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Comparison of Runners' Hydration Practices during an Intended Training Run, an Intended Event, and the Hyannis Massachusetts Marathon

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ABSTRACT

Young, S, Stastny, S, Wen, Q. Comparison of Runners' Hydration Practices During an Intended Training Run, an Intended Event, and the Hyannis Massachusetts Marathon. **JEPonline** 2021;24(3):82-96. Overhydration is the primary cause of exercise-associated hyponatremia (EAH). If intended hydration practices are different than actual practices, this may lead to overhydration and will increase the risk of EAH. The purpose of this study was to compare self-reported hydration practices of marathon runners during an intended training run, an intended marathon event, and an actual marathon event. The researchers hypothesized volumes and strategies intended would be different than actual. In a cross-sectional pre-online and post-online survey design, participants completed a pre-race survey (N = 46) and a post-race survey (N = 30). The event took place in February 2020. A weak correlation (r = 0.13, P = 0.56) was found when comparing volumes intended during training to the actual volumes during the marathon. In one-sided paired *t*-tests, runners consumed more than they intended during the marathon when compared to intended volumes during training (t = 4.49, P = 0.0001) and an event (t = 3.68, P = 0.0005). Finally, knowledge of optimal hydration strategies, EAH, and EAH prevention factors were inconsistent among the participants in this sample. These findings indicate the need for ongoing and further education in the running community.

Key Words: Endurance, Exercise-Associated Hyponatremia (EAH), Overhydration, Thirst

INTRODUCTION

Exercise-associated hyponatremia (EAH) is defined as serum sodium levels less than 135 $mmol \cdot L^{-1}$ both during and 24 hours after exercise (12). EAH occurs among endurance and ultra-endurance athletes both during and up to 24 hours after exercise, and is primarily caused by overhydration of hypotonic fluids and associated weight gain (3,5,12). The suppression of arginine vasopressin, the hormone that regulates water excretion, can also contribute to water retention (3,5). The physiological effects of EAH include headaches, nausea, vomiting, weight gain, bloating, confusion, and muscle cramping (5,9,14). Further symptoms may include dizziness, weakness, adynamia, tremor, fatigue, swelling of hands and feet, and coma (9). It is estimated that 10 to 20% of marathon runners experience EAH (12) or more recently, 23 to 28% among ultra-endurance athletes (3) during and/or after their run. Many athletes have suggested that drinking according to thirst or fluids as thirst dictates is the recommended hydration strategy to prevent EAH (5,6,8,10,15). Others have suggested that having an individualized or personalized hydration plan is the optimal hydration strategy (2,12). Specifically, individualized hydration plans may consider sweat rate, environment, acclimatization state, body size, exercise duration, exercise intensity, and individual fluid preferences and tolerance (12). Similarly, a personalized hydration plan is one that optimizes the performance and safety of athletes during their sporting event, while considering the physiological, behavioral, logistical, and psychological needs of the athlete (2). If an individualized or personalized plan is not available, then drinking according to thirst should be considered as the appropriate hydration strategy to avoid overdrinking and EAH (3,12). Additional hydration strategies include ad libitum drinking, which is to drink at one's pleasure (12), and programmed or prescribed drinking, which is drinking pre-determined amounts of fluid with the purpose of minimizing fluid loss (7).

Understanding overall hydration practices of marathon runners may help to assess their potential risk for EAH. Hydration practices not only include hydration strategies during training and competition, but also include the carrying of hydration packs, whether or not the runner stops to hydrate during a run, and hydration before and after the run. If runners ascertain what works in training to optimize performance, then these hydration practices can be mimicked during an event and overhydration may be avoided. Training is an appropriate way to practice for the actual event to determine what hydration or fuel optimizes performance (14). If individual hydration practices are influenced by factors in an event, such as availability of fluids, the event excitement, time of race or influences of other runners, then occurrences of overhydration may be increased. Also, social and emotional state pre-race may impact behavior and performance, especially in recreational marathon runners (4).

Determining exactly how much runners consume during a marathon event or during training is very difficult to measure unless a runner's hydration is carefully monitored. In addition, events provide hydration or aide stations during the race. Not only does the race cup size vary, but the amount of fluid in the cup varies as well. Also, the amount of liquid consumed by the athlete will differ. Some liquid may be spilled, consumed, and some thrown on the ground or in waste baskets. The purpose of this pilot research was to assess and compare self-reported, hydration practices of marathon runners during an intended long training run (LTR), an intended marathon event, and a marathon event. Similar research studies to date (10,15) have yet to compare these three scenarios. Also, the pre- and post-race survey is unique to this study and allows for comparison between intentional and actual hydration practices. In addition, sources of hydration information, knowledge of EAH and hydration, EAH preventative factors, and contributing factors were evaluated to inform main findings.

METHODS

Study Design

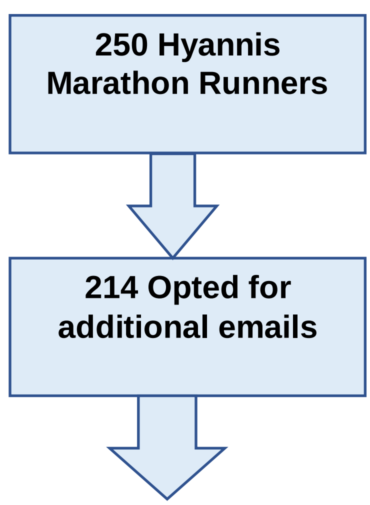
This was a cross-sectional pre- and post-questionnaire pilot study that included men and women signed up to compete in the Hyannis Massachusetts Marathon in 2020. Approval was obtained from the Institutional Review Board at North Dakota State University. Each participant provided consent. Pre- and post-race surveys were designed to assess the hydration practices among individuals registered to compete in the marathon.

Setting

The 2020 Hyannis Massachusetts Marathon race time temperature was between 45 and 53º Fahrenheit. The race conditions were mild and partly cloudy. The start time was 9:30 am EST.

Participants

Hyannis Marathon runners that opted for email communication were eligible to participate in the survey(s) as illustrated in Figure 1. Similar to other studies (10,15), experienced (EXP) marathon runners were defined as those who had completed at least one marathon. Inexperienced (INEXP) marathon runners were defined as those who had yet to complete a marathon.



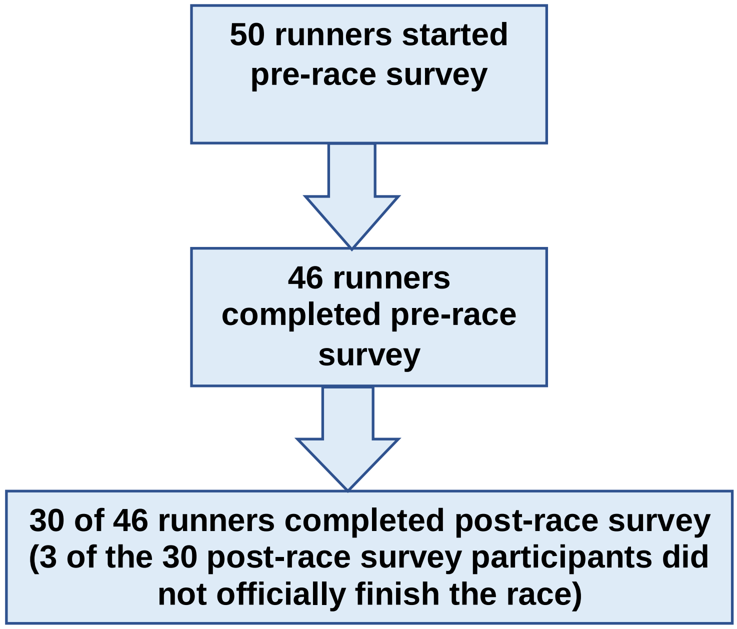


Figure 1. Pre- and Post-Race Research Participant Selection Process.

The descriptive statistics for the participants are presented in Table 1. Some of the data was aggregated due to lack of heterogeneity.

Instruments

Online surveys were administered with Qualtrics (Provo, UT). The pre-race survey was sent 10 days before the race. It assessed the intended hydration practices during a long-training run (LTR) and a marathon event. The post-race survey was sent immediately after the race. It evaluated the self-reported volumes before and during the marathon, as well as the hydration practices during the actual event. Prior to this study launch, the survey was tested among 20 runners and/or fitness enthusiasts known by the researcher. The purpose was to test the survey for consistency, face validity, understanding, and to suggest possible improvements. Minor changes were made to improve the survey in addition to the revision of three questions. For example, the LTR was initially defined as over 10 miles then changed to 15 miles. The information from both surveys allowed for comparison of intended hydration practices with actual practices during the marathon. The pre-race survey included 52 questions divided into 6 areas that included: (a) demographic information; (b) running experience; (c) sources of information on hydration; (d) intended hydration practices both before and during a LTR; (e) intended hydration practices before and during marathon event day; and (f) knowledge of EAH. Questions regarding the amount of fluid consumed were accompanied by a visual diagram of the amount of fluid contained in a typical cup, defined as 8 ounces, used during the race course. In order to further assess the knowledge of the runners and EAH, one question asked them to select “contributing factors” and another asked them to “select ways to prevent EAH” to ascertain criterion validity.

The post-race survey was emailed to those who volunteered in the pre-race survey (see Figure 1). It probed for estimates of actual hydration consumption before and during the event and hydration practices. There were 21 multiple choice questions and one open-ended question to close the survey. The majority of the questions replicated the pre-race survey with the exception of three questions: one question regarding weight change, another probed for physiological symptoms during or after the run, and the last was an open-ended question asking for final comments.

Table 1. Descriptive Characteristics of the Hyannis Pre-Race Survey Participants.

Characteristic (N = 46)		Number of Participants	Proportion of Participants
Age	**18-24 years**	6	13.04%
	25-39 years	22	47.83%
	40-64 years	18	39.13%
Sex	**Male**	27	58.70%
	Female	19	41.30%
Prior Marathons	**< 1**	13	28.26%
	1-4	14	30.43%
	5-9	12	36.36%
	≥10	7	21.21%
Running Club Member	**Yes**	11	23.91%
	No	35	76.09%
Weekly Training Hours	**Under 5 hours**	4	8.7%
	5-8 hours	13	28.26%
	8-10 hours	15	32.16%
	>10 hours	14	30.43%

Characteristic	ALL	Female	Male
BMI	23.87 ± 3.67	23.67 ± 4.69	24.01 ± 2.84
Fastest Marathon Time	3:45 ± 0.43	4:06 ± 0.49	3:29 ± 0.31
Expected Marathon Time	3:59 ± 0.51	4:19 ± 0.54	3:46 ± 0.45

Note: One runner did not answer the fastest and expected time question and was excluded.

Procedures

Information describing this multi-stage research was sent to registered race participants via email to the Hyannis Marathon race director. The race was conducted in February 2020. In order to promote participation in the research, a description was posted on the Hyannis Race website and on their Facebook page. All participants were volunteers and no financial incentives were provided. In the pre-race survey, the participants were asked to provide their email address to elect to receive the post-race survey. Those who provided their email address received the post-race survey immediately after the race. In order to prevent any memory lapse, the participants were asked to complete it within 60 hours of the event. A reminder notice was sent one day after the race and another one was sent two days after the race.

Statistical Analyses

The runners' demographic data, total and subcategory mean scores and standard deviations were calculated using descriptive statistics in Qualtrics (Provo, UT). Correlation tests were used to compare volumes consumed among the three scenarios that included: (a) an intended LTR; (b) an intended marathon event; and (c) during the actual marathon event.

A one-sided paired *t*-test was used to test if there was a significant difference between combined volumes consumed before and during the three scenarios. A Kappa agreement test was used to evaluate the significance of agreement in the selection of hydration strategies in the scenarios for all runners, both EXP and INEXP. All statistical analyses were performed using SAS version 9.4 (Cary, NC). The alpha level was set at $P<0.05$.

RESULTS

The hydration strategy frequency of the runners in the various scenarios are displayed in Table 2.

Table 2. Frequency of the Hydration Strategies in EXP vs. INEXP Runners.

Hydration Strategies	Intended Long Training Run (LTR) n = 36 Frequency (%)		Intended Marathon n = 44 Frequency (%)		Actual Marathon n = 29 Frequency (%)	
	EXP (n = 26)	**INEXP** (n = 10)	**EXP** (n = 31)	**INEXP** (n = 13)	**EXP** (n = 19)	**INEXP** (n = 10)
I do not have one	1 (3.85)	2 (20.00)	1 (3.13)	1 (7.69)	0 (0)	2 (20.00)
According to Thirst	4 (15.38)	2 (20.00)	3 (12.50)	3 (23.08)	2 (15.00)	3 (30.00)
Ad libitum	9 (34.62	1 (10.00)	8 (25.00)	2 (15.38)	7 (35.00)	1 (10.00)
Programmed	7 (26.92)	4 (40.00)	10 (31.25)	5 (38.46)	2 (10.00)	2 (20.00)
Personalized Plan	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Trial & Error	4 (15.38)	1 (10.00)	6 (18.75)	1 (7.69)	5 (25.00)	1 (10.00)
Other	1 (3.85)	0	3 (9.38)	1 (7.69)	3 (15.00)	1 (10.00)

Note: Sample sizes may vary due to those who intended to drink during the LTR or intended marathon.

The agreement between the various hydration strategies in all participants were assessed for the different scenarios (Table 3). Runners assessed hydration (Table 4). Cups are 8 ounces.

Table 3. Agreement between the Hydration Strategies in All, EXP, and INEXP Runners.

Hydration Strategy	Hydration Strategy	Agreement Kappa (K) ALL	EXP	INEXP
Intended during LTR	**Intended during Marathon**	69% K = 0.604* n = 36	65% K = 0.549* n = 26	80% K = 0.740* n = 10
Intended during Marathon	**Actual during Marathon**	52% K = 0.406* n = 29	58% K = 0.456* n = 19	40% K = 0.268 n = 10
Intended during LTR	**Actual during Marathon**	65% K = 0.619* n = 23	73% K = 0.641* n = 15n	63% K = 0.539* n = 8

Note: The Kappa test of agreement indicates statistical significance* (P<0.05).

Table 4. Drink Type and Total Volume Intake Before and During the Three Scenarios.

	Intended LTR Frequency (%)	**Intended Marathon Frequency** (%)	**Actual Marathon Frequency** (%)
BEFORE:			
Water	36 (50.70)	35 (47.30)	20 (47.55)
Sports Drinks	13 (18.71)	18 (24.32)	8 (17.02)
Coffee	15 (21.13)	14 (18.92)	12 (25.53)
Other	7 (9.86)	7 (9.96)	7 (14.89)
Amount: (cups)			
None	0	1 (2.27)	0
1-2	33 (76.74)	22 (50.00)	11 (39.29)
3-5	7 (16.28)	16 (36.36)	13 (46.43)
>5	3 (6.98)	5 (11.36)	4 (14.29)
DURING:			
Water	11 (30.56)	11 (22.92)	6 (17.14)
Sports Drinks	2 (5.56)	5 (10.42)	6 (17.14)
Both	21 (58.33)	30 (62.50)	22 (62.85)
Other	2 (5.56)	2 (4.17)	1 (2.86)
Amount: (cups)			
1-3	18 (50.00)	16 (35.56)	5 (16.67)
4-6	11 (27.78)	14 (31.11)	10 (33.33)
7-9	7 (19.44)	9 (20.00)	9 (30)
10-12	0	2 (4.44)	4 (13.33)
>12	1 (2.78)	3 (6.67)	1 (3.33)
Other/unsure	0	1 (2.22)	1 (3.33)

Volumes were compared between the three scenarios displayed in Table 5.

Table 5. Comparison of Volumes Intended and Consumed Before and During an Intended LTR, an Intended Marathon, and an Actual Marathon, Respectively for Participants in Hyannis Marathon.

	Intended Volume Before Marathon vs. Intended Volume Before LTR	Volume Before Marathon vs. Intended Volume Before LTR	Volume Before Marathon vs. Intended Volume Before Marathon	Intended Volume During Marathon vs. Intended Volume During LTR	Volume During Marathon vs. Intended Volume During LTR	Volume During Marathon vs. Intended Volume During Marathon
Correlation	0.611*	0.225	0.347	0.608*	0.127	0.487*
Participants	n = 27	n = 25	n = 26	n = 23	n = 23	n = 29

Note: *Indicates significance (P<0.05)

A one-sided paired *t*-test was used to determine if the mean differences in volumes were significant between the various scenarios (Table 6). A positive *t*-value indicates that the volume listed first is greater than the volume listed second. A negative *t*-value indicates that the volume listed first is less than the volume listed second in each scenario.

Table 6. Differences in Volumes Among the Three Scenarios for the Hyannis Marathon Runners.

One-Sided Paired *t*-test	Intended Volume Before Marathon vs. Intended Volume Before LTR	Volume Before Marathon vs. Intended Volume Before LTR)	Volume Before Marathon vs. Intended Volume Before Marathon	Intended Volume During Marathon vs. Intended Volume During LTR	Volume During Marathon vs. Intended Volume During LTR	Volume During Marathon vs. Intended Volume During Marathon
***t* value**	3.16*	3.37*	-1.00	0.22	4.49*	3.68*
Runners	n = 27	n = 25	n = 26	n = 26	n = 23	n = 29

Note: *Indicates significance (P<0.05)

Knowledge of runners' hydration information sources is important to determine an effective education strategy. In the pre-race survey, there were several questions that asked runners to identify their hydration information sources. These sources are displayed in Table 7.

Table 7. Sources of Hydration Information for Hyannis Marathon Runners.

Source	Number (%)
The Running Event Website	7 (5.5)
Running Club	5 (3.9)
Running Coach	6 (4.7)
Registered Dietitian	2 (1.6)
Running Friends	28 (22.0)
Personal Trainer	2 (1.6)
Physician/Medical Professional	9 (7.1)
TV/Radio	3 (2.4)
Running Magazine or Book	24 (18.9)
Other Internet Sources	28 (22.1)
Professional Organizations	3 (2.4)
Research or Journal Articles	8 (6.3)
Other	2 (1.6)

Note: Participants were allowed to select more than one source of information. Items are ordered as they appeared in the actual survey.

Other hydration practices were assessed in the survey. First, 35% of the runners reportedly weighed themselves before and after a LTR However, only 13% indicated that they weighed themselves before and after the race in the post-race survey with a 0 to 6 lbs difference. Two runners reported a 1- to 2-lb difference, one runner reported a 4- to 6-lb difference, and one runner reported no difference in weight. Second, 65% of runners carried their own hydration during a LTR, while 39% said they placed fluids along their route. Of the runners that did carry their own fluid, 43% carried 1 to 2 cups, 27% carried 3 to 4 cups, and 27% carried more than 4 cups. Third, the key factors that influenced the runners' hydration plan during a LTR included weather (83%), running intensity (76%), and availability of drinks (63%). Lastly, 59% of the runners said their intended hydration practices during training generally mimic their hydration practices during an event.

About half (54%) of the participants indicated familiarity with the term EAH. From a list, participants selected EAH contributing factors and methods to prevent EAH. Regarding EAH contributing factors, "high intensity exercise" (13%), "drinking too much" (20%), "temperature and humidity" (14%), "continuous exercise lasting over four hours" (12%), and "sodium or electrolyte deficit" (16%) were the most frequently selected. Responses of 6% or less included "low intensity exercise", "not drinking enough", "extremely cool weather", "not enough training preparation for the event", "availability of drinks", "age", and "low or high body weight". When the participants were asked to identify EAH preventive factors, the most common responses were “drinking sports drinks” and “educating myself on this topic”, both at 19%. “Drinking according to thirst”, 16% and “taking salt tablets”, 14% were also identified, while 5% noted “I am not sure how to prevent EAH”. In addition, 10% identified “following my hydration plan”, 12% identified “dressing appropriately for the weather”, and only 2% selected “high intensity exercise”. Finally, the runner’s top general symptoms reported during or after the race were lightheadedness (50%), nausea (32%), and headaches (9%).

DISCUSSION

In this study, hydration strategies across the three scenarios were in relative agreement and the agreements were significant, except when comparing the hydration strategy intended during the marathon to the actual marathon in the INEXP runners. This suggests intended behaviors for hydration both in training and competition, usually mimic the actual practice for the competition among this sample. The Theory of Planned Behavior supports the notion that intended behaviors predict actual behavior (1). The key component of the theory is that behavioral intent is influenced by the likelihood of having an expected and beneficial outcome (1). Thus, intended hydration practices should impact the actual, that is, if a beneficial outcome is perceived by the runner. In this study, inexperienced runners seem to be unsure of their hydration strategy and perhaps may be more influenced by the race day environment. Also, the differences in hydration strategy selection may be due to lack of knowledge on appropriate marathon running hydration in general. Further analysis indicated that only about half of the participants felt they had a solid understanding of a safe and effective hydration plan, even though most had read or heard of race day hydration practices. This result is reflected by how the runners reported information sources on hydration. Similar to the other studies (10,13,15), the majority of runners in the current study selected running friends, magazines, and other Internet sources (Table 7). When compared to the professional organizations, these sources are generally unreliable. Thus, there seems to still be a need for further education to the marathon running community.

The results indicated that more of the runners chose ad libitum versus drinking according to thirst as their hydration practice (Table 2). While these two practices seem similar, they are different. Drinking according to thirst is driven by a physiological drive to drink, while ad libitum means drinking according to one’s pleasure (12). Programmed drinking was selected the most frequently (Table 2). However, none of the respondents indicated that they had worked with a professional nor had their sweat rate measured. In one study (11), only 5% reported using commercial sweat testing services and 75% thought it was beneficial. In the present study, no one selected as having a personalized hydration plan. A personalized hydration plan may incorporate sweat rate and perhaps knowledge of weight loss or gain during a long run or marathon. Because sweat rate is quite variable, it is inappropriate to specify a “one size fits all” hydration plan for all runners (12). Only a few of the runners who completed the post-race survey (n = 30) reported weighing themselves before and after the race. Perhaps, if a scale was provided at the event, more runners would have given weighing consideration (3). Some runners suggested that having scales at events could in itself increase awareness of the importance of avoidance of EAH (3). Finally, there were two runners who reported high BMIs, a potential risk factor for EAH (5).

Variation was found between volumes intended and consumed both before and during the three scenarios (Table 5). For example, the weak relationship found between the intended LTR and the marathon event could be due to several factors. First, the training run in this study was defined as greater than fifteen miles. Since there is a difference between 15 and 26 training miles, the volumes intended would presumably be greater the higher the mileage. Runners tend to drink more the longer the exercise time frame associated with a greater distance. Also, perhaps runners do not consume the same amount during training as they do in an event due to other factors, such as intensity or temperature. In addition, more fluids are available and accessible during an event. Also, runners may be more prone to carry their liquids during training. In fact, 65% of the runners intended to carry water or sports drinks during the LTR, while only 29% intended to carry fluids during the marathon event. In this sample, 37% did carry liquids during the actual marathon. The runners must have been counting on the hydration stops provided during the event.

There was a weak relationship when comparing intended volumes and the actual volume consumed before the marathon (Table 5). In a previous study (15), the researchers collected the intended volumes consumed before the marathon, but did not report the results. Perhaps, runners actually intend to drink less or more than they actually do drink before the marathon. Maybe the timing before the marathon was not taken into consideration when the runners predicted their volumes. For most events, runners are required to arrive early. Due to the logistics of larger marathon events, this may be two or more hours before the race starts. This timing may add to the increased fluid consumption of runners prior to the event, or change their intended plans. This should be a consideration of both marathoners and marathon event planners. In addition, there was a moderate correlation between the intended volume during a marathon when compared to an actual marathon. Although the correlation was moderate, we would predict this to be higher. Interestingly, there was a slightly higher moderate correlation between the intended volume during training and the intended during the marathon. Thus, it appears the runners' intentions were a bit more consistent than what they may actually do during an event in this sample. This is supported by the Theory of Planned Behavior that emphasizes how intentions can predict behavior (1).

The volumes consumed in the marathon were significantly greater when compared to the volumes in both the intended LTR and the event. Consuming more during competition when compared to training may enhance the risk for EAH. Again, this increase in volumes consumed may be due to several factors, including the emotional state on race day (4). The excitement or anxiety of the race itself may impact planned behavior, especially in recreational or novice runners. In addition, the intended volumes during the marathon were statistically greater than the volumes intended in an LTR. This could be due to the fact that the LTR may be a shorter distance than the race.

About half of the participants had indicated familiarity with the term EAH, but this does not mean they understood the condition. Although other studies had asked questions on EAH awareness or knowledge (10,15), their questions included only one open-ended question on the causes and effects of EAH. Unique to this study, two multiple choice questions were included in the pre-race survey. These questions were designed to test the runners' knowledge of both contributing factors to the onset and the prevention of EAH. About half of the runners who acknowledged familiarity of EAH were asked these additional questions. The participants were allowed to select multiple answers for both questions. The top three contributing factors to the onset of EAH selected were drinking too much, high temperatures and humidity, and sodium or electrolyte deficit. In another study, 75% of the participants reported believing sodium ingestion during endurance exercise prevented EAH (11). Overhydration is a main contributor to EAH, while sodium or electrolyte deficit is still controversial as a risk factor (3). Although sodium supplementation during exercise, especially in the heat is advantageous to replace sodium losses in sweat, it does not prevent EAH when combined with overhydration (3). Also, high ambient temperature may lead to overhydration, and is a possible risk factor for EAH. Both high intensity exercise and continuous exercise lasting for more than four hours resulted in multiple responses. These are also considered risk factors for EAH (5,9,12,14). Overall, the participants had mixed knowledge of the EAH contributing factors.

The second EAH knowledge assessment question asked participants to select ways to prevent EAH. The top three responses included drinking according to thirst, drinking sports drinks, and educating themselves on this topic. Also, 14% of the runners selected taking salt tablets. This differs from another study (11) on sodium beliefs where 74% of the participants indicated that sodium supplementation prevented EAH. The current study results indicate that these runners are mixed on their knowledge of EAH prevention. While drinking according to thirst and "educating myself" are preventive practices, drinking sports drinks and taking salt tablets are not necessarily preventive practices (3, 5).

While 69% of the runners reported intention to stop at the hydration stations during a marathon event, 83% said they actually did stop during the Hyannis marathon. However, when comparing the intended frequency of stops and the actual number of stops that occurred during the marathon, the relationship was weak. In the present study, 19% of the runners intended to slow down or stop at all hydration stations during the race, but only 12% of the runners actually did say they slowed down or stopped. This appears to show that although more runners actually stopped, they stopped less frequently. In this marathon, there were 15 hydration stations. The placement and number of stops in this race may not reflect all races. Some marathons, such as the London Marathon, have hydration stations every mile from the third mile onward (8), or approximately 23 stops. This study shows a lower percentage than the London study, who reported 22% of runners stopped at all stations (15). The concern is that stopping at every hydration stop as a hydration strategy may be not only inconsistent between events, but can actually contribute to EAH, especially for slower runners.

Limitations in this Study

There are several limitations to this study. One limitation was the small sample size. This survey involved a questionnaire in which runners reported on intended behaviors. Due to the challenges of measuring actual volumes consumed, the post-race survey recorded self-reported versus measuring the actual volumes. The self-reported nature of this study is a limitation itself. In addition, the volume averages were calculated from the mean of each volume range, based on the design of the question. Also, not all of the pre-race survey participants completed the post-race survey. Thus, the comparisons were only with those who completed both surveys.

CONCLUSIONS

This pilot study shows insight to hydration practices in the 2020 Hyannis Marathon runners. This assessment compared three different hydration scenarios (i.e., intended during a LTR, intended for a marathon event, and the actual marathon). It appears that the runners consumed more both before and during the race than intended. This may lead to an increased risk of EAH. Future studies should include a larger sample size, actual measurement tracking, and application to other endurance sports. Overall, lack of consistent hydration practices, specifically hydration strategy and knowledge of EAH, suggest that more education is essential to provide marathoners in order to optimize hydration, health, and performance.

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