DIETARY PRACTICES OF AEROBIC DANCERS AND BODYBUILDERS IN VHEMBE DISTRICT, LIMPOPO PROVINCE: ASSESSING THE NEED FOR NUTRITION INTERVENTION STRATEGIES

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ABSTRACT

Introduction: Recreational sports have gained popularity in South Africa. However, the dietary practices of participants remain unknown. The study evaluated the nutrient and timing of intake of recreational sports participants in the Vhembe District (VD), Limpopo Province. **Methods**: A cross-sectional descriptive study was conducted to evaluate the dietary practices of 112 recreational sports participants in the VD. Ethical clearance and written consent were obtained from the Turfloop Research Ethics Committee (TREC) and participants, respectively. Multiple 24-hour-recall questionnaires were used to capture all food consumed the previous day and the intake timing (before, during, and after physical activity). Portion sizes were estimated using marked household utensils during the interview/recall. The Food Frequency Questionnaire (FFQ) was used to validate the 24-hour recalls. The Food Finder (electronic software) was used to determine nutrient intake and descriptive statistics through the Statistical Package for Social Science (version 28) to report the practices of participants. **Results:** Participants were aged 34.2±9.0 years, majority of whom being males (58%) engaging in recreational aerobic dance and bodybuilding programs. Participants trained three times or more per week for two hours. Aerobic dancers consumed energy (16.6±8.0kcal/kg/day), CHO (3.4±1.5g/kg/day), protein (0.6±0.2g/kg/day), and fat (0.4±0.3g/kg/day) suboptimal. Similarly, bodybuilders consumed energy (55.6±1.0kcal/kg/day), CHO (1.5±0.2g/kg/day), and protein (0.4±0.0g/kg/day) suboptimal, while the fat intake (0.6±0.3g/kg/day) was optimal. Participants mainly drank water prior to, during, and after physical activity. However, no other nutrient-dense meals or beverages were consumed. **Conclusion:** The dietary intake and timing of recreational participants were suboptimal, thus, deviated from the sport nutrition recommendations, respectively.

Keywords: Dietary practices, recreational sport, energy, macronutrients, fluid

INTRODUCTION

Aerobic dance involves the coordination of movement following the rhythm of music performed at moderate intensity for a prolonged time (Baral, 2021), while bodybuilding focuses on body aesthetics through muscle development (Oborný & Ferenc, 2019). Nutrition is an important aspect during these physical activity (PA) programs for optimal health (Hopper et al., 2025) and anthropometric status (Amawi et al., 2024; Venn, 2020). South Africans are encouraged to engage in PA for at least 30 minutes each day per week (Saha et al., 2021). However, during PA engagement, characteristics such as personal sports goals, dietary preferences, social factors, and nutritional knowledge may influence nutritional practices (Martín-Rodríguez et al., 2024). Until now, two studies reporting on suboptimal energy and macronutrient intake of sports participants in Limpopo Province (LP), South Africa (SA) were identified (Masoga et al., 2019; Masoga et al., 2021). These two studies were, however, carried out in the Capricorn District of Limpopo and not in the Vhembe District (VD). The latter district seems to be experiencing an increase in the number of physically active participants in recreational programs such as aerobic dance and bodybuilding. Participation within these programs aligns with one of the South African Food Based Dietary Guidelines (SAFBDG) messages "Be active" (Saha et al., 2021) and responds to the attainment of Sustainable Development Goal number three of good health and well-being (WHO, 2023).

These recreational sports participants in the VD were observed practicing different dietary strategies, some of which seem to encourage imbalanced macronutrient intake. It is a concern that the actual dietary intake of these participants in the VD remains unknown. The authors could not identify any report about sports nutrition experts, for instance, Registered Dietitian-Nutritionist as described by Lambert et al. (2022) in the VD area to properly guide these individuals on nutrition during their PA programs. It is possible that VD participants could be following dietary recommendations suggested by alternative nutrition information sources, such as media, culture, or society (Martín-Rodríguez et al., 2024). Some of these sources lack sufficient scientific support (Denniss et al., 2024) and could influence participants to adhere to imbalanced macronutrient intake resulting negative health consequences (Hopper et al., 2025). Therefore, this research aimed to investigate dietary practices of these VD recreational sports participants to establish baseline dietary profile and evaluate adherence to sports nutrition guidelines. Sports practitioners and other researchers may find the results of this study interesting, consequently igniting a passion for interventions in these programs.

Dietary practices

Dietary practices (DP) are long-term dietary patterns and habits adhered to by an individual to maintain life (Li et al., 2023) and can be classified as either good or poor (Nana & Zema, 2018). Good dietary practices involve meeting daily nutritional requirements of physically active individuals (Hopper et al., 2025) to improve athletic performance and recovery (Amenya et al., 2021). To evaluate the nutrient intake, food

diary, 24-hour-recall, and FFQ are often applied (Bailey, 2021). Optimal nutrition supports training and recovery to minimizing injury and illness (Koehler et al., 2019).

Energy

An optimal diet is essential for adequate energy to sustain PA (Martín-Rodríguez et al., 2024). Energy requirements should be adjusted to support sports participants such as aerobic dancers to minimize risk of negative energy balance (Loucks, 2021). Optimal energy that maintains health is recommended (Amawi et al., 2024) and should be determined relative to body mass, duration, and the PA intensity (Braun et al., 2020). Therefore, energy intake of 25 – 35 kcal/kg/day for aerobic dancers and 40 – 70 kcal/kg/day for bodybuilders is suggested to maintain balance (Kerksick et al., 2018). Otherwise, predictive equations such as Harris-Benedict or Cunningham equations with activity factor of 1.8 – 2.3 could be alternatives (Ramokolo et al., 2024).

Carbohydrates

Carbohydrate is the main energy source during acute intensity PA programs (König et al., 2020) serving as the main preferred fuel source for the brain, spinal cord, and red blood cells (Naderi et al., 2023). The recommendation for CHO varies depending on the intensity and duration of PA (Amawi et al., 2024). For moderate to intense PA, 5 – 12 g/kg/day is suggested (Amawi et al., 2024; König et al., 2020; Kerksick et al., 2018). On the other hand, the glycemic index (GI) is another aspect to consider. This concept classifies CHO foods according to their impact on blood glucose levels after the consumption (Gerontiti et al., 2024; Moitzi & König, 2023). Rapidly digested and absorbed CHO are classified as having high GI (≥ 70), whereas those that are slowly digested and absorbed have low GI (LGI) (≤ 55) using glucose scale (Gerontiti et al., 2024). High GI CHO are required for acute high/rapid intense PA, while LGI-containing CHO sustain prolonged activities (Acharjee & Patel, 2025).

Intake of CHO before embarking on exercise is encouraged since the body's glycogen stores are easily depleted (Kerksick et al, 2018). Noting this, König et al. (2020) suggest that 2 – 3 hours prior PA, 1 – 4 g/kg of CHO should be consumed. To minimize fatigue during exercise, CHO is generally required to maintain blood glucose concentration. Therefore, CHO intake of 30–60 g/hour is recommended for PA lasting more than an hour to two while 90 g/hour is required in those exceeding 2.5 hours (Holtzman & Ackerman, 2021; König et al., 2020). Glycogen reserves are mostly increased through the consumption of CHO, consequently, when there are fewer hours (<4 hours) of recovery periods between PA sessions, rapid CHO refueling is crucial (Naderi et al., 2025). In view of this, CHO amount of 1.0–1.2 g/kg/hr. for the first 4-hours following exercise session (Podlogear & Wallis, 2022), and then every two hours for the next 6-hours is recommended.

Protein

Protein requirements are increased during PA due to exercise intensity, and duration; and other factors such as gender, age and body weight, (Witard et al., 2025). Protein promotes muscle strength, protein synthesis and restores muscle damage (König et al., 2020). Therefore, the major focus of consumption should be on high biological value (HBV) protein from animal sources such as fish, cheese, and milk due to a higher anabolic effect they have compared to plant sources (Ajomiwe et al., 2024; van Loon, 2021). Plant protein sources are less digestible and bioavailable due to fiber, phytates, and tannins (Berrazaga et al., 2019). Because plant protein presents a unique profile of amino acids (AA) (Wolfe et al., 2024), combination of various plant protein sources together in one meal, would generally improve AA composition to stimulate muscle synthesis (Berrazaga et al., 2019). The recommended daily allowance for general individuals is 0.8 g/kg/day (Iraki et al., 2019), while 1.0 – 2.0 g/kg/day is suggested for PA individuals (Holtzman & Ackerman, 2021).

Similar to CHO, varying information around protein recommendations before PA exists. However, 0.15–0.25 g/kg combined with CHO of 1.0 – 2.0 g/kg is recommended (Kerksick et al., 2018). Protein is also needed to reduce muscle damage and the extent of the exhaustion period during the PA (Awai et al., 2024). Therefore, an intake of 0.25 g/kg/hour combined with CHO is recommended (Vitale & Getzin, 2019; Kerksick et al., 2018). The consumption of protein after PA session generally preserves and repairs muscles (Wolfe et al., 2024). Conversely, supplementing 0.2–0.5 g/kg of protein or adding protein to CHO at a ratio of 3–4:1 supports recovery (Zhao et al., 2024; Moore, 2021; Kerksick, 2018). On the other hand, Martín-Rodríguez et al. (2024) suggest the consumption of 20 – 25 g of HBV protein following PA engagement. However, to effectively facilitate muscle glycogen and protein synthesis, the co-ingestion of CHO (0.9 g/kg/hr.) with protein (0.3 g/kg/hr.) is recommended (Margolis et al., 2021).

Fat

The daily fat recommendations for physical active individuals are comparable to those of the general population, 20 – 35% of total energy (TE) daily (Kerksick et al., 2018). The following distribution is recommended: Saturated fats, 7 – 10% of TE; polyunsaturated, 7% of TE and monounsaturated fatty acids making up to the difference of total fat recommendation per day (Schek et al., 2019). For bodybuilders and aerobic dancers, whom the goal is to reduce body fat, 0.5 – 1 g/kg/day is recommended (Kerksick et al., 2018). The adjustment of dietary fat should not decrease to < 20% of TE per day to avoid essential fatty acids deficiencies and impaired absorption of fat-soluble vitamin (Holtzman & Ackerman, 2021; Schek et al., 2020). For this reason, diets containing suboptimal or restricted fat (15 – 20 % TE per day) should be avoided (Hannon et al., 2020). On the other hand, high-fat diets should be avoided due to risks of cardiovascular diseases (Zeng et al., 2023). Until now, there remain no concrete recommendation for fat intake before, during, and after PA. Individuals may, however, need to practice caution towards the intake of fat before, during, and after PA due to risks of gastrointestinal discomforts (Amawi et al., 2024). There

are practices of fat loading before the competition to increase intramuscular triglycerides while preserving glycogen stores during prolonged physical activities (Amawi et al., 2024). The later remains an ongoing discussion and could be found elsewhere (Schek et al., 2020).

METHODS

A cross-sectional descriptive study designed was undertaken to assess the dietary practices of 112 adults participating in recreational exercise programs in gymnasiums (gyms) around VD, Limpopo Province. Ethical clearance was obtained from the Turfloop Research Ethics Committee (TREC) (TREC/346/2022: PG), while permission was sought from the gym managers before participants recruitment. Four main gyms were registered in the district offering exercise facilities mainly on aerobic dance and bodybuilding programs at the time of this research. These gyms had a total of 113 candidates (aerobic dancers, n=98 and bodybuilders, n=15) who were affiliated as members. Therefore, all registered gyms and affiliated participants were purposively selected during the two weeks of recruitment, of whom 112 consented to participate. Purposive sampling method was used in this study, given the small number of registered gyms and participants in the area. During the recruitment period, research information documents that clearly stated the aim and objectives, including the risks of participating in the study, were distributed to the potential participants. The same information about the aim, objectives and risks related to participation in the study were explained to the participants before signing the consent form. Participants were made aware that participation was voluntary with no incentives, and that they can withdraw at any point of the study whenever they feel uncomfortable. Data collection for this study took place at various gyms during exercise days before the commencement of the training activities over four months period. The process involved the enquiry of dietary (CHO, protein and fat) intake of athletes using the 24-hour-recall and FFQ to evaluate the adherence to sports nutrition recommendations. The questionnaires were filled in accordance with the standards and procedures stipulated by the Food and Agriculture Organization of the United Nations FAO (2018). The questionnaires were filled by the researchers, who were registered dietitians, using a pencil to allow corrections during the recall process. Participants were requested to remember all foods and fluids consumed the previous day. The participants were assisted through probing on the time and events that may have taken place on the previous day to minimize recall bias. This allowed the capturing of more detailed foods and preparation methods, time of meal intake, and addition of any condiments after cooking (Bailey, 2021). Portion sizes were also estimated using marked household utensils during the interview to minimize recall bias. The 24-hour-recall was collected twice, one over the weekend, Monday, and the other during the week, Thursday, to assess variations in consumption patterns (Bailey, 2021).

The FFQ was used to validate the frequency of intake of food and fluids after each 24-hour-recall. Dietary data were first loaded onto the South African Medical Research Council Food Finder (SAMRC-FF) program (electronic version) to determine nutrient intakes. The average of the nutrients was considered

from the two recalls. The dietary data were then transferred onto the Statistical Package for Social Sciences (SPSS) program (version 28) for further analysis. Descriptive statistics (percentages, mean and standard deviation [±SD]) were used to report the findings. Results were then compared to recommendations stipulated by the ISSN (2018) for compliance (Kerksick et al., 2018).

RESULTS

This study aimed to determine the dietary practices of recreational sports participants in Vhembe District, Limpopo Province, and further evaluate adherence to sports nutrition guidelines. The study evaluated the dietary practices of 112 participants who were affiliated and engaged in aerobic dance exercise (n=98; 87.5%) and bodybuilding (n=14; 12.5%) programs within four registered gyms in the VD. The participants were mostly young adults (34.2±9.0 years), the majority of whom were males (58%) who engaged as part-time participants. Aerobic dancers consumed energy below the recommendations compared to the optimal intake by bodybuilders. The macronutrient intake in both programs was suboptimal, while hydration practices and nutrient timing before, during, and after PA engagement deviated from the ISSN (2018) recommendations. Table 1 shows the characteristics of these participants. The majority of the participants (87.5%) engaged in aerobic dance exercise as opposed to a bodybuilding program (12.5%) training 3.1±0.9 and 3.4±0.5 days per week for 1.8±0.5 and 1.5±0.5 hours in that order.

Table 1. Characteristics of the participants

Program	Gender	Participants (%)		Total (N=112; 100%)		
Aerobic dance	Males	52 (53%)		98 (87.5%)		
	Female	46 (47%)				
Bodybuilding	Males	13 (93%)		14 (12.5%)		
	Females	01 (7%)				
Training Schedule	**Aerobic dancers**			**Bodybuilding**		
	Min	**Max**	**Mean±SD**	**Min**	**Max**	**Mean±SD**
Days per week	3.0	3.2	3.1±0.9	3.0	3.8	3.4±0.5
Hours per week	1.7	1.9	1.8±0.5	1.0	2.0	1.5±0.5

Table 2 shows the energy and macronutrient intake of participants. According to this table, aerobic dance participants consumed energy below recommendations (25–35 kcal/kg/day), whereas bodybuilders were at optimal levels (40–70 kcal/kg/day). In both programs, most of the participants consumed CHO and protein sub-optimally. At least females in both programs and male bodybuilders consumed fat optimal to recommendations (0.5–1.0 g/kg/day).

Table 2. Participants' energy and macronutrient intake

Program	Gender	Energy kcal/kg	Macronutrients (g/kg/day)		
			CHO	Protein	Fat
Aerobic dance	Males	16.9±9.0	4.1±1.5	0.6±0.3	0.4±0.4
	Females	16.3±7.0	2.7±1.5	0.6±0.2	0.5±0.3
Bodybuilding	Males	69.8±31.5	2.4±0.5	0.5±0.1	0.6±0.4
	Females	41.4±0.1	4.0±0.0	0.3±0.0	0.7±0.0

The participants' hydration practices were also investigated. Most of the participants (81%) consumed water an hour before the PA, while half of them consumed up to a liter of water every 25 – 30 minutes during the activity. Also, all participants consumed water 30 minutes immediately after the PA. Table 3 shows detailed analysis of the participants' hydration practices.

Table 3: Participants' Fluid Intake

Timing	Period (minutes)	Number (N)	Percentage (%)
Before physical activity	30– 120 minutes	91	81
	121 – 180 minutes	21	19
	Volume (ml)	Frequency (N)	Percentage (%)
	250 – 500	65	58
	501 – 1000	34	30
	>1000	13	12
During physical activity	Period (minutes)	Frequency (N)	Percentage (%)
	Every 10	22	20
	Every 15 – 20	40	36
	Every 25 – 30	50	44
	Volume (ml)	Frequency (N)	Percentage (%)
	<250	28	25
	251 – 500	28	25
	501 – 1000	56	50
After physical activity	Period (minutes)	Frequency (N)	Percentage (%)
	<30 minutes	112	100
	30 – 60 minutes	-	-
	Volume (ml) After	Frequency (N)	Percentage (%)
	<1000	15	14
	1000 – 2000	54	48
	>2000	43	38

Use of ergogenic agents

Table 4 reports the participants' use of ergogenic agents and dietary supplements. The majority of the bodybuilders (64%) used creatine powder as an ergogenic agent, most of whom were males (57%). On the contrary, 17% of aerobic dancers, mostly females (9%), used dietary supplements such as energy and meal replacement bars.

Table 4: Practice of physical activity performance enhancers

Ergogenic	Gender	Number (09)	Percentage (64%)	Total
Bodybuilders (n=14)	Males	8	57%	64%
	Females	1	7%	
Supplements		Number (17)	Percentage (15.2%)	Total
Aerobic Dancers (n=98)	Males	8	8%	17%
	Females	9	9%	

DISCUSSION

This study aimed to determine the nutrient intake and timing of recreational sports participants in Vhembe District, Limpopo Province, and further evaluate adherence to sports nutrition guidelines. The participants in the aerobic dance program consumed energy below the recommendations, whereas those in bodybuilding consumed energy optimally. The macronutrient intake in both programs was generally suboptimal, while hydration practices and nutrient timing before, during, and after physical activity deviated from the ISSN (2018) recommendations. The results of the current study for both aerobic dance and bodybuilding participants are not unusual, as suboptimal intakes of macronutrients were also widely observed among different categories of PA participants by other researchers. For instance, in a longitudinal study involving 17 female collegiate dancers at the University of Idaho, the imbalanced distributions of macronutrient intake were reported in accordance with the recommendations. The energy intake (2040.0±710.0 kcal/kg) of collegiate dancers was optimal, while CHO (3.7±1.6 g/kg/day) and protein (1.11±0.5 g/kg/day) were suboptimal (Brown et al., 2020). In another study investigating the relationship between macronutrient adequacy and aerobic power varying patterns of macronutrient intake, suboptimal CHO (3.0 g/kg/day) and protein (0.9 g/kg/day), and excessive fat (1.1 g/kg/day) were reported among the 52 Indonesian aerobic power recreational athletes, including 15 aerobic dancers (Ali et al., 2024).

Additionally, Mphafudi et al. (2024) reported suboptimal protein (0.9±0.6 g/kg/day) and CHO (2.3±1.3 g/kg/day) intake among the 66 aerobic dancers in Limpopo Province (LP) (SA). While in the latter study, the 24-hour-recall & FFQ methods were used to collect the dietary intake of athletes, a food log/diary was applied in the two former studies (Brown et al., 2020; Ali et al., 2024). This dietary self-record method is thought to be labor-intensive due to data/record management, while the reliability of the records may decrease over time (FAO, 2018). The dietary collection methods applied by Mphafudi et al. (2024) are, therefore, comparable to

those applied in the current study. Additionally, athletes in both studies emanated from the LP and could share a few similarities in sociodemographic characteristics.

Similarly, bodybuilders in the current study also consumed CHO and protein suboptimally. These findings are somewhat comparable to those by Masoga et al. (2019), who, in their study, reported suboptimal intake of CHO (3.9±0.9 g/kg/day) and protein (1.3±0.5 g/kg/day) among bodybuilders in LP, SA. The suboptimal energy levels among the aerobic dancers in the current study could be explained by the fact that energy balance is highly dependent on sufficient consumption of macronutrients such as CHO and fat (Galchenko et al., 2021), which were imbalanced. In another study investigating body composition and dietary patterns of professional (n=29) and amateur (n=26) bodybuilders, the consumption of CHO (3.8±2.5 g/kg/day) and fat (0.7±0.4 g/kg/day) in the professional group was optimal while the protein intake was excessive (3.7±1.0 g/kg/day) in accordance with the Polish standards. On the other hand, the amateur group had an excessive intake of fat (1.1±0.5 g/kg/day) while the CHO (3.6±12 g/kg/day) and protein (1.7 g/kg/day) were optimal (Makiel et al., 2020). In the current study, CHO intake was insufficient in both the aerobic dance and bodybuilding groups. In contrast, fat intake was optimal in all groups, except for the insufficient level within the aerobic dance male group. Fat, for instance, is a more concentrated macronutrient in energy, offering 9.0 kcal per gram compared to protein and CHO (WHO, 2023).

We, however, suspect that the excessive fat intake by the amateur bodybuilders reported in the study by Makiel et al. (2020) could have been influenced by practice of protein supplements (Karpik et al., 2020) or fat-loading practice (Schek et al., 2020) given the intense nature of sport these athletes participated in. Excessive dietary fat consumption above 35% of TE has been associated with increased body weights, body mass index, and risks of obesity later in life (WHO, 2023; Wang et al., 2020). Individuals in SA are advised to use fat sparingly, make starchy foods part of most meals, and consume protein foods daily, among other SAFBDG messages (Saha et al., 2021). The suboptimal intake of dietary fat in the current study may have been partly influenced by the former statement about fat in the SAFBDG. However, the suboptimal finding of the other two macronutrients, protein, and CHO, among the aerobic dance and bodybuilding participants in the current study is surprising. Firstly, starchy foods such as maize meal are generally known to be staple foods in some parts of SA (Khumalo et al., 2011), particularly LP. Secondly, plant-based protein foods such as legumes (dried beans and lentils) could be used as alternative substitutes as they are mostly available and cheap compared to animal protein (Zhang et al., 2024) in Limpopo. These protein alternatives contain good sources of fatty acids and fiber, which these recreational participants could obtain extra health benefits (Amoah et al., 2023). The existing plethora of nutrition information from many social media platforms may have contributed to these suboptimal intakes. On the other hand, these participants may have under-reported their intakes to at least meet the expectations of the researchers, given our profession as nutrition experts. However, it would be interesting to comprehend the body composition status of these participants, given these suboptimal macronutrient intakes.

Overall, a few participants (23%) in the current study used ergogenics or dietary supplements to enhance their PA performance. The highest use was observed among the bodybuilders (64%) than the aerobic dancers (17%). In these groups, bodybuilders used creatine powder, while the aerobic dancers used meal replacement bars. The use of creatine powder is a common practice among physique athletes (Roberts et al., 2020), making our results comparable to other studies. For instance, in a cross-sectional study involving 100 gym participants in Sulaymaniyah City (Iraq), a higher prevalence (n=54; 54%) of nutritional supplement use was reported among the participants. The majority of these participants (57.4%) were youth (18 – 25 years) who used protein powders for bodybuilding purposes (48%), as guided by healthcare providers (Mahmood et al., 2021). In another pre- and post-intervention study by Thomas et al. (2024), 218 bodybuilders' views towards the use of performance nutritional supplements in the United Arab Emirates were assessed. The intervention involved the administration of educational flyers containing information on the use of supplements in sports termed "The power of the right choice." The performance enhancement attitude scale was used to evaluate the effect of education in the post-intervention phase. Of the 80 participants who completed the study, the distribution of attitude scores was reduced from before to post-intervention, suggesting an improved understanding of the use of performance-enhancement products, especially among the school students. In a cross-sectional study involving 614 in 17 fitness centres in Sarajevo, a higher (38.7%) use of food supplements among the participants aged 18 – 25 years (n=214; 34.9%) was reported compared to other age categories. The top three used supplements by the overall participants (40.4%) in the latter study were magnesium (29.5%), whey protein (27.0%), and vitamin C (20.0%) (Caušević et al., 2025).

On the other hand, Ficarra et al. (2022) reported that only 5.6% of the participants, during the investigation of drug and dietary supplement use among Sports Sciences university students, used pharmaceutical products (vitamin C, multivitamin, and vitamin B complex). Although the setting and population in the latter study, may somewhat be incomparable to those of the current group (general public), it is generally advised to obtain nutrients through optimal dietary intake (Amawi et al., 2024). The increased usage of ergogenic agents in the current study, particularly by bodybuilders, could mean that information on the long-term disadvantages of ergogenic agents' use on general wellbeing has not been notable. The results in the current and the latter studies are incomparable, given the differences in socioeconomic and demographic statuses, and geographical settings of the participants. For instance, most participants who used supplements in our study were young adults (34 years) whereas those of the latter were youth (18 – 25 years). In reference to the socioeconomics, more than one-third of breadwinners in Limpopo Province (SA) were reported to earn ±3000.00 ZAR (South African Rands) (155.54 €) monthly during the household socioeconomic determinants of food security among residents (Tambe et al., 2023). The other possibility to explain less use of ergogenics and supplements in the current research, especially among aerobic dancers, may be due to the participants' naivety of these ergogenics as they are mostly from a rural setting.

Lastly, participants in the current study consumed no nutrient-dense meals or beverages some hours before, during, and immediately after the physical activity. However, fluid in the form of pure water was used for hydration during the physical activity. In accordance with the SAFBDG, the latter is appropriate as the physiological demands and muscle activities during exercise are increased thus necessitating a need for increased intake (Saha et al., 2021). In one descriptive study investigating the fluid intake and hydration strategies of 66 part-time bodybuilders in Limpopo Province (LP), inconsistent consumption patterns of fluids were reported before, during, and after training sessions (Masoga et al., 2024). In another cross-sectional study investigating the nutritional practices of 86 aerobic dance participants, 83.3% were reported to have consumed pure water during the dance session. In the later study, there were no nutrient-dense meals consumed before and immediately after the dance sessions (Mphafudi et al., 2024). The former and the latter study are comparable to the current study given similarities in sports and study setting characteristics of the participants. Although participants in the current study are applauded for the consumed fluid during their physical activity, there remains a need to adequately distribute their intake throughout the training session in accordance with sports recommendations (Amawi et al., 2024).

On the other hand, the practice of no nutrient-dense food consumption before physical activity is another worrying factor as it can predispose participants to risks of negative energy balance, fatigue, and poor sports performance (Amawi et al., 2024). To maximize physical activity performance, Naderi et al. (2025) recommend the consumption of 5 – 7 ml/kg of fluids four hours before the training. A slightly higher recommendation of 5 – 10 ml/kg/day of fluids containing 1 – 4 g/kg of CHO combined with 0.15 – 0.25 g/kg of protein before the session is recommended by the ISSN (Kerksick et al., 2018). Additionally, 200 – 300 ml of fluid containing minerals and electrolytes should be consumed every 10 – 20 minutes intervals during the PA session (Amawi et al., 2024). However, most of the participants in the current study consumed fluid in the form of water an hour before, every 30 minutes during, and immediately after the physical activity session. It is vital to consume fluid optimally in accordance with recommendations for optimal hydration (Zhang et al., 2021). PA participants are encouraged to start their sessions on a euhydrated status to prevent undesired health outcomes such as overheating and organ failure. Although participants in the current study consumed fluids to mitigate these health risks, their intake was without a solution. As mentioned earlier, fluids containing 60 – 100 g/hour of CHO in a 6 – 8% solution are advocated (Kerksick et al., 2018) to alleviate hypoglycemic episodes.

CONCLUSION

This study aimed at determining the nutrient intake and timing of recreational sports participants in This study aimed at determining the nutrient intake and timing of recreational sports participants in Vhembe District, Limpopo Province and further evaluate adherence to sports nutrition guidelines. The dietary intake and timing thereof of the recreational sports participants at Vhembe District, overall, deviated from the sports nutrition recommendations stipulated by the ISSN (2018). The aerobic dance participants consumed energy and macronutrients below the recommendations. The bodybuilding participants, on the other hand, consumed energy and fat optimally, whereas protein and CHO were suboptimal. The hydration practices and nutrient intake timing (before, during, and after PA) of both groups also deviated from the sports recommendations, as participants did not consume any meals/snacks during these periods, except for fluid in the form of water. Imbalanced nutrient intake, incorrect timing, and improper hydration practices while involved in PA consequently affect exercise itself through early fatigue, deprived tissue repair, hydration variabilities, and nutrient deficiencies later in life. Athletes may have overlooked the importance of maintaining optimal nutrition while pursuing different goals in their PA programs. Thus, current findings necessitate an intervention that encourages adherence to PA or sports nutrition recommendations. Interventions in the form of nutrition education and/or meal plan programs in each PA group can be of paramount to relieve the current situation. As mentioned earlier, it would also give a comprehensive guide towards the advanced interventions whenever the entire nutritional status profile of these participants is known, for example, anthropometric and biochemical profiles, in which further research is suggested.

Conflict of interest

The authors declare no conflicts of interest**.**

Acknowledgment

The researchers would like to acknowledge the recreational sports participants, coaches and gym managers in the Vhembe District (Limpopo Province) for participating in this study.

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