

# Nutrition Supplementation Practices of Recreational Gym Users in Uganda's Capital City: A Cross Sectional Study

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## Research Article

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## **Nutrition Supplementation Practices of Recreational Gym Users in Uganda's Capital city: A Cross Sectional Study**

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## **Abstract**

**Background:** This study focused on investigating the prevalence of nutritional supplement (NS) usage, establishing their source and the motivating factors for the usage of NS among Gym users in Kampala city, Uganda.

**Methods:** The study employed a cross-sectional research design. Multistage random sampling techniques were used to select 45 gym users among the 5 divisions that constitute Kampala city. Data were collected using questionnaires and analyzed using SPSS Version 26, where means, SD, frequencies and percentages were obtained. Chi-square tests were used for categorical comparisons between variables.

**Results:** The results showed that there were more male participants (62.2%) than female participants (37.8%). The majority (76.9%) of gym users obtained NS from retail stores such as pharmacies, (10.2%) from their sports coaches, (7.7%) nutritionists/dieticians, and (5.1%) from team mates. Non-professional gym users (62.3%) reported higher levels of energy drink consumption than professional gym users (26.7%). The consumption of vitamins, herbal products and proteins was also considerably high. We also identified coaches/trainers (30.8%) as the main source of information, followed by nutritionists/dieticians (23.1%) and online websites (20.5%). Most gym users strongly agreed that supplements increase endurance training, increase strength, and make one healthier.

**Conclusions:** The prevalence of nutritional supplement usage among gym users was high, with energy drinks and herbal products being the most preferred supplements.

**Keywords:** Nutritional supplements, athletes, gym users, athletes, dietary supplements.

## 1. Introduction

Uganda, a landlocked country in the eastern region of Africa, has an estimated population of 45 million, with a population of approximately 4 million people flocking Kampala capital city during the day.<sup>1</sup> Although faced with the challenge of not having a sea port for easy exportation and importation, various medicinal products easily find their way to different marketing outlets in Kampala city through neighboring countries, especially Kenya and Tanzania. Among these are sports nutrition-related products that have flooded Kampala and have been linked to successful sports figures in Uganda.<sup>2</sup> A recent report indicated challenges in reporting, tracking and identifying poor-quality medical products in Uganda.<sup>3</sup> However, such products may include various types of nonlocally made NS.

It is important to understand that the consumption of foods in diets that do not necessarily meet the Recommended Dietary Allowance (RDA) is grounds for the legitimate consumption of additional foods that are widely referred to as nutritional supplements.<sup>4</sup> These nutritional supplements (NS) contain food components that might provide more than one or more food nutrients.<sup>5</sup> Furthermore, the recommendations for usage of NS are clear and suggest usage only among those individuals with restricted diets, those with severe weight loss and those that consume high quantities of one food group.<sup>6</sup> However, as an increasing number of people purchase NS, more of those products continue to flock the market due to the increasing interest among users.<sup>2</sup>

Among recreational athletes in Greece, low levels of awareness and lack of information have been previously highlighted as a challenge.<sup>7</sup> A previous self-reported study on the usage of NS among professional athletes in Uganda found that although the level of usage was low, there was a need to further sensitize frequent users.<sup>8</sup> The literature on NS usage among gym users

globally is still scant, with these few studies concentrated in developed countries.<sup>9-12</sup> There is an increased influx of recreation centers or gyms in Kampala city of Uganda, leading to the continued demand for NS. The misuse of these products is concerning, particularly arising from high dosage and mixed usage.<sup>13</sup> Therefore, the aim of this study was to assess the prevalence of nutrition supplement usage among gym users, sources of supplements and related information, and understand the perceptions and motivating factors for NS usage in an effort to design a community-based education awareness campaign for the public in Kampala city.

## **2. Methods**

### **2.1. Design**

The study used a cross-sectional design with a convenient sample involving gym users in selected gyms in the five divisions (Rubaga, Central, Nakawa, Makindye and Kawempe) of Kampala city in Uganda in 2019.

### **2.2. Population**

A sample of 45 recreational gym users was enrolled in the study. We utilized a multistage sampling technique where gyms were eliminated based on their proximity to each other. In the first stage, gyms that were excluded were those that were in close proximity to each other. We instituted a fixed distance of approximately a 5-mile radius between the selected gyms as a way to increase the spread. A total of two gyms in each of the five divisions of Kampala were then randomly selected. In the second stage, adults in the selected gym (n = 45) were randomly approached and enrolled in the study. For one to be included in this study, they had to be > 18 years of age. All participants in this study consented to voluntary participation and were free to terminate participation at any time. The study was conducted according to the principles of the Helsinki Declaration and was approved by the Institutional Review Board of University of

Missouri- St. Louis, the School of Biomedical Sciences in the College of Health Sciences at Makerere University in Kampala Uganda. This study was also registered and approved by the Uganda National Council for Science and Technology, IRB# SS 5026.

### **2.3. Instrument**

This study utilized a modified questionnaire from the original questionnaire designed by the researchers.<sup>8</sup> This study's questionnaire consisted of various sections. The first section captured responses to questions relating to an individual's sociodemographic factors such as age, gender and level of education. The second section was designed to solicit the respondent's motivating factors for using supplements. The third section gathered information on the sources of the utilized supplements and sources of supplemental information.

### **2.4. Data Collection**

Prior to conducting the data collection, the researchers conducted two trainings for three research assistants at Makerere University in Kampala. The first training reviewed human participant protocols and usage of data capture forms. The second training equipped them on how to review and interpret the survey in local language and how to securely protect the consent and survey forms. Research assistants distributed surveys and collected data at gyms and post respondent workout sessions. Nine respondents were conveniently selected at each of the five selected gyms in the five regions of Kampala city.

### **2.5. Statistical Analysis**

Data were entered and analyzed using SPSS 26.0 software for Windows. Continuous variables were summarized using means and standard deviations after assessing the normality of the data. We standardized our variables and tested the normality of our data using Lillieforts corrections and Kolmogorov\_Smirnov tests. Categorical variables were summarized using frequencies and

percentages. Chi-square tests were used to compare categorical variables between groups. A probability  $p$  value  $< 0.05$  at a 95% confidence interval was considered significant.

### **3. Results**

#### **3.1. Participant characteristics**

A total of 45 recreation gym users (male; 62.2%, female; 37.8%) in five subdivisions of Kampala city in Uganda participated in this study. Participant characteristics are provided in table 1. In terms of age groups, the majority of the participants (26.6%) were within 20-25 years of age compared to the least number of participants from the 35 years and above age group (13.3%). There was a significant difference ( $P = .004$ ) in users' education levels, with the majority of participants (27.9%) having had some secondary school education and the least education level being nursery school (2.3%). It was evident from the participant responses that fewer gym users in Kampala were current students (4.4%), business managers (11.1%), unemployed (11.1%), skilled agriculturalists (15.6%), or professional workers (17.8%) compared to the majority who engaged in a variety of other professions (40%). These occupational group differences were, however, not significant ( $P = 0.126$ ). The majority of recreation gym users were professional users (51.1%) compared to their nonprofessional counterparts (48.9%). These male and female participants also engaged in a number of sports: football/soccer (2.2%), netball (4.4%), athletics (6.7%), and weightlifting (40%). A significant number of participants (46.7%) did not indicate any sports participation ( $P = .017$ ).

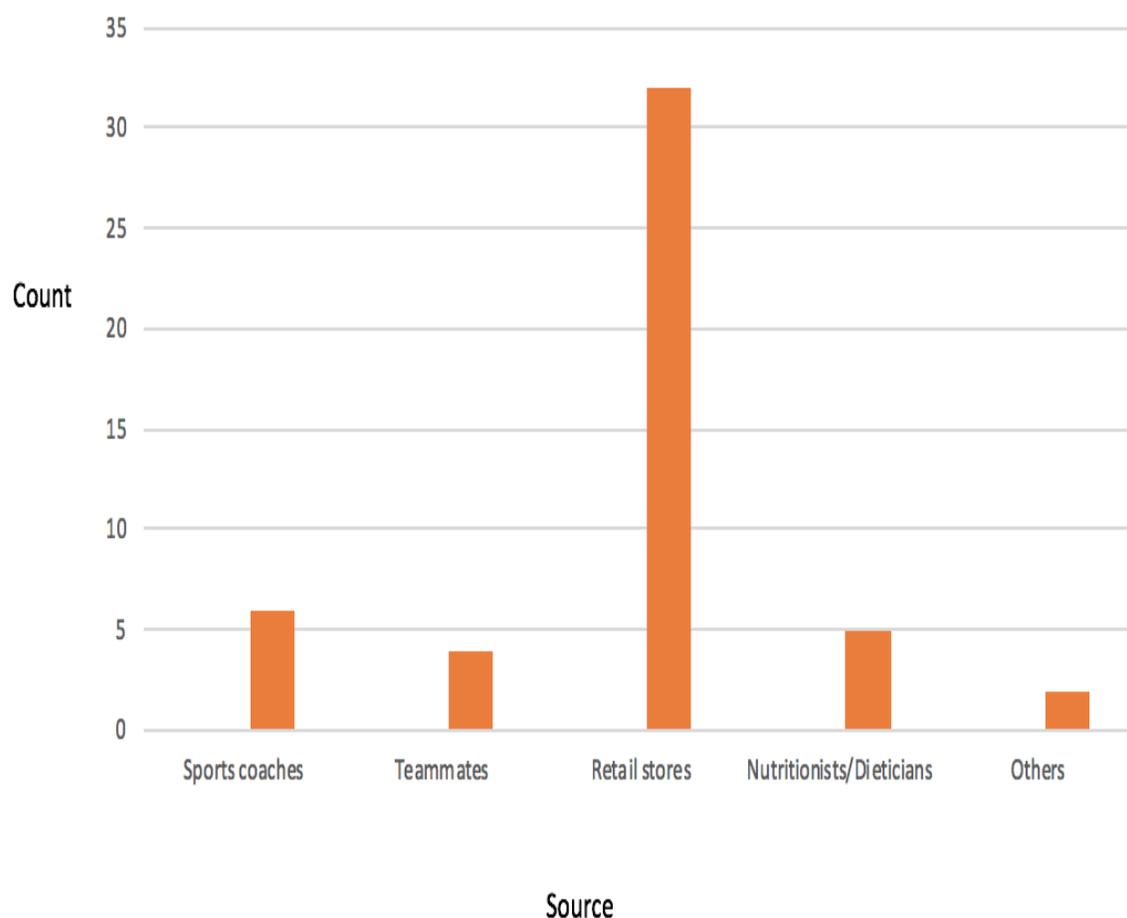
**Table 1. Characteristics of participants**

Variable	Frequency (n)	Percentage (%)	P value
Usage of Nutrition Supplements			
Yes	39	86.7	.005*
No	6	13.3	
Age group (n= 45)			.001*
18 - 20 years	9	20.0	
21 - 25 years	12	26.6	
26 - 30 years	10	22.2	
31 - 35 years	8	17.8	
36 years and above	6	13.3	
Sex (n= 45)			.002*
Female	17	37.8	
Male	28	62.2	
Highest Education level (n= 43)			.004*
Nursery school	1	2.3	
Some primary school	9	20.9	
Primary school	6	13.9	
Some secondary school	12	27.9	
Ordinary Level	3	6.9	
Advanced Level	8	18.6	
Tertiary Institution	5	11.6	
Occupation			.126
Student	2	4.4	
Business manager	5	11.1	
Professional	8	17.8	
Skilled agriculture	7	15.6	
Unemployed	5	11.1	
Other professions	18	40.0	
Type of gym user			.003*
professional user	23	51.1	
non-professional user	22	48.9	
Sport played			.017*
Netball	2	4.4	
Football/Soccer	1	2.2	
Athletics	3	6.7	
Weightlifting	18	40.0	
None	21	46.7	

\* $p < .05$

### 3.2. Source of nutrition supplement

When we asked the participants about the sources of their NS, the majority (76.9%) indicated retail stores such as pharmacies (figure 1). Other sources of NS were sports coaches (10.2%), nutritionists and dieticians (7.7%), and teammates (5.1%).



**Figure 1: Source of NSs for recreation gym user participants in Kampala.** This figure illustrates a variety of sources that participants reported as reliable avenues on the various products they consume. Individuals regard these as both valid and reliable sources of supplement effectiveness and any potential effects. Some participants indicated relying on more than just one source.

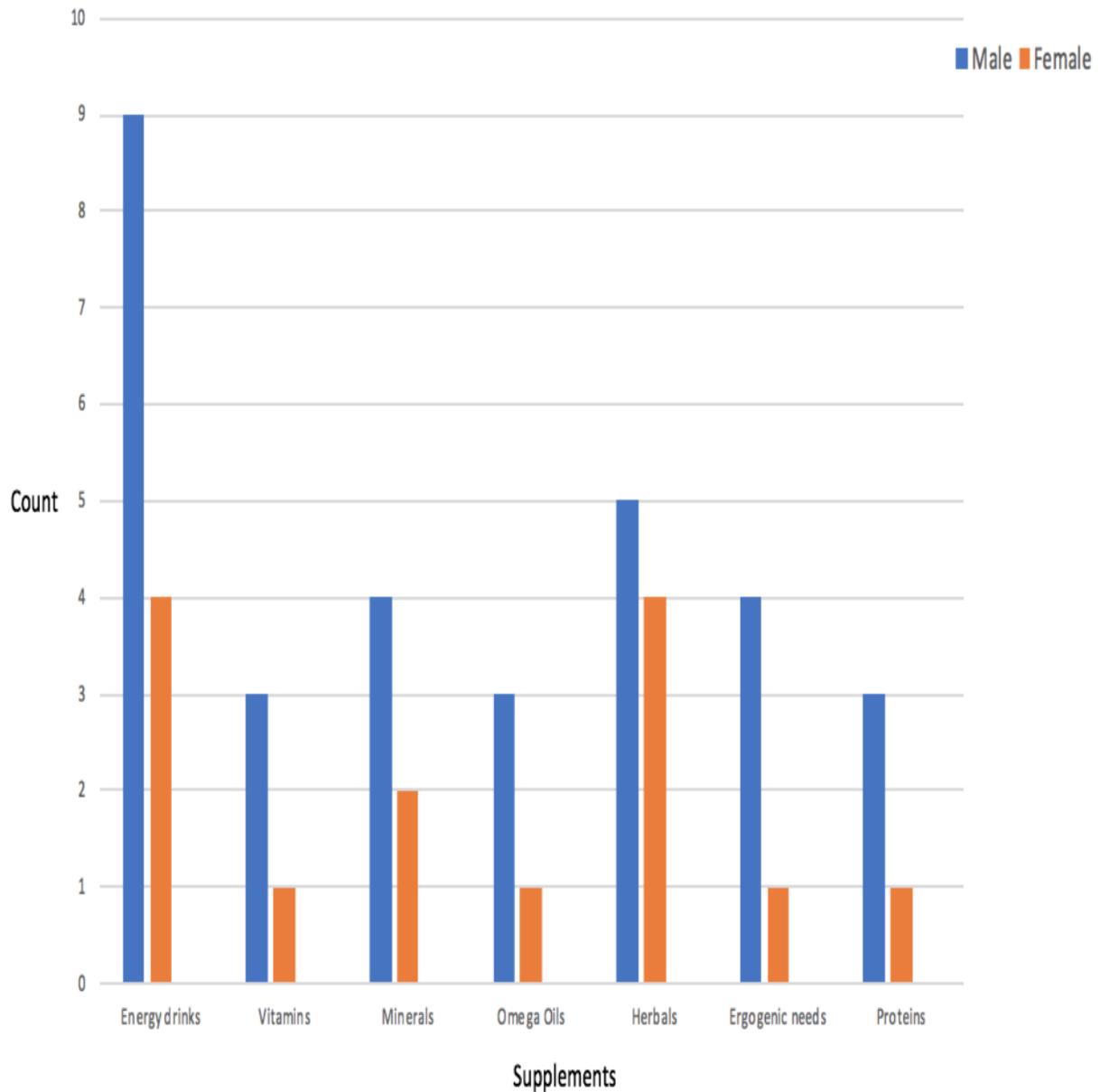
Table 2 details the gendered categorization of NS sources for recreation gym users. Male participants were more likely to acquire NS from retail stores or pharmacies ( $2.04 \pm .012$ ) than female participants ( $1.72 \pm .008$ ). In terms of the source of NS, male participants who acknowledged using NS were more likely to acquire NS from their coaches ( $1.98 \pm .016$ ) than female participants ( $1.33 \pm .025$ ). However, female participants were more likely to acquire NS from nutritionists or dieticians ( $1.44 \pm .011$ ) than their male counterparts ( $1.32 \pm .006$ ). Furthermore, the female participants were more likely to obtain NS from teammates ( $1.16 \pm .040$ ) than their male counterparts ( $1.06 \pm .004$ ).

**Table 2. Source of nutrition supplement by gender of gym user**

Source of Nutrition Supplements	Females		Males	
	Mean	SD	Mean	SD
Coach	1.33	$\pm .025$	1.98	$\pm .016$
Teammates	1.16	$\pm .040$	1.06	$\pm .004$
Retail store or pharmacy	1.72	$\pm .008$	2.04	$\pm .012$
Nutritionist or dietician	1.44	$\pm .011$	1.32	$\pm .006$
Others	1.10	$\pm .008$	1.11	$\pm .010$

Note. SD is standard deviation

Figure 2 indicates the various types of NSs consumed by gym users. Overall, energy drinks and herbal supplements were the most commonly consumed types of NS. The majority of male gym users indicated a preference for energy drinks (23.1%), followed by herbal supplements (12.8%), whereas female gym users indicated a higher preference for energy drinks (10.3%) and herbal supplements (10.3%).



**Figure 2: Various types of NSs among male and female gym users.** This figure illustrates the various types of supplements that participants reported utilizing routinely to support their exercise regimen in gyms in Kampala. Some participants indicated using more than one type of supplement.

### 3.3. Professional versus Non-Professional gym user consumption

As indicated in Table 3, non-professional gym users reported the highest levels of energy drink consumption compared to professional gym users. (professional = 26.7%, nonprofessional= 62.2%,  $\chi^2= 15.93$ ,  $df = 1$ ,  $p <.001$ ). The consumption of vitamins was also considerably high (professional = 26.7%, nonprofessional= 40%,  $\chi^2= 13.42$ ,  $df = 1$ ,  $p <.001$ ) in this group. The consumption of herbal supplements was considerably different between professional and nonprofessional gym users (professional = 4.4%, nonprofessional= 46.7%,  $\chi^2= 8.37$ ,  $df = 1$ ,  $p <.001$ ). Protein consumption was also different between the groups, with higher consumption among professional users (professional = 22.2%, nonprofessional= 6.7%,  $\chi^2= 11.44$ ,  $df = 1$ ,  $p <.001$ )

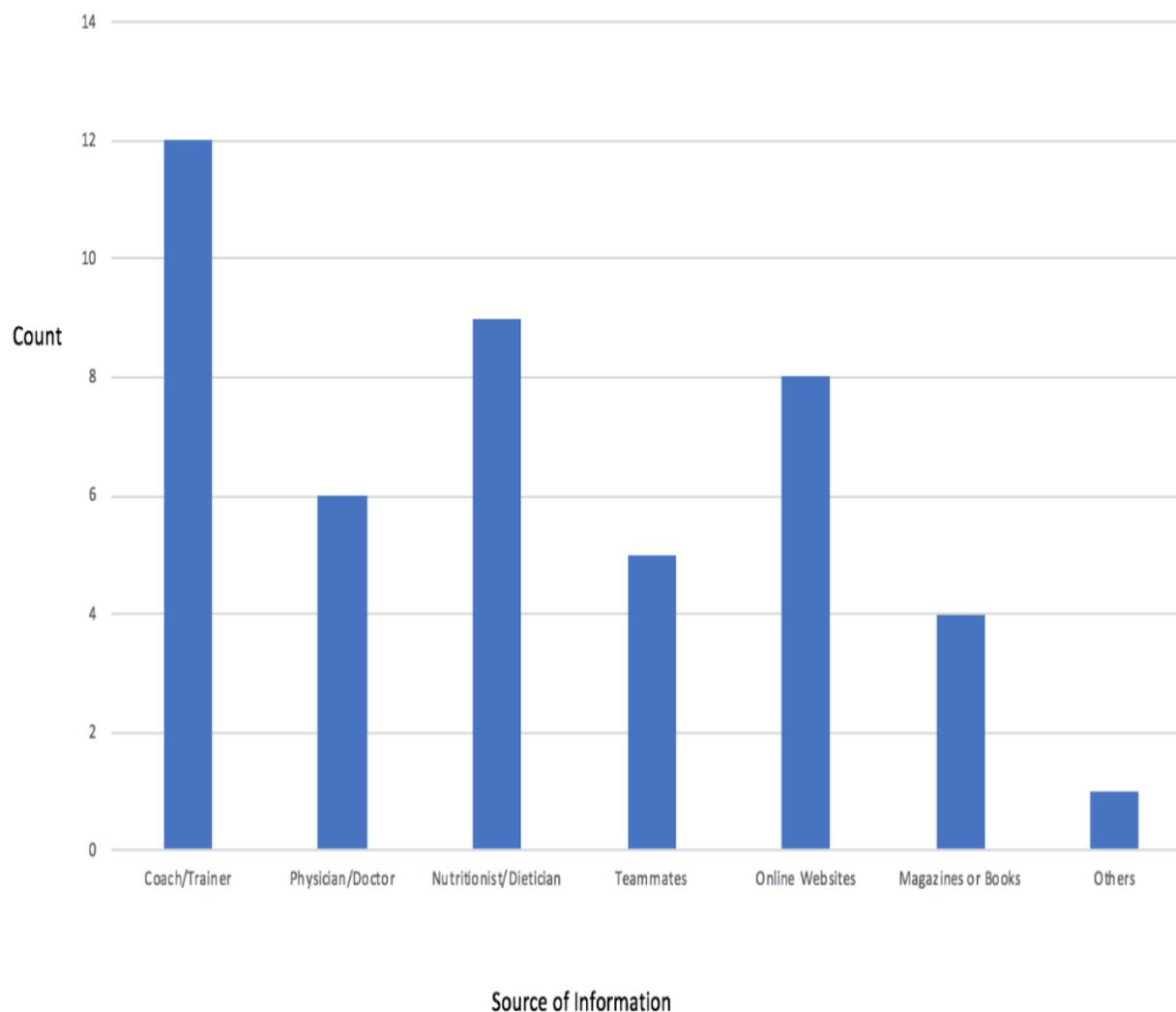
**Table 3. Supplement consumption patterns between professional and recreational gym users**

Type of supplement used (ALL)	Type of gym user				Chi- square
	Professional		Non-professional		
	Yes, n (%)	NO, n (%)	Yes, n (%)	NO, n (%)	$\chi^2$
Energy drink	12 (26.7)	0 (0)	28 (62.2)	5 (11.1)	15.93**
Vitamins	12 (26.7)	0 (0)	18 (40.0)	16 (35.6)	13.42**
Minerals	4 (8.9)	8 (17.8)	12 (26.7)	21 (46.7)	5.62*
Omega oils	1 (2.2)	11 (24.4)	8 (17.8)	25 (55.6)	4.99*
Herbals	2 (4.4)	10 (22.2)	21 (46.7)	12 (26.7)	8.37*
Ergogenic needs	3 (6.7)	9 (20.0)	9 (20.0)	24 (53.3)	2.37*
Proteins	10 (22.2)	2 (4.4)	3 (6.7)	30 (66.7)	11.44**

\* $df = 1$ ,  $p < .05$ , \*\* $df = 1$ ,  $p <.001$

### **3.4. Source of Supplements Information**

Recreation gym users indicated obtaining what they considered to be relevant NS information from coaches or trainers, nutritionists or dieticians, teammates, online websites, physicians or doctors, magazines or books and other sources that were not specified. The majority of participants (30.8%) indicated coaches or trainers as a reliable source of information, followed by nutritionists/dieticians (23.1%) and online websites (20.5%). Physicians/doctors, teammates and magazines or books were indicated among other sources. (Figure 3).



**Figure 3. Various sources of information on NSs reported by gym users in Kampala city Uganda.** This illustration includes sources of information that individual participants regard as both valid and reliable sources on supplement information and an avenue for information on product effectiveness and any potential side effects.

### 3.5. Gym users' perceptions about supplement usage

Using the Nutritional Supplement Perception Scale (NSPS), a modified version of the Performance Enhancement Attitudes Scale (PEAS),<sup>13, 8</sup> gym users were asked for their views on various statements regarding NS. Their Likert-scale measured responses ranged from strongly

disagree to strongly agree. Descriptive statistics in the form of frequencies and percentages of the different responses are captured in Table 4. In general, these responses showed variations in gym users' perceptions regarding NS. Most gym users strongly agreed that supplements increase endurance during training, increase strength, and make one healthier. In contrast, most gym users strongly disagreed on the statement that NS may contain doping agents (Table 4).

**Table 4. Gym Users perceptions about nutrition supplements**

How strongly do you agree or disagree with the following statements?	Strongly disagree n (%)	Disagree n (%)	Slightly disagree n (%)	Slightly agree n (%)	Agree n (%)	Strongly agree n (%)
1. Nutrition supplements make me healthier (n= 45)*	3 (6.7)	2 (4.4)	0 (0)	2 (4.4)	19 (42.2)	19 (42.2)
2. Nutrition supplements improve my endurance (n= 42)*	1 (2.4)	6 (14.3)	2 (4.8)	3 (7.1)	12 (28.6)	18 (42.8)
3. Nutrition supplements are safe to use (n= 41)*	1 (2.4)	3 (7.3)	3 (7.3)	13 (31.7)	15 (36.6)	6 (14.6)
4. Nutrition supplements provide me with more energy (n= 44)*	2 (4.5)	0 (0)	1 (2.3)	4 (9.1)	19 (43.2)	18 (40.9)
5. Nutrition supplements increase the amount of training I can undergo (n= 43)*	2 (4.6)	1 (2.3)	1 (2.3)	9 (20.9)	10 (23.3)	20 (46.5)
6. Nutrition supplements increase my strength (n= 42)*	3 (7.1)	0 (0)	0 (0)	4 (9.5)	17 (40)	18 (42.9)
7. Nutrition supplements increase my ability to cope with pain (n= 40)*	4 (9.8)	5 (12.2)	3 (7.3)	6 (14.6)	12 (29.3)	10 (24.4)
8. Nutrition supplements improve my concentration (n= 40)*	5 (11.4)	5 (11.4)	2 (4.5)	10 (22.7)	14 (31.8)	4 (9.1)
9. Nutrition supplements may contain doping agents (n= 40)*	10 (25)	5 (12.5)	5 (12.5)	12 (30)	8 (20)	0 (0)
10. Recreational drugs give the motivation to train and compete at the highest level (n= 40)*	3 (7.5)	0 (0)	1 (2.5)	9 (22.5)	11 (27.5)	16 (40)

\**P value* < .05

#### 4. Discussion

Our study aimed to understand NS usage among regular recreation gym users in Kampala city of Uganda. Over half of gym users who used NS played either netball, soccer, athletics, or weightlifting. A significant number of gym users who utilized NSs reported not playing sports (46.7%,  $p = .017$ ). Male and female gym users both reported that their primary source for NS products was either a retail store or pharmacy. Most supplements were consumed for endurance, increased training load, increased strength, health reasons and motivation to compete at higher levels. Overall, the study respondents, who were a representative sample of gym users in Kampala city, reported a high level of usage (86.7%) of NS. Such prevalence rates are higher than those described in previous studies in urban cities.<sup>9,15</sup> Selling NS in developing cities such as Kampala is a lucrative business for manufacturers of foreign products, which is a persuasive strategy to increase sales.

In developed countries, education, employment status and level of income are forms of socioeconomic status that are known determinants for the usage of NS,<sup>16-18</sup> whereas cultural factors play a significant role in NS usage in developing countries such as Malawi.<sup>18</sup> Higher levels of education have previously been associated with higher NS usage.<sup>19-21</sup> Although the majority of participants in this study reported having attained some form of secondary school education, it is possible that those with a higher education level greatly value the role of nutrition in their overall health.<sup>22</sup> In the neighboring country of Kenya, income and education have also been attributed to higher usage of dietary supplements,<sup>23</sup> although the levels of education among teachers in Kenyan secondary schools were not significantly related to supplement consumption.<sup>24</sup> In other African countries, such as Malawi, cultural factors may also play a significant role in NS usage.<sup>18</sup>

Furthermore, the majority of participants in this study reported having received NS products from retail area sources in urban areas of Kampala. In Uganda, most of these retail areas include urban pharmacies, shops and small clinics. Although most pharmacies in Uganda have been largely approved by the National Drug Authority,<sup>25</sup> a few instances of operational irregularities stemming from the utilization of unqualified attendants have been reported in some areas of Uganda,<sup>25</sup> suggesting a possibility of similar instances in cities such as Kampala. A recent study on the existence of falsified medical products in various African countries revealed that the available evidence on falsified and substandard medical products in Uganda's pharmaceutical wholesalers might be misleading given that the evidence was not collected from the informal sector but rather from a wholesaler, rendering that evidence inadmissible.<sup>26</sup> However, there has been the implementation of strict policies and the enforcement of laws against the sale of counterfeit products in Uganda and neighboring Kenya, as cited by a recent study indicating a shift to online markets, which lack relevant legislation.<sup>27</sup>

Energy drinks (26.7%), vitamins (26.7%) and protein supplements (22.2%) were the most consumed types of supplements among professional gym users in Kampala city, whereas energy drinks (62.2%) and herbal products (46.7%) were the most widely used NS types among nonprofessional gym users in Kampala city. The reported impact of energy drinks on cardiorespiratory fitness could have been the main motivating factor for the widespread use of energy drinks.<sup>28</sup> A large proportion of respondents in our study indicated weightlifting as a main professional sport played. Likewise, supplement usage among weightlifters in the current study was high, corroborating earlier findings.<sup>8</sup> Overall, the results of this study partially agree with those of previous studies on nutrition supplement usage in other cities.<sup>9</sup>

Our study reveals the occurrence of multiple supplement consumption patterns of professional and nonprofessional gym users in Kampala city. Such patterns of multiple usages of NS have been similarly reported in the U.S., where vitamins/minerals, herbs, and other specific supplements were concurrently used daily.<sup>29</sup> However, multiple supplement usage might be detrimental for consumers in Uganda, especially given the lack of individual primary physicians for many of the people in Uganda,<sup>30</sup> compared to their counterparts in the U.S., thus putting consumers in Uganda at a risk for serious adverse effects arising from high intakes.

As was reported in an earlier study,<sup>8</sup> the perception of the usage of NS by gym users in the current study ranged from increasing strength, improving endurance and making one healthier. Although the majority of participants in our study were male at 61.3%, with female participants accounting for only 38.7%, previous studies have revealed varying gender compositions of their studies.<sup>31-34</sup> Our participants asserted that their perceptions and motivation for consuming NS were related to the desire for increased strength, increased endurance, and harnessing of health benefits. Future studies could explore gender-based perceptions and motivation for using NS in Kampala.

## **5. Conclusion**

Our study is the first to evaluate the usage of NS among gym users in Kampala city in Uganda. The results indicate that there is a very high prevalence of NS usage among gym users, most of whom indicated the role of trainers, coaches and retail stores or pharmacies in the acquisition and distribution of NS. Energy drinks and herbal supplements were among the most preferred types of supplements among professional and nonprofessional gym users. Perceptions and motivations for NS usage were related to performance enhancement aspects of endurance and strength rather

than as a doping agent. Other motivations were related to the users' perception of acquiring health benefits with the use of supplements.

## **6. Perspectives**

The findings of this current study are vital in guiding interventions and education programs that address community usage of NS in Kampala city. Furthermore, the heightened usage of NS underscores the immediate necessity for coaches and trainer certification and continuing education in nutrition and wellness. There is a need for strict enforcement by the National Drug Authority to ensure the sale of safe nutrition supplement products in the retail outlets of Kampala city. Although enforceable policies could act as a deterrent to the possible sale and eventual consumption of expired and counterfeit products, it is highly recommended that legislation on the sale of products via online markets be introduced.

### **List of abbreviations**

NS Nutritional supplements

NSPS Nutritional Supplement Perception Scale

PEAS Performance Enhancement Attitudes Scale

RDA Recommended Dietary Allowance

### **DECLARATIONS**

#### ***Ethics approval and consent to participate***

This research was carried out in compliance with the Helsinki Declaration, and approval to conduct the study was obtained from the Institutional Review Board of the School of Biomedical Sciences (SBS-REC); protocol number: SBS 601. Additionally, the study was registered by the Uganda National Council of Science and Technology; Protocol Number: SS 5026. Written informed consent was obtained from all study participants.

#### ***Consent for publication***

Not applicable

### ***Availability of data and material***

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

### ***Competing interests***

The authors declare that they have no competing interests.

### ***Funding***

None

### ***Author's contributions***

HM & TM contributed to the study conceptualization, data collection, data analysis, manuscript writing and revision. SL, RZ & RM contributed to manuscript writing and revision. All authors read and approved the final manuscript.

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