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The Use of Nutritional Supplements among Gymnasium Trainees in Maseru, Lesotho

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Abstract The use of nutritional supplements among gymnasium trainees is experiencing a global surge in popularity as a means to augment dietary intake. Despite this widespread knowledge about nutritional supplement consumption, Lesotho gymnasium trainees' dietary supplement behaviors remain unknown. This study aimed to evaluate the use of nutritional supplements among gymnasium trainees in Maseru, Lesotho. A cross-sectional quantitative study involving 239 trainees aged 18 and above in various gymnasiums in Maseru was conducted between February 2023 and May 2023. Participants completed a self-administered survey that covered socio-demographic information and supplement use. Data analysis was done in SPSS version 15.0. Descriptive statistics were performed to analyze supplement types, reasons for use, and sources of information and purchase. Chi-square (X^2) tests were conducted with significance set at $p < 0.05$. Findings showed that 57.3% of the participants identified as female, 45.6% of whom were 18-29 years of age. The most consumed supplements were herbal (53.1%), protein (16.7%), and mineral and vitamin supplements (21.7%). More women than men (29.7% vs. 23%, $p < 0.05$) reported using herbal supplements. The most common reasons for taking supplements were to lose weight (22.6%), stay healthy (43.5%), and improve performance (24.3%). Females had higher referral rates for health and wellness (26.4% vs. 16.3%, $p < 0.05$), and weight loss (14.6.7% vs. 7.9%, $p < 0.05$) than males. More men (12.6%) compared to women (11.7%) reported using nutritional supplements for enhancing performance ($p < 0.05$) and muscle building (2.5 vs. 0.8% $p < 0.05$). The primary sources of information for supplement use were the Internet (28.0%) and social media (56.1%). Participants purchased nutritional supplements from retail stores and pharmacies (55.6%). In conclusion, this study found that gymnasium trainees, particularly young females with higher education, are the most prominent users of nutritional supplements.

Keywords: *nutritional supplements, gymnasium trainees, lesotho*

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1. Introduction

There has been a significant rise in the global consumption of dietary supplements, particularly among gymnasium trainees [1]. The appeal for dietary supplement consumption among gymnasium trainees has been heightened due to the prevalent desire for rapid results. These products are promoted with claims of various health benefits, such as instant muscle gain, weight loss, prevention of illness and disease, enhanced immunity, improved appearance, accelerated workout recovery, and slowed aging [2]. Unfortunately, there is little evidence that most of these products actually work, and many disregard the fact that they may be hazardous [3,4]. Previous studies by [5,6] estimate the prevalence of dietary supplement consumption among gymnasium trainees to vary between 30% and 95%. The magnitude of this variation depends on several factors, including, the level of competition, the specific athletic discipline, and the criteria used to define dietary supplements. The growing prevalence of nutritional supplements has raised concerns regarding their inappropriate usage.

A substantial body of research consistently indicates that individuals who engage in consistent physical activity and possess optimal overall health do not require additional nutritional supplements beyond what is acquired from a comprehensive and nutritionally adequate diet [7]. Supplements are commonly recommended for individuals who consume energy-restricted diets, exclude certain food groups from their diets, employ extreme weight loss methods, or consume diets with low micronutrient density [7]. Nevertheless, it has been noted that a considerable number of gymnasium trainees use dietary supplements without seeking proper consultation or guidance, consequently elevating the potential for misuse [8]. This pattern gives rise to apprehensions regarding potential hazards to the well-being of the general population.

Extensive research has examined the global prevalence of dietary supplement usage and associated behaviors [9].

The interest groups most heavily targeted concerning dietary supplement consumption are athletes and individuals who frequent the gymnasium [10]. This is because these groups comprise a substantial portion of the consumer base for such supplements [11]. Despite the global prevalence of awareness regarding nutritional supplements, there is a dearth of documented information regarding the practices of most gymnasium trainees in Maseru, Lesotho. Hence, this study aimed to evaluate the utilization of nutritional supplements among individuals engaged in gymnasium training in Maseru, Lesotho. The findings of this study will yield significant knowledge regarding the utilization of supplements and promote the adoption of safe and responsible consumption practices among individuals engaged in gymnasium training.

2. Methods

2.1. Participants and Settings

A cross-sectional study was conducted between February 2023 and May 2023. The sample used in this study was a convenience sample comprising 239 individuals who trained in various gymnasiums in Maseru during the study period. Eligibility criteria for participation in the study included individuals 18 years of age and above who identified as gymnasium trainees residing in any area of Maseru, and could speak, comprehend, and read both Sesotho and English. The participants were recruited through the utilization of social media postings, as well as from local gymnasiums located in Maseru. To ensure ethical compliance, the researchers sought informed consent from the participants before engaging in the research. Individuals who chose to engage in the activity received no immediate advantages. This research was authorized by the Institutional Review Board of the National University of Lesotho and the Ministry of Health, Lesotho (ID49-2023).

2.2. Survey Instruments

In this study, a validated survey instrument was utilized. The questionnaire employed a five-point Likert scale and closed-ended response options. The survey was evaluated by personnel from the nutrition department in terms of its readability and content validity. Before enrolling participants in the study, a pilot test was conducted on 40 individuals who regularly attended the gymnasium in Roma, Maseru. This pilot test aimed to evaluate the readability and validity of the survey instrument. The preliminary investigation indicated the absence of any issues, and consequently, no modifications were implemented to the survey instrument. The data were obtained from the participants through a self-administered online questionnaire. The survey instrument comprised inquiries tailored to extract data regarding the socio-demographic characteristics of the participants, as well as their utilization of nutritional supplements. Participants were requested to provide basic demographic information, including age, gender, educational attainment, employment status, and marital status. The study participants shared information about nutritional supplements, including their reasons for using the supplements, commonly used supplements, preferred purchasing places, and sources of guidance and information regarding nutritional supplements.

2.3. Sampling Size Determination

The sample size was determined using Slovin's formula, mathematically represented by the equation:

$$n = \frac{N}{1 + Ne^2} \quad (1)$$

The variable "n" denotes the sample size of 239 in the present context. The margin of error, represented as e, is equivalent to 5%. The variable N denotes the estimated entirety of the population of supplement users.

2.4. Statistical Analysis

Descriptive statistical analyses were conducted to ascertain the demographic characteristics of the participants, the types and frequencies of dietary supplements utilized, the sources of information for nutrition supplements, as well as the places of purchase. The data were analysed using SPSS version 15.0. Pearson's chi-square tests were employed to ascertain the presence of any associations between the utilization of supplements and the categorical variables. The threshold for statistical significance was established at a level of $p < 0.05$.

Table 1. Socio-demographic and Lifestyle Characteristics of All Participants and Supplements

Characteristic	*n*	*Percentage of total population (n =239)*	*Percentage of dietary supplement users (n =230)*	*P value*
Age group				
18-29	109	45.6	44.8	
30-39	83	34.7	34.8	
40-49	36	15.1	15.7	.431
50 and above	11	4.6	4.8	
Gender				
Female	137	57.3	58.7	
Male	101	42.3	40.4	
Unspecified	1	0.4	0.9	.083
Marital status				
Single	113	47.3	45.7	
Married	111	46.4	47.8	
Divorced	9	3.8	3.9	
Widowed	6	2.5	2.6	.089
Occupation				
Employed	76	31.8	32.6	
Self-employed	61	25.5	26.5	
Unemployed	102	42.7	40.9	.016
Education				
Tertiary	188	78.7	77.8	
High school	47	19.7	20.4	
Primary	4	1.7	1.7	.281
Gymnasium hours per week				
<5hours	48	20.1	16.9	
5-10hours	30	12.6	13.0	
10-15 hours	51	21.3	22.2	
15-20 hours	44	18.4	19.1	0.00
≥20 hours	66	27.6	28.7	

3. Results

3.1. Sample Characteristics

The demographic characteristics of the participants in the study are presented in Table 1. Out of the total sample size of 239 participants, it was observed that approximately 45.6% fell within the age range of 18-29 years, 34.7% belonged to the age range of 30-39 years, 15.1% fell within the age range of 40-49 years, with only 4.6% aged 50 years and above. The research revealed that a majority of the participants (57.3%) identified as females, were single (47.3%), and indicated being unemployed (42.7%). Most participants (78.7%) possessed a tertiary education, while 19.7% had a high school education, and only 1.7% had completed education at the primary level. A significant proportion of the participants (26.7%) reported dedicating more than 20 hours per week to their gymnasium activities.

3.2. Supplement Use

Most participants in the study (n = 230,96%) indicated that they had utilized at least one dietary supplement within the preceding year. Although this difference did not reach a statistical difference ($p>0.05$), compared to men (40.4%), a higher proportion of women (58.7%) reported using dietary supplements. Additionally, it was found that most individuals who consumed supplements were young individuals who engaged in gymnasium training, specifically between the ages of 18 and 29, comprising 44.8% of the sample. A majority of supplement users (28.7%) engaged in training for more than 20 hours per week. No significant associations were found between supplement use and other factors, including education, marital status, gender, and age group. As indicated in **Table 1** above, a statistically significant difference was observed in the use of nutritional supplements between occupation and gymnasium hours per week ($p<0.05$).

3.3. Types of Nutritional Supplements Used by Gymnasium Trainees

According to the data presented in Figure 1, the supplements that participants most commonly consumed were herbal supplements, accounting for 53.1% of the total. This was followed by protein supplements, which constituted 16.7% of the consumption. Mineral and vitamin supplements were also prevalent, making up 21.7% of the overall consumption. Omega 3 fatty acids supplements accounted for 5.1% of the consumption, while only 3.4% was attributed to other supplements. There was a notable disparity in the consumption of various supplements between women and men. Specifically, a more significant proportion of women reported using herbal supplements (29.7% vs. 23%, $p < 0.05$), mineral supplements (9.2% vs. 5.0%, $p < 0.05$), Omega 3 supplements (3.8% vs. 1.3%, $p < 0.05$), as well as vitamin and mineral supplements (6.3% vs. 1.3%, $p < 0.05$). There was a notable disparity in the consumption of protein supplements between men and women, with a significantly greater proportion of men (10.5%) compared to women (6.3%) reporting usage ($p<0.05$).

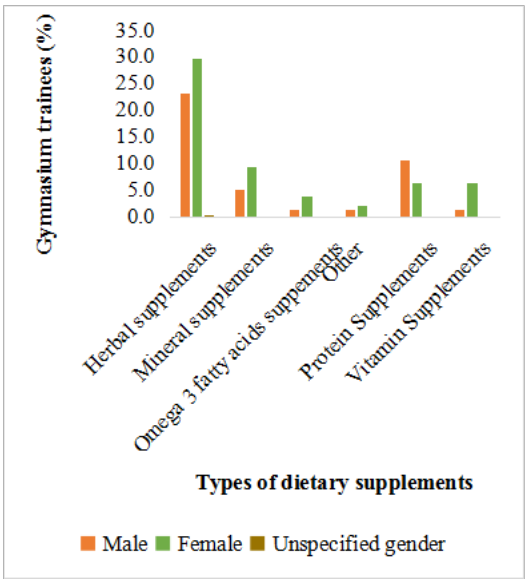

Figure 1. Types of Nutritional Supplements Used by Gymnasium Trainees

3.4. Reasons for Supplements Consumption among Gymnasium Trainees

The most cited reasons by participants for utilizing supplements, as indicated in Figure 2, included the desire to maintain health and well-being (43.5%), achieve weight loss (22.6%), and enhance performance (24.3%). Compared to males, females exhibited a higher frequency of referrals for health and well-being (26.4% vs. 16.3%, $p < 0.05$), as well as weight loss (14.6.7% vs. 7.9%, $p < 0.05$). In comparison to women (11.7%), it was observed that a higher proportion of men (12.6%) reported using nutritional supplements to enhance performance ($p < 0.05$). Similarly, a greater percentage of men (2.5%), as opposed to women (0.8%), reported using such supplements for muscle building ($p < 0.05$). Additionally, a higher proportion of men (1.3%) reported using nutritional supplements to increase strength.

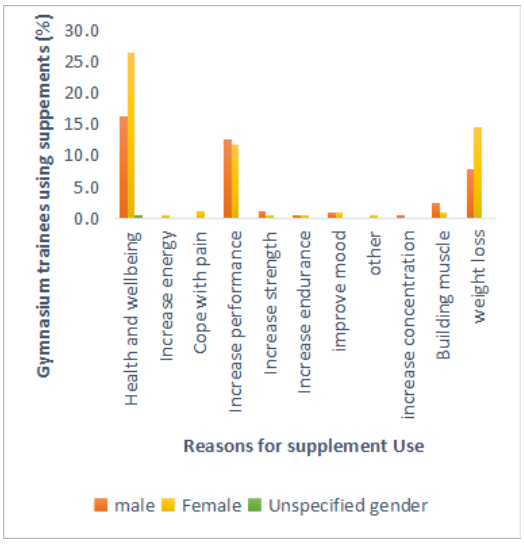

Figure 2. Source of Information about Nutritional Supplements

3.5. Sources of Information about Nutritional Supplements

The primary sources of information that participants most frequently consulted were social media platforms (56.1%) and the Internet (28.0%) (see Figure 3). A small proportion of individuals engaging in gymnasium training indicated that they obtained information regarding dietary supplements from various sources, including print media (0.4%), gymnasium trainers (0.4%), academic journals (5.9%), nutritionists/dieticians (6.7%), and other unspecified sources (2.5%).

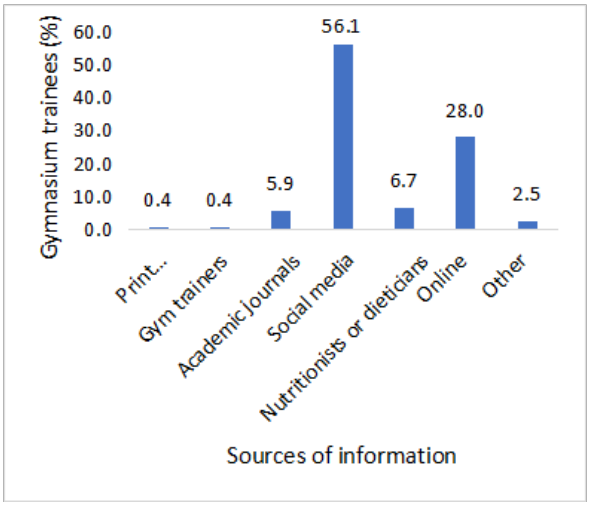

Figure 3. Sources of Information about Nutritional Supplements

4. Nutritional Supplements Purchase Information

Research findings indicate that the primary channels through which dietary supplements are acquired are retail stores and pharmacies, accounting for 55.6% of purchases (see Figure 4). Gymnasium stores, on the other hand, represent the second most popular option, accounting for 33.9% of purchases. A small proportion of individuals engaging in gymnasium training opted to acquire their supplements through online retailers (4.6%), nutritionists (3.8%), and alternative sources (1.7%).

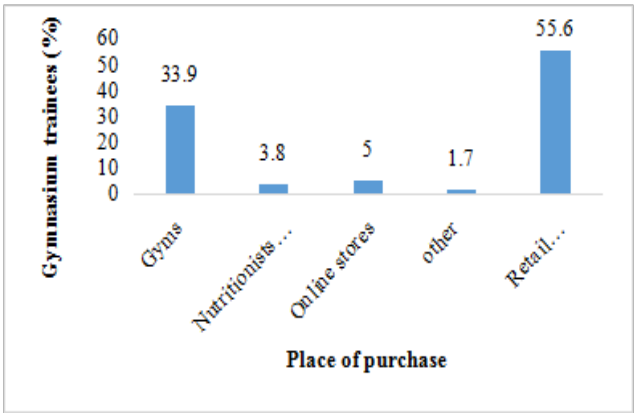

Figure 4. Nutritional Supplements Place of Purchase

5. Discussion

The present study aimed to assess the use of nutritional supplements among gymnasium trainees in Maseru. This study supports the assertion that gymnasium trainees are substantial consumers of dietary supplements. The study revealed a notably higher prevalence of dietary supplement utilization (96%) compared to the reported prevalence rates in previous studies conducted among gymnasium trainees (32.3%, 43%, 43.8%) [12,13,14]. The consumption of dietary supplements appears to be widely prevalent in Southern Iraq, as indicated by a study conducted by [15]. This finding aligns with the results of the present study and that of [16]. The variations in the documented prevalence rates could potentially be attributed to socio-demographic and cultural factors, the inclusion of specific gymnasium types, and methodological considerations such as the definition of supplements and the approach used to collect data.

While the precise impact of gender on supplement usage remains uncertain, this investigation revealed a higher prevalence of supplement consumption among women than men, aligning with prior research [17]. However, it is worth noting that this correlation was not statistically significant. In contrast to the results obtained in the present study, [13] conducted research indicating that the predominant consumers of dietary supplements in Portugal are males, with a prevalence of 62.7% compared to 33.9% for females ($p < 0.05$). Additionally, [14] reports that men are more likely to utilize dietary supplements than women. Similarly, [18] found that a higher proportion of male versus female athletes (65.3 vs. 56.5%, $p < 0.05$) consumed dietary supplements.

Herbal supplements and protein supplements were the most common type of supplements consumed, resembling an international study done in Portugal with adult athletes reporting that the supplements used most were proteins (80.1%) [13]. According to a study by [19], protein supplements (54.3%) were identified as the dietary supplements most consumed in the United Arab Emirates (UAE). Similarly, in a study conducted by [20], it was observed that more gymnasium trainees (67.8%) consumed protein supplements than those who did not attend the gymnasium (32.2%). The observed popularity of protein supplements among gymnasium trainees is likely influenced by assertions of increased muscle mass, increased fat loss, improved performance, and improved markers of recovery [21].

Despite a lack of comprehensive data regarding the prevalence of herbal supplement consumption among gymnasium trainees, evidence from this study suggests that a significant proportion (53.1%) of gymnasium trainees in Maseru consume herbal dietary supplements. The voluminous advertising of herbal dietary supplements as enhancers of weight loss, health maintenance, well-being, and performance in developing countries may contribute to this phenomenon [22]. However, it is imperative to conduct additional research to investigate the specific herbal supplements Basotho utilize in local fitness facilities.

The primary sources of information that exhibit a

higher degree of preference among consumers of dietary supplements include social media platforms (56.1%), followed by the Internet (28.0%). A smaller proportion of respondents reported obtaining information from nutritionists and gymnasium trainers. Consistent with the results of prior research [13,14,19], it is evident that gymnasium trainees heavily rely on the Internet as a primary means of obtaining information about dietary supplements. This finding diverges from previous research conducted in Switzerland, which indicated that the primary source of information regarding nutritional supplements for most participants was gymnasium personnel [23]. In previous research, [24] found that parents/guardians were the primary supplementary informants. The rationale behind gymnasium trainees' reliance on the internet and social media platforms as their preferred means of acquiring supplement information owes to the visually appealing nature of these platforms and their capacity for interactivity and information sharing [25]. It is conceivable that the abundance of information accessible on the internet, coupled with the pervasive influence of social media marketing, could potentially heighten the likelihood of athletes disregarding dependency on other professionals for guidance.

The primary reasons cited by participants for supplement consumption were maintaining health and well-being, weight loss, and improving performance. The present study aligns with the research conducted by [24] and [26], identifying performance as the predominant motivation behind the consumption of dietary supplements. On the contrary, research conducted by [27] indicated that the primary motivations for individuals to consume supplements were the desire to increase muscle mass (56.1%) and address protein deficiency (28.6). A statistically significant gender disparity was observed for these reasons ($p < 0.001$). Females were more inclined to preserve health, well-being, and weight reduction, while males demonstrated a notably higher propensity towards enhancing performance. A previous study conducted by [24] demonstrated that males are more inclined toward utilizing performance-enhancing supplements. In contrast, females tend to exhibit a higher propensity for consuming supplements primarily aimed at promoting health-related outcomes. Given the high prevalence of herbal supplement usage among most women surveyed, it can be inferred that women positively perceive herbs as a valuable means to facilitate weight loss and enhance overall health and well-being.

The study revealed that retail stores/pharmacies, and gymnasium stores were the predominant channels for acquiring dietary supplements. Prior research conducted by [27] and [13], a significant number of individuals engaged in gymnasium training opt to procure dietary supplements from specialized retailers that cater specifically to health and fitness-related merchandise. In contrast, a recent investigation conducted by [7] revealed that most individuals engaged in gymnasium training procured dietary supplements through online platforms. The purchasing patterns exhibited by individuals who engage in gymnasium training with respect to dietary supplements can be influenced by a range of factors, including personal preferences, geographic location, and employment status. Most participants in this study were not employed, which may have impacted their purchasing preferences. However, additional investigation is necessary to examine the justifications for purchase preferences in this context thoroughly.

This study possesses several notable strengths, the most important being the inclusion of participants from a population group that has received a limited assessment in Lesotho. While nutrition studies on various groups are prevalent, the evaluation of gymnasium trainees, as conducted in this study, is comparatively infrequent. The sample size employed in this study facilitated the identification of diverse parameters and their subsequent association through comprehensive data collection. The current study possesses inherent limitations that warrant acknowledgment, with the primary limitation about the methodology employed for data collection, specifically the utilization of a self-administered online questionnaire. The use of self-reported answers could affect the reliability of the responses. Additionally, it is essential to note that the sample used in this study was selected through convenience sampling. Therefore, generalizations and extrapolations from the results should be made cautiously.

Nevertheless, the validity of the gathered data is reinforced by consistent findings in other closely related research studies. Another relevant limitation is that the use of these supplements may be difficult to admit in front of a nutritionist, thus affecting the data collected. The survey findings indicate that a significant proportion (77.8%) of the participants possessed a tertiary degree. This observation suggests that individuals who frequent gymnasiums exhibit a notable level of educational attainment, potentially stemming from their awareness of the positive impact of exercise on health or their inclination to engage in research.

6. Conclusion

In conclusion, the findings of this study indicate that gymnasium trainees are large consumers of dietary supplements, with a particular emphasis on females. The consumption of herbal supplements and protein supplements was found to be prevalent among the participants. The primary reasons for consuming these supplements were identified as the desire to maintain overall health and well-being, enhance physical performance, and facilitate weight loss. The study reveals a significant reliance on the Internet as a primary source of information. The widespread utilization of dietary supplements persists despite limited empirical support for their efficacy and a dearth of understanding regarding individuals' pre-existing nutritional insufficiencies. It is imperative for sports nutrition professionals to disseminate accurate scientific information about the advantages and potential drawbacks associated with the utilization of dietary supplements. This practice enables consumers to make well-informed decisions and highlights the significance of maintaining a well-balanced diet in attaining their desired objectives. Healthcare professionals must offer gymnasium trainees more comprehensive guidance to mitigate potential adverse

effects. Educating gymnasium trainers and trainees regarding nutritional supplements can benefit the utilization of such supplements.

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Institutional Review Board Statement

The National University of Lesotho Institutional Review Board and the Ministry of Health in Lesotho both authorized this research.

Informed Consent Statement

Before starting data collection, participants were informed about the research objective and the consequent statistical analysis. Participation in the study was entirely voluntary and anonymous; subjects could also withdraw from the survey at any time and for any reason.

Data Availability Statement

The archived data, and all the elaboration and analysis generated and used to present results in this study are fully available on request from the corresponding author.

Conflict of interest Statement

Authors declare no conflict of interest in this study.

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