to initiation, reasons for use, cost implications, and risks.	A cross-sectional quantitative survey based on a self-administered questionnaire and systematic convenience sampling.	364 male and female gym visitors recruited.	The primary motivations for going to the gym among women: muscle gain (57%), weight loss (48%), remaining healthy (47%), and spiritual purpose (39%).	Highlights the need for education on supplement use, focusing on cost-benefit and risk assessment for gym-goers, the public, and guardians of minors.	[12]
2	To determine the Austrian gym users' knowledge of myths and facts in resistance training (RT).	Cross-sectional survey through an electronic questionnaire containing 14 statements regarding RT (both myths and facts) based on systematic reviews. Chi-squared tests were	721 subjects (mean age: 30.1±14 years, 454 men) from Austrian fitness centers. Response rate: 91.2 % (from 790 who were contacted).	The majority of participants recognized only five correct sentences out of 14 about the benefits of resistance training (RT), including the fact that creatine and protein	Points out the disparity between sports science and gym practice. Implies that there is a need for better science communication to gym users.	[13]

		employed to analyze data.		enhance strength and hypertrophy, and the myth that RT doesn't decrease flexibility.		
3	To examine the usage of supplements by gym patrons.	Use anonymous questionnaires for the survey.	Members of a gym on Long Island, New York, aged 18 and up	84.7% of people took supplements. Common: protein (42.3%), vitamin C (34.7%), vitamin E (23.4%), and MVM (45%). - 28 % took ephedra. MVM/VE was chosen by older persons, whereas protein/creatine was preferred by younger adults. Younger—muscle-building; older—illness avoidance.	Highlights trends, risks, and need for education on safe use.	[14]

4	To evaluate gym-goers' supplement use, awareness, and adverse effects.	research that uses structured questions and is cross-sectional.	121 people from 5 city zones go to the gym.	Five city zones included 121 gym patrons.	97.5% of people ate protein powder. Longer gym sessions are associated with increased supplement use (p=0.020). Consequences include nausea and cramping (p=0.015). Just 9.9% sought help from dieticians, while 51.2% turned to trainers.	[13]
5	To examine patterns in protein consumption and how they affect Pakistani gym-goers'	semi-structured in-person interviews as part of a qualitative investigation.	Thirty fitness enthusiasts from Islamabad, Lahore, Hyderabad, Sukkur,	Because of their cost and cultural acceptability, the majority favored natural protein sources like chicken,	draws attention to the need for improved protein source knowledge via fitness clubs and social networks.	[15]
	levels of fitness.		Karachi, and Faisalabad.	eggs, and legumes. Decisions were impacted by fitness groups and social media. The desire for whole meals was strengthened by worries about the quality of supplements.		
6	Examine the	using a self-	399	Supplement	Education on	[16]

	variables, knowledge, and supplement usage of Amman, Jordanian gym patrons.	administered questionnaire in a cross-sectional research.	participants from 35 gyms.	use was 57.6%, predominantly male (72.6%) and 26-30 (43.6%). Higher use among university graduates (77.4%) and employed people (53.9%). 83.2% knew and 81.2% didn't abuse supplements. Gender, age, exercise, and bodybuilding predicted knowledge and conduct.	the safe use of supplements is necessary.	

2.1 **Research gap**

Even though nutritional supplements (NS) are used extensively by gym enthusiasts, there is a dearth of knowledge about their safe use, side effects, and the authenticity of information sources. The majority of users seek information from the internet or trainers instead of healthcare professionals, resulting in potential misinformation. Although research indicates supplement use trends, gender variability, and social and economic impacts, few investigations examine the long-term health effects, regulation, and efficacy of various supplements on enhancing fitness. Moreover, there is a lack of emphasis on educating gym users about balanced diet and the necessity of whole foods compared to supplements. Filling these gaps will contribute to facilitating informed and safe supplement consumption.

3 Methodology

3.1 Study Design

This study sought to uncover the knowledge and abuse of dietary supplements, such as protein powder, creatine, and vitamins, among gym enthusiasts. The sample comprised 399 participants who were recruited from a random sample of 35 out of the 100 available gyms in the metropolitan area.

3.2 Participant Recruitment Method

Volunteers were recruited by stratified cluster sampling. Gyms were stratified by gym type (e.g., CrossFit gyms, bodybuilding gyms, and general fitness clubs) to provide representation within various fitness environments. On randomly chosen days, gym-goers were contacted during their visits and asked to participate. This method provided a representative sample of gym attendees in the area. A total of around 12 people were recruited from each chosen gym.

3.3 Ethical Considerations and Data Collection Process

Ethical clearance for the study was given by the [Institutional Ethics Committee] after reviewing and approving the study protocol, recruitment procedures, and informed consent documents. Ethical standards of voluntary participation, confidentiality, and freedom to withdraw without penalty were adhered to. Informed consent was sought prior to participation, and participants answered a self-completed questionnaire surveying supplement usage, knowledge, and misuse. Gym managers gave permission verbally to make participation and survey handout possible. To reduce possible biases, data collection was done without involving gym employees. Researchers were physically on the scene to answer participant questions and make data collection flow smoothly.

3.4 Data Collection Instrument

The process of data collection employed a standardized questionnaire, originally created in English and translated into [Native Language], to ensure cultural appropriateness and understanding. The translation was also checked by an expert panel of specialists in assessment methods, measurement, fitness, nutrition, and language translation. The questionnaire was based on validated questionnaires and adjusted to suit the context of the study.

3.5 Questionnaire Structure and Design

The questionnaire was divided into five sections:

1. **Sociodemographic Information** – This section gathered information on gender, education, age, and employment status.
2. **Exercise Patterns** – Participants were also queried about the frequency and length of exercise, reasons for training, and weight and height to determine BMI. BMI was determined using an Excel function based on self-reported height and weight.
3. **Knowledge of Supplements** – Five questions tested for participants' knowledge of protein powders, creatine, and vitamins in terms of benefits, risks, and dosages recommended.
4. **Behavioral Patterns Regarding Supplement Use** – Ten items asked about the rate and setting of supplement consumption, such as reasons for use, information sources, and history of side effects. Answers were marked on a four-point continuum: "Yes," "Often," "Sometimes," and "Never."
5. **Misuse of Supplements** – This section examined indicators of misuse, such as exceeding recommended dosages, combining multiple supplements without guidance, and using supplements as meal replacements.

3.6 Pilot Study and Validation

A pilot study of 30 subjects was done prior to the main survey to pilot test the questionnaire and determine the effectiveness of the questionnaire. This stage served to enhance clarity, reliability, and validity to ensure a strong study tool.

Response Rate and Assessment Criteria

The survey had a response rate of 43.3%, with 399 of the 920 questionnaires distributed and returned.

Assessment Criteria

- **Knowledge Assessment** – Knowledge of the participants was measured as per accuracy levels in responses provided for knowledge items, yielding a cumulative score.
- **Behavioral Assessment** – The four-degree frequency scale was used to classify respondents' supplement consumption patterns, assessing the regularity and context of use.
- **Misuse Assessment** – Misuse was established on the basis of self-reported excessive consumption, improper use, and use of supplements without professional advice.

4 Results

399 participants visited the gym. Of these, 57.6% indicated that they used dietary supplements, with 72.6% of male and 27.4% of female respondents taking nutritional supplements. The age group 26-30 had the highest use of dietary supplements at 43.6%, and the age group 41+ had the lowest use at 38.8%.

Use of dietary supplements rose with level of education, with 16.1% of those with a high school education and 77.4% with a university education reporting use. Participants who were employed reported a higher rate of use at 53.9%, as opposed to the unemployed (18.3%) or self-employed (18.3%).

Respondents with more than a year of training (72.2%) and three to five times per week (61.7%) used the highest number of supplements. Furthermore, participants who trained for body appearance improvement (21.81%) used a higher number of supplements compared to those who took part in sports competitions or other activities.

Based on the BMI index:

8.3% of participants who were underweight, 67.8% of healthy-weight participants,

21.3% of participants with weight overage, and 2.6% of obese participants used dietary supplements.

As seen in Table 1, all the variables were significantly different in the intake of nutritional supplements.

Table 1 Demographic Information of the Study Sample by Supplement Consumption

Characteristics	No (N, %)	Yes (N, %)	P-value
Total	196 (42.4%)	230 (57.6%)	
Gender			0.000
Male	67 (36.6%)	167 (72.6%)	
Female	102 (60.4%)	63 (27.4%)	
Age Group			0.003
18 - 25	52 (30.8%)	101 (43.9%)	
26 - 30	55 (32.5%)	49 (21.3%)	
31 - 35	34 (20.1%)	55 (23.9%)	
36+	28 (16.6%)	25 (10.9%)	
Academic Level			0.000
High School	15 (8.9%)	37 (16.1%)	
Undergraduate	116 (66.6%)	178 (77.4%)	

Postgraduate	38 (22.5%)	15 (6.5%)	
Employment Status			0.001
Unemployed	58 (34.3%)	42 (18.3%)	
Employed	76 (45.0%)	124 (53.9%)	
Self-employed	35 (20.7%)	64 (27.8%)	
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Knowledge and Behavior about Supplement Use

Out of the 399 participants, 332 participants (83.2%) showed sufficient knowledge regarding dietary supplements, whereas 67 participants (16.8%) lacked good knowledge.

As far as behavioral patterns are concerned:

324 participants (81.2%) showed good behavior concerning dietary supplement intake. 75 patients (18.8%) had misuse or inappropriate behavior.

These results point out that most gym enthusiasts possess a solid knowledge of supplements, but there is a significant percentage that still practices improper consumption.

Table 2Level of Knowledge and Behavior About Dietary Supplements

Category	**Total Score**
Knowledge	
Adequate	332 (83.2%)
Poor	67 (16.8%)
Total	399 (100.0%)
Behavior	
Good	324 (81.2%)
Misuse	75 (18.8%)
Total	399 (100.0%)

Perceptions and Knowledge About Dietary Supplements

Perceptions among participants regarding dietary supplements were mixed. The majority of the respondents (86.2%) appropriately identified that proper nutrition involves vitamins, amino acids, and minerals. Nevertheless,

just 54.4% knew about regulations on supplements, and 32.3% incorrectly assumed that dietary supplements fall under the category of drugs. These results indicate a solid core knowledge but with some misconceptions that must be clarified.

Table 3Table 3. Perceptions and Knowledge About Dietary Supplements

Item	Mean	Std. Dev.	Adequate (%)	Poor (%)
Proper nutrition includes vitamins, amino acids, and minerals.	2.79	0.57	86.2%	13.8%
Vitamins, amino acids, and minerals are dietary supplements.	2.56	0.75	71.2%	28.8%
Dietary supplements are drugs.	2.47	0.81	67.7%	32.3%
There is regulation and licensing for dietary supplements.	2.33	0.81	54.4%	45.6%
Regulation requires dietary supplements to include a recommended daily dose label.	2.47	0.75	62.9%	37.1%

Conclusion:

The research demonstrates a wide usage of dietary supplements among bodybuilding gym enthusiasts with large gaps in knowledge and problematic behavior to contribute to improper usage. Most of the subjects had general awareness about supplements but utilized incorrect information from friends, instructors, or the internet over health professionals. Misuse by taking too many supplements, with pressures from exercising regimens and promotional campaigns, creates hazards including renal damage, heart problems, and gastrointestinal illness. Gender, age, and educational status had a marked impact on consumption patterns, with young, educated men being the most common users. The research highlights the need for more stringent regulatory controls, improved product labeling, and education programs targeting gym users. Fitness professionals and policymakers need to join forces to ensure responsible supplement use and promote natural food sources over excessive supplementation. Future research must examine long-term health consequences and psychological reasons for supplement addiction. Overcoming these issues with awareness campaigns and scientific outreach will be important in helping gym members make proper and safe health choices.

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