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Fluid Intake and Hydration Strategies of Bodybuilders In the Capricorn District, Limpopo Province, South Africa

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Abstract

Background: Dietary practices of bodybuilders in the Limpopo Province have been reported. However, fluid intake and hydration strategies of these athletes were never reported. **Problem:** Bodybuilding athletes in Capricorn district of Limpopo province adhere to various hydration practices. However, the extend at which these athletes adhere to the fluid intake and hydration guidelines during sport engagement is unknown. **Research objectives:** This study aimed to determine the fluid intake and hydration practices of bodybuilders in Capricorn District of Limpopo province and adherence to the guidelines thereof. Furthermore, to investigate the association of fluid intake with the demography of athletes. **Methods:** A quantitative descriptive study was used to obtain 66 part-time bodybuilders in the Capricorn district. Demographic information and hydration practices of the athletes were collected during training days. Descriptive statistics were used to summarize the athletes' fluid intake and hydration practices. Pearson's correlation test was used to associate hydration practices with the athletes' educational status and source of hydration information. **Results:** Athletes were 24 (± 4.2) years old, engaged as bodybuilders for 2.3 (± 1.5) years, training once a day (61%), for 2.2 hours (males) and 2.0 hours (females). Athletes used pure water before (51%), during (47%) and after training (57%). Social media (47%) and the internet (25%) were used as sources of hydration information. There was no significant correlation between hydration practices and demographics. **Conclusion:** Fluid intake of athletes was suboptimal. Athletes consumed mostly pure water before, during, and after their training sessions. Therefore, athletes' fluid intake (amount) and hydration strategies (type and timing of fluid) did not adhere (mostly suboptimal to) sports nutrition standards. This poses a risk for dehydration during sport.

Keywords: Athletes, Bodybuilders, Hydration, Fluid, Training

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A. Introduction

Bodybuilders intend to maximise muscle hypertrophy through strenuous training (Alves et al. 2020). During training, factors such as sweating (Mosler et al. 2020) and reduced fluid intake result in a decline in plasma volume (Mosler et al. 2019) posing a risk for fluid deficit and dehydration (Mosler et al. 2020). Optimal fluid intake is required to support temperature regulation and training performance (Ceylan, 2021). Suboptimal hydration in the last days towards bodybuilding the competition "peak week" (Escalante et al. 2021; Tidmas et al. 2022; Parent et al. 2022) coupled with the use of diuretics poses a risk for dehydration (Steele et al. 2019; Mosler et al. 2019). Bodybuilders restrict fluid intake to suboptimal levels to accomplish a "dry" appearance (Escalante et al. 2021) and vascularity (Parent et al. 2022), and to minimize bloating (Escalante et al. 2021). However, suboptimal fluid intake during bodybuilding training may limit blood flow to various muscles (Mosler et al. 2019; Roberts et al. 2020). The latter may pose a risk of dehydration, hyperthermia (Bean, 2022), coma (Dube et al. 2022), and kidney failure (Tidmas et al. 2022). On the other hand, excessive fluid intake may predispose athletes to polyuria which bodybuilders try to avoid during competitions (Chappell & Simper, 2018). Hence, athletes should endeavor for a euhydration state during their bodybuilding training sessions (Belval et al. 2019). To the knowledge of the researchers as informed by observations made during interaction with athletes, there is a lack of fluid intake and hydration guidelines for boybuilding athletes in South Africa (SA). Thus the hydration strategies used by these athletes might be founded on individual experiences, recommendations from coaches or teammates, and guides from social media platforms. However, the extent of fluid intake and hydration status of these bodybuilders has not yet been reported. This study, therefore, intends to highlight the need for the development of fluid intake and hydration standards for South African bodybuilders.

Hydration strategy index for athletes

During training, the body regulates temperature through the evaporation of sweat (Mosler et al. 2020). Therefore, athletes should commence training sessions in a euhydration state (Desbrow, 2021) to prevent hypohydration, and replace the lost fluids after the exercise session (Belval et al. 2019). Sport practitioners or coaches need to tailor hydration plans to suit the training schedules of individual athletes (Bean, 2022; Knap, 2021). These plans should consider factors influencing hydration statuses such as age, gender (Zhang et al. 2020), environmental

conditions, nature of exercise (duration, intensity, and sport category), body weight, and body composition (Knap, 2021; Grozenski & Kiel, 2020). Optimal hydration is important for ideal health and improved sports performance (Barley et al. 2020; Belval et al. 2019). In general, a total water and fluid intake of 2.6 and 2.1 liters per day are recommended for adult males and females respectively (Survey, 2016). However, during the day of training, intake of fluids before, during, and after training should be planned practically to suit the sport needs of an athlete (Mosler et al. 2020) with special consideration to the intensity, duration, and gastrointestinal tolerance (Mccubbin et al. 2020).

Pre-training fluid intake

Athletes should begin training sessions on optimal hydration (Ceylan, 2021; Mosler et al. 2019). This can be achieved through the consumption of 500 – 600 ml of water or sports drinks 2 – 3 hours before training (Judge et al. 2021). Relative to body weight, about 5 – 10 ml/kg of fluid, 2 – 4 hours before the sports event is recommended (Bean, 2022; Mosler et al. 2019; Smith et al. 2015). This pre-training timing is sufficient to permit the elimination of any accumulated urine (Collins et al. 2021) that may interfere with sport performance. If a sport event or training lasts for an hour or less, fluid intake before such an event may not be necessary (Mosler et al. 2020).

During training fluid intake

The hydration strategy used during training should aim to maintain body weight loss to <2% to avoid impaired sports performance (Bean, 2022; Ceylan, 2021; Desbrow, 2021). This can be achieved by the consumption of 200 – 300 ml of fluids in intervals of 10 – 20 minutes (Judge et al. 2021) or 13 ml/kg/hour relative to body weight (Desbrow, 2021). Alternatively, athletes may consume an amount of 400 – 800 ml of fluids per hour during exercise (Bean, 2022; Thomas et al. 2016). Consumption of fluids containing electrolytes (Mosler et al. 2020) increases the need to drink, improves palatability and promotes retention of fluids (Bean, 2022) and/or carbohydrates (CHO) are recommended as are a source of energy (Bean, 2022) and to replenish muscle glycogen (Roberts et al. 2020). In events lasting longer than an hour, fluids containing CHO solution of 4 – 8% and sodium of 400 – 1100 mg/l are recommended to minimise fatigue and replenish the sodium lost through sweating, respectively (Mosler et al. 2020). Fluid intake and hydration status in sports can be further monitored using athletes' thirst sensation and urine output (Bean, 2022). However, the maintenance of a good

hydration status of bodybuilders can be problematic as these athletes may intentionally reduce fluid intake or induce excretion of fluids to achieve a desired physique for competitions (Escalante et al. 2021; Chappell & Simper, 2018). The safety of these practices is still to be established (Escalante et al. 2021)

Post-training fluid intake

Athletes may consume fluids in the form of water, sport drinks or diluted fruit juices (Mosler et al. 2019). For every 1 kg of body weight lost after exercise, intake of about 1.2 – 1.5 liters of fluids containing 20 – 50 mmol/l sodium is encouraged to optimise sodium levels (Bean, 2022; Heaton et al. 2017). Urine colour observations and analysis may also be used as an index to monitor hydration after training (Mosler et al. 2020). Highly concentrated urine may warrant an additional 3 – 5 ml/kg of fluids (Grozenski & Kiel 2020). However, urine colour and/or output as an indication of hydration status must be used with caution as these factors might be influenced by previous fluid, diet, and/or medication intake (Barley et al. 2020). Urine specific gravity and osmolality of ≤1.02 and ≤700 mOsm/kg respectively indicate euhydration (Ersoy et al. 2016).

Thirst sensation and physical signs are other fluid and hydration monitoring techniques. The appearance of sunken eyes, poor capillary refill time, and prolonged raised skin turgor may be useful markers during the clinical assessment of athletes (Barley et al. 2020). Thirst sensation is thought as a regulatory mechanism to prevent severe dehydration and risk of exercise associated hyponatraemia (EHA) among athletes (Hew-Butler et al. 2015). Thirst sensation should, however, not be used alone as a marker of hydration during exercise (Belval et al. 2019) as the marker is highly variable between individuals and dependent on factors such as hyperosmolarity and hormonal responses (Bean, 2022; Adams et al. 2019).

Monitoring fluid and hydration through changes in body weight is another reasonable technique during sport events or training (Bean, 2022; Mosler et al. 2020; Belval et al. 2019). This technique associates the amount of weight loss or gain with fluids noting that fluids, especially water, account for up to 80% of body weight. For instance, 1 – 2% loss of body weight as fluid is acceptable (Nuccio et al. 2017). At this level, however, the onset of thirst may be prominent (Adams et al. 2019). Losses of ≥3% of body weight as fluid result in dehydration (Grozenski & Kiel 2020) which often significantly impairs exercise performance (Mosler et al. 2020), especially aerobic sports performance taking place in cool weather

(Bean, 2022). The use of acute dehydration to achieve weight loss may cause altered thermoregulation (Barley et al. 2020), ischaemic heart disease and stroke (Januszko & Lange 2021). These events often result from the loss of minerals such as sodium, magnesium, and potassium leading to thickened and reduced blood flow to muscles and cardiovascular system (Mosler et al. 2019). Therefore, the addition of these minerals to water may significantly improve hydration (Chappell & Simper 2018). The measurement of weight is recommended for monitoring hydration levels in sport (Januszko & Lange 2021). Pre- and post-exercise weight comparisons may serve as a guide for the adequacy of fluid intake (Belval et al. 2019). However, this method only provides accurate results for a period of ≤24 hours (Barley et al. 2020). Noting that bodybuilding is a weight-category sport, monitoring body weight changes after training may serve as a reasonable and practical approach during tailoring athletes' hydration plans. Lastly, sweat production can also serve as an indicator for fluid replacement (Mosler et al. 2019). Noting the possibility of increased variation in sweat production during exercise and performance (Mccubbin et al. 2020; Belval et al. 2019); fluid recommendations should, therefore, be tailored per athlete's needs (Mosler et al. 2019).

One study investigated the hydration status of the 26 male soccer athletes using different urine index methods (urine colour, osmolality and urine specific gravity [USG] tests) and found that athletes were at a slight risk of dehydration (colour: 3±1; Osmolality: 903±133 mOsm/kg USG [laboratory]: 1.021±4 g/cm^3) (Ersoy et al. 2016). Two other studies also investigated the hydration status of different categories of atheletes using USG as an index during the pre-training period (Volpe et al. 2009; Heishman et al. 2021). These authors found USG of <1.020 g/cm^3 which implied hypohydration state among their athletes. In another study thirst was used as a marker for hypohydration among the 12 male recreational athletes using motorised treadmill exercise. Using body weight changes, likert-scale approach to measure thirst (1-not thirst at all, 5-moderately thirsty and 9 very very thirsty) and hematological measures of serum osmolality, thirst perception and percentage body weigh loss (3.0±1.2% vs 2.6±0.6%) were higher in the both the hypohydrated groups post exercise (Adams et al. 2019). Although several methods for monitoring hydration for athletes exist (Barley et al. 2020), there remain no golden strategy superior than the other. Athletes are encouraged to practice to achieve optimal

hydration by starting training in a euhydration state, adequate intake of fluid during training and replacing lossess following training (Belval et al. 2019). We, however, noted that little research has been done towards the assessment of fluid intake and hydration practices of bodybuilding sport, particularly in Limpopo province, thus responding to this need.

B. Methods

This was a quantitative descriptive research which adopted a purposive sampling technique to obtain sixty-six (66) part-time competitive bodybuilding athletes in gyms in the Capricorn district of the Limpopo province, SA. These bodybuilders participate in bodybuilding sport as affiliates of the International Fitness and Bodybuilding Federation South Africa (IFBBSA). Data were collected in the evenings before the commencement of the training. Demographic information (including age, gender, education level, employment, marital status, and known medical conditions), and the pattern of training (years involved in bodybuilding, duration, and frequency of training; sources of nutrition information used) and the hydration strategies and consumption of fluid (before, during, and after the training; and type used) of the athletes were collected. The weight before and after the training was also measured to calculate fluid requirements. Data were loaded into the statistical program for social sciences (SPSS) version 28 for analysis. Descriptive statistics were used to summarise the hydration strategies of these athletes. Pearson's (r) correlation test, with a p value of <0.05, was used to determine the association between hydration strategies to education levels, nutrition information sources and employment status.

C. Result and Discussion

The demographic profile of the 66 athletes included in the study is summarised in Table 1. The majority of athletes were males (n=57; 86%) and the mean age for the group was 24.2±4.3 years. Most athletes, namely 46% (n=26) of males and 33% (n=3) of females had a degree or were completing their degrees followed by those who were still in high school (35%; n=20 males & 44%; n=4 females). A few males (10%; n=6) and females (22%; n=2) had completed their diplomas. However, a large number of these athletes, males (72%; n=41) and females (56%; n=5) were unemployed. Of those who were employed, 23% (n=13) and 22% (n=2) were males and females, respectively. The vast majority of males (91%; n=52) and females (89%; n=8) were single.

Table 1. Demographic profile of athletes (N=66)

Variables	**Males; n=57 (86%)**	**Females; n=9 (14%)**
Age (mean±sd)yrs.	24.7±4.1	23.7±4.6
Educational level	**Males; n=57**	**Females; n=9**
High school	20 (35%)	4 (44%)
Diploma	6 (10%)	2 (22%)
Degree	26 (46%)	3 (33%)
Other (Postgraduate)	5 (9%)	0 (0%)
Employment status	**Males; n=57**	**Females; n=9**
Employed	13 (23%)	2 (22%)
Unemployed	41 (72%)	5 (56%)
Self-employed	3 (5%)	2 (22%)
Marrital status	**Males; n=57**	**Females; n=9**
Single	52 (91%)	8 (89%)
Married	3 (5%)	1 (11%)
Staying with partner	2 (4%)	0 (0%)

The training profile of bodybuilders was recorded and a summary is provided in Table 2. The mean years of involvement in bodybuilding was higher for males (2.4±1.5 yrs.) than females (1.6±1.1 yrs.). However, both males (1.5±0.9 times) and females (1.7±0.8 times) had a near similar frequency of training each day. Similarly, males and females had a comparable number of training sessions each week (3.5 versus 3.7 sessions per week) and duration during each training (2.2 versus 2.0 hrs.).

Table 2. Training profile of athletes (N=66)

Variables	**Males (n=57)**			**Females (n=09)**		
	Min	**Max**	**Mean±SD**	**Min**	**Max**	**Mean±SD**
Yrs. in bodybuilding	1	7	2.4 ±1.5	1	4	1.6±1.1
Training frequency (per day)	1	4	1.5±0.9	1	3	1.7±0.8
Training frequency (per week)	1	5	3.5±0.9	3	5	3.7±0.6
Time spent in training (hrs.)	1	5	2.2±0.7	2	2	2.0±0.0

According to Table 3 athletes consumed suboptimal average amounts of fluid (males, 4.5 ml/kg and females, 2.2 ml/kg) in the before training period. The timing of fluid intake before training (1.1 hrs. for males and 1.4 hrs. for females) also deviated from sports recommendations (2 – 4 hrs. before training). During training, average fluid intake was suboptimal (<13 ml/kg/hr.) for both males (9.9 ml/kg/hr.) and females (7.1 ml/kg/hr.). Furthermore, the average timing of fluid intake during training also deviated from recommendations for both male (1.7 hrs.) and female (2.0 hrs.). The average intake of fluids after training was found to be excessive (compared to 1.2 – 1.5 ml) for all athletes (males, 37.3 ml/kg [2832.0 ml] and

females, 28.9 m/kgl [2111.1 ml]) while the average timing was not immediate (<30 minutes) post training, but 2.3 and 2.7 hours after training for males and females respectively.

Table 3. Timing and amount of fluid intake (N=66)

Fluid intake timing	**Males(n=57)**	**Females (n=9)**
Before training	**Mean±SD**	**Mean±SD**
Amount (ml/kg)	4.5±4.8	2.2±2.9
Timing (hrs.)	1.1±0.5	1.4±0.8
During training		
Amount (ml/kg/hr)	9.9±6.8	7.1±4.5
Timing (hrs.)	1.7±0.8	2.0±1.4
After training		
Amount (ml/kg)	37.3±20.5	28.9±14.8
Timing (hrs.)	2.3±1.5	2.7±1.7

The sources used to guide hydration and the type of fluid used by athletes during training are summarised in Table 4. About half of the males used social media for their hydration information compared to a minority of females (22%; n=2). One-third of females used teammates as a source of information, compared to 12% (n=7) of males. Internet was the second most used information source by males (26%; n=15) while females (33%; n=3) used teammates. Nutrition experts were infrequently (males, 2%) or never (females) used by athletes.

During training sessions, two-thirds of females and just below half of the males were guided by thirst to hydrate. The second most frequent guiding sign during training was time and fatigue for males (24%; n=14) and females (22%; n=2) respectively. Pure water was used by more than half of males before during and after training. In contrast, more than half of females (56%; n=5) consumed vitamin and mineral water indicated under other before, pure water or fruit juice during (22%; n=2) and pure water after (55%; n=5) training.

Table 4. Hydration information sources and type of fluid used by athletes (N=66)

Hydration information source	**Males (n=57)**	**Females (n=9)**
Coaches	4 (7%)	2 (22%)
Teammates	7 (12%)	3 (33%)
Dietitian	1 (2%)	0 (0%)
Social media	30 (53%)	2 (22%)
Internet	15 (26%)	2 (22%)
Guide for intake during training		
Thirst	26 (46%)	6 (67%)
Fatique	13 (23%)	2 (22%)
Time	14 (24%)	1 (11%)
Fluid availability	4 (7.0%)	0 (0%)

Type of fluid	**Before Training**		**During Training**		**After training**	
	Males	**Females**	**Males**	**Females**	**Males**	**Females**
Pure water	31 (54%)	4 (44%)	29 (51%)	2 (22%)	33 (58%)	5 (55%)
Fruit juice	5 (9.0%)	0 (0%)	10 (17%)	2 (22%)	14 (25%)	1 (11%)
Milk	1 (2%)	0 (0%)	1 (2%)	0 (0%)	4 (7.0%)	2 (22%)
Protein shakes	6 (10%)	0 (0%)	17 (30%)	5 (55%)	6 (10%)	1 (11%)
Other	25 (14%)	5 (56%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Table 5 shows that average BMI of athletes was 25.5 kg/m^2 while the average weight loss after training were 0.3 and 0.5 kg respectively.

Table 5. The average weight loss/gain during training (N=66)

Variable (kg)	**Males (n=57)**			**Females (n=9)**		
	Min	**Max**	**Mean±SD**	**Min**	**Max**	**Mean±SD**
Height (cm)	156	185	171±5.6	145	167	156±6.3
Weight (kg)	55	125	75.9±14.1	44.3	73	61±10.3
BMI (kg/m^2)	19.2	44.5	25.9±4.7	17.9	34.3	25.2±4.8
Weight before training	55.6	125.5	75.9±14.1	44.3	72.9	61.5±10.3
Weight after training	55.9	125.0	75.9±14.0	43.9	72.1	61.5±10.3
Average weight loss	0.0	0.7	0.3±0.1	0.1	0.9	0.5±0.2
Average weight gain	0.1	1.0	0.6±0.2	0.0	0.0	0.0±0.0

According to Table 6, there was no significant association between hydration practice and the demographic profile of athletes.

Table 6. Association of fluid intake with demographic profile (N=66)

Hydration practice of athletes		Education	Info. Source	Employ. Status
		P-values (*r**)		
Before training	Timing of intake	0.709 (0.047)	0.036 (0.259)	0.745 (-0.041)
	Type nutrient	0.729 (-0.043)	0.243 (0.146)	0.488 (-0.087)
	Amount of fluids	0.614 (-0.063)	0.014 (-0.300)	0.408 (0.103)
During training	Timing of intake	0.665 (-0.054)	0.150 (0.179)	0.318 (-0.125)
	Type nutrient	0.706 (-0.047)	0.607 (-0.064)	0.931 (-0.011)
	Amount of fluids	0.744 (-0.041)	0.160 (-0.175)	0.506 (-0.083)
After training	Timing of intake	0.542 (0.076)	0.601 (-0.066)	0.573 (-0.007)
	Type nutrient	0.941 (-0.009)	0.988 (0.002)	0.029 (0.269)
	Amount of fluids	0.155 (-0.177)	0.054 (-0.238)	0.143 (-0.182)

Discussion

This study investigated the fluid intake and hydration strategies of bodybuilding athletes in the Capricorn district during a training session. We found that athletes mostly consumed water, and their hydration practices were guided by social media; and that practices deviated from sports nutrition guidelines. The majority of participants were males; most of whom participated in bodybuilding sport for two year or less. It is not unusual that most participants in our study were males. In a study by Chappell & Simper (2018) involving British bodybuilders, 81 athletes were investigated; 72% of whom were males. In another study around Polokwane municipality, (SA) 96% of the bodybuilding participants were males (Masoga et al. 2019). Therefore, it is thought that males are more attracted to this sport than females possibly due to the exhaustive demands during training (Escalante et al. 2021). Furthermore, athletes in the current study participated for an average of 2.4±1.5 years in bodybuilding sport, more than half of whom were unemployed.

Fluid intake and hydration by athletes

Before training

More than half of the males and females in the current research consumed pure water and vitamin and mineral solutions an hour before the training respectively. The practice of achieving optimal hydration before training is recommended (Knap, 2021). However, both the amount of fluid and timing of hydration in our group were suboptimal and deviated from recommendations respectively (Bean, 2022; Judge et al. 2021; Mosler et al. 2020; Kerksick et al. 2018). Training events

lasting ≤1 hour may be conducted without fluid intake; nevertheless, bodybuilders are encouraged to adequately hydrate before the commencement of training (Mosler et al. 2020) given the demanding nature of this sport. This can be achieved through consumption of 5 – 10 ml/kg 2 – 4 hours before training (Bean, 2022; Mosler et al. 2020).

During training

More than half of both males and females consumed pure water and protein shakes during training. The mean fluid intake for males was 9.9 ml/kg/hr while for females was 7.1 ml/kg/hr. The practice of consumption of fluids is recommended during training to prevent risk of dehydration (Bean, 2022; Potgieter, 2013). However, the amount of fluid consumed in our group was suboptimal (to 13 ml/kg/hr) which is thought to undesirably affect sports performance (Desbrow, 2021). This is unusual to bodybuilders especially during the off-season period. These athletes often drink more fluid to lose more (Chappell & Simper, 2018; Mitchell et al. 2017). Excessive fluid intake is associated with overhydration and polyuria (Chappell & Simper 2018). During training, athletes are encouraged to frequently consume fluid at 200 – 300 ml (Judge et al. 2021) every 10 – 20 minutes (Kerksick et al. 2018). Fluid can be obtained from water or other fluid-containing foods, e.g. vegetables and fruit juices (Halder & Daw, 2020). However, athletes should consume fluids containing 6 – 8% of glucose during the training (Rosenbloom, 2012) in exercises lasting ≥ 1 hour. Unlike male athletes in our study, females consumed fluids that contained solutions such as protein shakes. On the other hand, bodybuilders should avoid strategies that decrease bodily fluids for the demonstration of muscles during competitions as this may negatively affect the appearance of muscles as skeletal muscles are composed of water (Chappell & Simper, 2018).

In our study, athletes trained for 2 hours (males 2.2±0.7 hrs. & females 2.0±0.0 hrs.) which may have not essentially warranted major fluid intake (Kerksick et al. 2018). However, the intense nature of bodybuilding justifies the need for fluid intake in this group. Almost half to two-thirds of the athletes in the current study relied on thirst (males 46%; females 67%) for the consumption of fluids. This practice might not be suitable as by the time athletes are aware of a need to drink fluids, a significant amount of water would have been lost through sweat (Kerksick et al. 2018). Therefore, given the training duration of our group (2.1±0.3 hours per training), planned fluid intake may possibly

be appropriate to develop individualised hydration strategies (Bean, 2022).

After training

The majority of athletes in our study consumed 2111 – 2832 ml of fluids 2 – 3 hours after the training session. The average weight loss in our group was 0.3 kg while the gain was 0.6 kg (Table 5). These loss or gain is less than 3% of weight loss as fluids for an average weight of 65kg (1.3kg) or 95kg (1.9kg) athlete to impair sports performance (Knap, 2021; Kerksick et al. 2018). On average, the athletes in our research were classified as overweight according to BMI (WHO, 2011) classification. Bodybuilders are known to manipulate weight to drop to lower weight classes (Escalante et al. 2021) especially during the competition season to qualify for lower weight divisions (Januszko & Lange 2021). The latter is, however, beyond the scope of our research as data were collected during the non-competitive "bulking" period when competition pressure was minimal. Nevertheless, body weight losses of 3 – 7% usually impair performance (Barley et al. 2019) and predispose athletes to undesirable health outcomes (Franchini et al. 2012). More than half of the athletes in our study consumed mostly pure water for post-training hydration. The mineral composition of the consumed water is unknown, however, we suspect that quality may vary from one region to the other (Judge et al. 2021). It is advised that sport beverages should contain, amongst other things, sodium, and potassium to promote fluid balance (Chappell & Simper, 2018). However, given to umployment status of our group (males, 72% and females 56%), homemade solutions such as oral rehydration solution, sports drink and tea (with added sugar), may serve as alternatives to achieve required fluid-mineral balance (Bean, 2022).

Hydration information sources

Bodybuilding athletes infrequently consult with qualified nutrition professionals for their nutrition decisions (Lenzi et al. 2019). Nutrition information about sports and athletic performance has become available over the internet (Iraki et al. 2019; Bourke et al. 2018) and internet sources increasingly attract athletes (Bourke et al. 2018). In agreement with these findings, more than half of males and a third of females in the current study relied on social media and teammates as their hydration information sources respectively. Our findings are similar to those reported during qualitative research involving seven bodybuilders. These athletes relied on the internet, fellow bodybuilders, and coaches as their hydration information source

(Mitchell et al. 2017). In another study investigating social media as a nutrition information source for athletes, 65% of participants used social media as their information source (Bourke et al. 2018). Similar findings of ranking social media (20%) and coaches (16.8%) and trainers (15.5%) as the first three preferred nutrition information sources by athletes were reported elsewhere (Klein et al. 2021). The minimal or absent use of nutrition experts for nutrition information during sports is a concern (Bird & Rushton, 2020) as the other preferred platforms may, at times, provide information that has weak scientific support (Iraki et al. 2019). However, no significant association was found in the current study between the fluid intake or hydration status of athletes with the demographic profile, including hydration information source.

Limitations

The major limitation of the current study was a small sample size (N=66) as bodybuilding was starting to gain popularity in Limpopo province. However, the current research is novel as regarded the first to evaluate and report information on the hydration practices of bodybuilders in the province.

D. Conclusion

This research aimed to investigate the fluid intake and hydration strategies of bodybuilders during training and further associated the hydration practice with the demographic profile of athletes. The athletes suboptimally consumed fluids before, during and excessively after their bodybuilding training sessions. This poses a risk for dehydration and over hydration which negatively affect sports performance respectively. The timing for the pre- and post-training sessions, and the type of fluid consumed were often not within sport recommendations. These athletes were mostly guided by thirst sensation as hydration index. Thirst implies that the fluid content in the body is marginally low. Another risk for dehydration. There was no association between the fluid intake and hydration status to demographic status. There is, therefore, a need for the development of sport-specific hydration guidelines in SA through the collaboration of coaches/trainers and other sport practitioners such as dietitians, physicians and biokineticists. In addition, nutrition practitioners such as dietitians should be used as part of nutrition information soucres during sport.

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F. Conflict of Interest

Researchers declare no conflict of interest.

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