

EAT2WIN: A PILOT STUDY ASSESSING ATHLETES'
BEHAVIORS, ATTITUDES, AND ADHERENCE
USING A MOBILE APPLICATION

by

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ABSTRACT

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Background: Athletes increasingly skip meals because they lack time or knowledge to prepare their own meals; mobile applications have been proposed as a potential solution to this problem. Adherence to mobile app tracking may vary, but self-motivation and nutrition knowledge has been shown to increase chances of behavior change while using an app.

Objective: Determine if female college athletes' nutrition/fueling behaviors changed over four weeks by utilizing a mobile application for tracking fueling practices.

Design: Pilot study with cohort of 17 female TCU NCAA Beach Volleyball athletes.

Methods: Pre and post-study questionnaires examined attitudes toward mobile applications, dietary behaviors, and frequency of fueling habits. Athletes also attended a pre-study training session about utilizing the Eat2Win app. Data analyses included recorded frequency of application usage and logged meals per/day plus impact on dietary behaviors/fueling habits. Study procedures were approved by TCU IRB. Participant informed consent was obtained. Data were analyzed to meet study objectives (SPSS, $p \leq 0.05$).

Results: Most athletes (82%) disliked using the Eat2Win app, where app usage decreased from 88% in week one to 18% app usage at the completion of the study. Reasons for the pronounced decrease in usage included frequent app crashes, too time consuming, and limited phone storage space. Additionally, results did not show improvement in athletes' eating habits with app usage. Although pre-study results showed 42% of athletes did not consistently eat breakfast and/or eat/drink something every 3-4 hours, those athletes who reported greater frequency of eating breakfast and/or every 3-4 hours or refueling one hour after practice, maintained consistent positive eating behaviors throughout the study. These same athletes also reported greater energy levels overall ($r = .671$; $p \leq 0.01$).

Conclusions: Study results emphasize the importance of implementing user-friendly mobile apps for athletes that are time-use efficient and offer calorie counting and picture logging functions to promote change in dietary and refueling practices.

Introduction

It has become increasingly apparent that a number of collegiate athletes across many sports disciplines are skipping meals or under fueling due to inadequate time, lack of meal preparation skills, and limited nutrition knowledge.¹ The aforementioned reasons are problematic because inadequate nutrition and food consumption increases chances of unintended weight loss. More importantly, poor nutrition greatly impacts athletic performance and focus and can lead to increased injury risk, fatigue, and impaired metabolic functions.

A well-balanced diet can adequately fuel an athlete before, during, and after a workout, and also impact or even improve long-term performance.² Properly balanced diets can also improve an athlete's recovery, especially when those nutrients are delivered during appropriate time period. Registered dietitian nutritionists (RDNs) can provide effective meal planning tips and nutrition fueling education so that collegiate athletes can adequately fuel themselves; however, many collegiate programs do not have access or funds to support a full-time RDN.³ Thus, nutrition education material and athletic fueling stations may be limited or unavailable. Nevertheless, universities that do have access to an RDN, especially a sports dietitian (CSSD) who has at minimum 2,000 hours of documented sports dietetics practice experience and has passed a national certification exam, will be better prepared to advise athletes on effective nutrition and fueling habits for optimal health, body composition, and performance.^{4,5}

In order to estimate athletes' caloric need and reported intakes, the CSSD may ask athletes to log or track their meals, a task that may be labor-intensive for both parties. With the popularization of smartphones and mobile applications, though, dietitians have a wider range of tools at their disposal. These apps, though handy, often offer a wide range of caloric allotment and often overestimate nutrient needs. Additionally, many of these apps do not offer a way to invoke or evaluate behavior change, which often results in limited long-term adherence by app users.⁶ Especially with athletes who have poor nutrition habits, meal tracking is an important feature sought out by many dietitians. Some mobile applications may address this issue by including the concept of gamification, the practice of using elements of game design to encourage behavior changes. Examples of this feature may include awarding points to users, progress reports, or new goals as they reach higher levels.

Other apps have found a way to incorporate imaging and social media styles into their design to increase user frequency. Apps that allow users to track their daily meals via images have shown to be popular among athletes and allow other users to comment or gain new ideas from their peers.¹ Furthermore, research by Lieffers also demonstrates that even though adherence to the use of mobile apps can vary, those with some knowledge about nutrition and self-motivation often record higher behavior change with the use of app than those who do not share the same knowledge.⁷ With this problem in mind, we developed a research study in which we sought to understand the feasibility of using the mobile app Eat2Win⁸ as a method of nutrition education for collegiate athletes. A secondary aim of the study was to encourage behavior change that increases healthy eating priorities in fueling habits and choices. Both of these objectives were considered with the key idea of determining overall whether a mobile app is effective for collegiate athletes and if so, if Eat2Win should be the app sports dietitians should consider using.

Materials and Methods

Study Design

This pilot study utilized a pre-post test design and was intended to assess NCAA collegiate athletes' nutritional behaviors, attitudes, and adherence before and after using a mobile app called Eat2Win. Athletes attended a one-hour nutrition information session where they also took a pre-study questionnaire that analyzed athletes' fueling habits and energy levels. For the next four weeks, athletes used the Eat2Win app to track dietary and fueling habits. Approximately five weeks later, athletes were given a similar post-study questionnaire that also asked for feedback on likeability and usability of the app.

Participants

A total of 17 female NCAA Division I Beach Volleyball athletes ranging in age from 18 to 23 years old participated in the study. No inclusion or exclusion criteria were used. All athletes were informed of investigative procedures and signed an electronic institutionally reviewed consent form prior to participation. The Texas Christian University Institutional Review Board approved all procedures.

Procedures

Before the study began, the 17 female athletes were divided into two groups based on their first names. One researcher was assigned to the first eight names from letters A to H while the other researcher was assigned to the other nine names from J to V. Researchers divided these names before the information session and pre-study survey began so that athletes could meet and interact with their designated researcher and receive contact information; contact information was distributed in case athletes had questions or wanted to remove themselves from the study during the four weeks.

The researchers designed a pre- and post-study questionnaire in conjunction with the university's CSSD to meet the needs of the Beach Volleyball program's female athletes. The pre-study questionnaire took approximately 15 minutes and was administered via Qualtrics after athletes were welcomed to the session but before anything else began. All athletes completed the pre-study questionnaire on their personal smartphones. The pre-study questionnaire contained 11 questions that asked athletes about their previous experience with tracking nutrition and exercise habits via mobile application (see appendix 1). The questionnaire also addressed perceived energy levels, timing of meals throughout the day and before/after practice, and reasons for missing a meal or snack. After the pre-study questionnaire, the athletes sat through a nutrition information session provided by the university's CSSD that lasted about 30 minutes. The session covered information regarding macronutrients (carbohydrates, proteins, and fat), and times to fuel with each of these macronutrients. Afterwards, athletes were given a demonstration on how to use the Eat2Win app, which included a demonstration of how to take pictures of meals to log on the app and were provided with a reminder sheet that indicated how their meals would be tracked over a four-week period (see appendix 3). This demonstration lasted about 30 minutes.

The pilot study then ran for four weeks. Athletes were instructed to log twice on Mondays, Wednesdays, and Fridays: before their workout and after their workout. Athletes were also instructed to log three times on Tuesdays and Thursdays: breakfast, pre-workout, and post-workout. Researchers tracked athletes' meal responses and participation and provided feedback for each instance the athlete recorded a picture of a meal or snack. Researchers commented on all picture logs, whether the athletes completed their log before or after the acceptable time frame, for four weeks. For example, if athletes logged within the appropriate time frame for any meal, they may have received a comment saying: "You ate close enough to your workout to keep

yourself fueled – good work! As a reminder, some good snack options before morning workouts are: yogurt, pretzels, applesauce pouches, fruit juice, or cereal. Keep up the good timing!” Athletes that logged outside of the appropriate time range received comments stating the timing for the meal was off and that fueling should be done within a certain time range to maximize energy levels (see appendices 4 and 5).

Athletes also received weekly email updates and reminders. These emails congratulated athletes on study participation, highlighted accomplishments for the week, and reminded athletes to keep logging. Emails also clarified any problems researchers noticed with logging. For example, if athletes were consistently logging two hours after practice, researchers reminded athletes that optimal fueling should happen within one hour after practice.

At the end of the four-week study, researchers emailed the post-study questionnaire link via Qualtrics. Athletes were asked to complete the questionnaire within five days. Any athlete that did not complete the link within the specified time frame was emailed and reminded individually. All athletes completed the post-study questionnaire. The post-study questionnaire contained 12 questions and asked similar questions, plus asked athletes to indicate if they did or did not like using the app, and why (see appendix 2).

Data Collection

Both questionnaires were administered online via Qualtrics survey and were completed using smartphones. Researchers provided instructions for how to complete questionnaires. Since the pre-study questionnaire was administered before the nutrition education session, researchers were present to answer questions as they arose.

Following the information session, researchers tracked the number of times athletes’ logged meals per day (Monday-Friday) on an Excel spreadsheet. Athletes had the opportunity to log 12 meal/snack pictures each week (see appendix 6). Data was monitored throughout the four weeks.

Data Analyses

All data were analyzed using Statistical Package for the Social Sciences (SPSS) for frequencies, descriptives, and correlates. Statistical significance was set at $p \leq 0.05$.

Results

Participant Demographics

In total, all (n=17) NCAA Division I Beach Volleyball female athletes aged 18 to 23 years old participated in the study and completed both the pre- and post-study questionnaire. Of the 17 athletes, 12 had used a mobile app to previously track their exercise and nutrition habits at one point in time or another. Of the athletes that indicated prior app usage, the majority of respondents indicated they have used MyFitnessPal (n=8), while others indicated using Lose It! (n=1), or the Fitbit app (n=3). Primary responses for attenuating or stopping logging via the app include too much of a time commitment, forgetting to log, or not seeing any results. However, most athletes indicated they would prefer to track their nutritional habits via a mobile app if they were required (58.9%, n=10). Other options included a written log (17.6%, n=3), picture log (17.6%, n=3), or mental tracking (5.9%, n=1).

Pre-Study Questionnaire

Before the study began (day 0), 10 athletes indicated they ate or drank something with calories (not including alcohol) every 3-4 hours while four athletes said they sometimes did. Those that engaged in this habit had higher energy levels ($r=-.591, p\leq 0.05$). Athletes also had higher energy levels when they did not forget to eat a meal or snack ($r=.494, p\leq 0.05$). However, reasons for skipping a meal or snack included: class (76.5%, $n=13$), lack of planning (52.9%, $n=9$), practice (47.1%, $n=8$), forgot to eat (35.3%, $n=6$), budget constraints (11.8%, $n=2$), and unsure of what to eat (5.9%, $n=1$). Additionally, 76.5% of athletes ($n=13$) ate breakfast most days of the week (4 or more) and ate within 1 hour before and after practice most weekdays (4 or more times). Those who ate breakfast more frequently had higher energy levels ($r=.512, p\leq 0.05$) and had more total responses throughout the whole study ($r=.496, p\leq 0.05$). The more often an athlete ate breakfast, the more times per week they ate something within one hour of practice ($r=.631, p\leq 0.01$) and had higher energy levels ($r=.671, p\leq 0.01$). See appendix 7 for graphical representations.

Post-Study Questionnaire

After the study (day 32), 14 of the athletes (82.4%) indicated they would not continue to use a mobile app to track nutritional habits. Athletes who specified this had higher energy levels ($r=.630, p\leq 0.01$) and did eat within 30 minutes of waking up ($r=-.571, p\leq 0.05$). However, 88.2% ($n=15$) said they do or sometimes do eat within 30 minutes of waking up. As well, 82.4% of athletes ($n=14$) indicated they do or sometimes do eat something with calories (not including alcohol) every 3-4 hours; this did not change from pre to post study. Most athletes ($n=11$, 64.7%) said that class was still the main reason for skipping a meal or snack, followed by lack of planning (52.9%, $n=11$), forgot to eat (35.3%, $n=6$), practice (29.4%, $n=5$), and not sure what to eat (5.9%, $n=1$). None of the athletes indicated that budgeting was a reason for skipping a meal or snack. Most athletes (88.2%, $n=15$) indicated they ate breakfast most days (4 or more). Athletes who ate their first meal within 30 minutes of waking up also more frequently ate within one hour of practice ($r=-.642, p\leq 0.01$). Athletes who ate within one hour after practice also ate breakfast more often ($r=.750, p\leq 0.01$) and also ate something within one hour before practice ($r=.552, p\leq 0.05$).

Post-study results showed more variance in preferred nutritional tracking methods if this were required; 35.3% ($n=6$) would prefer to track via mobile app, 23.5% ($n=4$) via picture log, 17.6% ($n=3$) via a written log or mental tracking, and 5.9% ($n=1$) have no preference. Overall, 64.7 ($n=11$) did not like the Eat2Win app while 35.2% ($n=6$) did or somewhat liked the app because it was convenient (100%, $n=6$), had timing alerts (83.3%, $n=5$), allowed users to score points (33.3%, $n=2$), they saw results (16.7%, $n=1$) or because it helped them change their eating habits (16.7%, $n=1$). See appendix 8 for a list of all responses detailing why athletes did not like the app and appendix 7 for graphical representations.

Pre- to Post-Study Questionnaire

When comparing the athletes' answers from the pre-study to the post-study questionnaire, athletes who initially had higher energy levels indicated to eating breakfast more frequently after the study ($r=.586, p\leq 0.05$) and to eating most days of the week within one hour after practice ($r=.662, p\leq 0.01$). Athletes who ate breakfast often before the study began had high energy levels after the study ($r=.605, p\leq 0.05$). Additionally, athletes who ate within 30 minutes of waking up before the study still ate within 30 minutes of waking up after the study ($r=.553, p\leq 0.05$). Athletes who ate or drank something with calories, not including alcohol, every 3 to 4 hours ate

within 30 minutes of waking up ($r=.627, p\leq 0.01$). Similarly, athletes who ate breakfast before the study still ate breakfast after the study ($r=.664, p\leq 0.01$). Along the same lines of continuing trends, if athletes skipped a meal, forgetting was not the cause ($r=.485, p\leq 0.05$); however, having class was a reason an athlete may have skipped a meal or snack ($r=.751, p\leq 0.01$). Athletes who often ate breakfast also continued to eat within one hour before practice ($r=.518, p\leq 0.05$) and within one hour after practice ($r=.508, p\leq 0.05$), and those who ate within one hour after practice continued to eat within one hour after practice ($r=.778, p\leq 0.01$). Athletes also indicated they had a history of using mobile apps to track nutritional habits before the study began, but after the study, the convenience of a mobile app is not a reason they particularly liked the app ($r=-.503, p\leq 0.05$). As well, athletes reported preferring mobile apps in the pre-study questionnaire, but after the study, they indicated they no longer would use a mobile app to track their nutritional habits ($r=.588, p\leq 0.05$).

Regarding energy levels and fueling habits in pre- and post-study questionnaires, athletes who ate breakfast before the study reported high energy levels after the study ($r=.605, p\leq 0.05$). Those who ate said they ate within one hour after practice before the study reported having high energy levels after the study ($r=.549, p\leq 0.05$). Athletes with high energy levels in the pre-study indicated in the post-study they ate most days within one hour after practice ($r=.662, p\leq 0.01$). See appendix 7 for graphical representations.

Discussion

Findings

The purpose of this study was to determine the feasibility of using Eat2Win as a viable nutrition education tool for collegiate athletes. Additionally, the study aimed to encourage athletes to change their fueling habits and make healthier meals choices (i.e. increase consumption of fruits, vegetables, whole grains, etc.). The primary results of this study indicated athletes would not continue to use the Eat2Win app because they did not like it and found it to be inconvenient. Another key finding of the study was that athletes reported similar energy levels before and after the study, day 0 and 32, respectively.

Mobile applications have increased in prevalence, specifically as a way to help individuals lose weight because they boast promising ability to change health behaviors.⁶ Especially because a majority of collegiate athletes have limited nutrition knowledge, mobile apps are a potential important solution.⁹ With this potential solution in mind, this study was designed to examine the impact of Eat2Win on athletes' nutrition behaviors, attitudes, and adherence. Given the rising popularity of mobile phones in general, athletes too would hopefully be receptive to this mode of nutrition education.⁷ However, given the results of the research study, athletes did not like the Eat2Win app and said they would not continue using it to track their nutrition habits even though they initially indicated they have used and do like using nutrition-related mobile applications.

In both the pre- and post-study questionnaires, athletes' energy levels, frequency of breakfast consumption, and fueling within one hour after practice remained unchanged. With or without the app, the participants did not change or increase their habits; thus, the app did not change behaviors. Moreover, a consistency in these habits indicates athletes had already established their habits and the app did not influence them to change their methods.

Ideal Mobile App

Athletes both before and after the study preferred using a mobile app or a picture log to track nutrition habits, and most athletes indicated they had used MyFitnessPal before. Compared to

Eat2Win, MyFitnessPal users can enter in the full details of their meals and snacks. This feature then allows for the total calculation of calories, macronutrients, and some micronutrients, including potassium, calcium, vitamins A and C, and iron. Users have the ability to create their own recipes and add frequently consumed foods. Users can also log exercise and water intake. Similar to Eat2Win, users can enter challenges and make friends. Eat2Win, then, is simpler in that users only take pictures of their meals, no calorie count is provided. This feature was of important note to the sports dietitian at the researcher's university because the sports dietitian did not want athletes focusing on calorie count; rather, she wanted them to focus on building better meals with increased fruit and vegetable choices. She also wanted athletes to focus on consuming meals at the appropriate times. Eat2Win allowed for a customization of meal timing alerts, a feature not as prevalent on MyFitnessPal. In sum, the app must meet the needs of the athletes as much as it meets the needs of the sports dietitian. Essentially, researchers would recommend this would be a combination of the two – an app that features calorie counting and picture logging and allows for meal timing notifications.

Strengths and Limitations

Strengths of this study included guaranteed participation since the Beach Volleyball coach volunteered the team to take place in the study. Additionally, creators of the app were open to helping researchers work through difficulties. Moreover, the app was free, so it was accessible to all those involved in the study. Limitations of this study included a skewed sample of only 17 female athletes; researchers had the opportunity to pilot the app with only one collegiate sports team due to limited time, so the results may not be applicable to all populations. Furthermore, the app itself was difficult to use. Many athletes had trouble staying logged in, or their app froze. From the researchers' perspectives, the pictures did not always load properly, which made it difficult to comment for tracking purposes. However, since researchers discovered these difficulties, the sports dietitian and other athletic staff can troubleshoot potential problems before implementing with all athletes.

Conclusions

Athletes did not find the Eat2Win app to be particularly user-friendly because it was inconvenient to their busy schedules, took up phone storage space, and froze often. However, this pilot study still offered a way to examine how mainstream technology can fit into behavior change studies. Furthermore, the study showed that this particular population of athletes already had a greater nutrition base level of knowledge than some populations. Overall, future studies should examine apps that combine both picture logging and calorie counting features. Future studies should also consider if and how behavior change increases nutrition knowledge and leads to better fueling choices (i.e. carb, protein, and fluid ratios). Studies such as these would address the benefits of proper fueling as a mechanism for increased performance and energy levels.

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Appendices

1. Pre-Study Questionnaire

Student Athlete Compliance to Eat2Win: A Study Regarding Behaviors to Sports Nutrition Knowledge Delivered via Mobile Application

Mobile applications are becoming more popular these days as a way to track fitness and nutrition habits. Thus, this is a pilot study to see how athletes utilize a specifically designed sports nutrition app. The purpose of this research is to gauge your response to the Eat2Win App, a sports nutrition mobile app that allows you to log your meals.

You will be asked to complete a pre- and post-study questionnaire that examines your attitude toward mobile applications, frequency of behaviors, and nutrition knowledge. Approximately 7 - 10 minutes are required for both the pre- and post-study questionnaire. There is no alternate option, and you will not be compensated for your participation.

All information obtained in connection with the study will remain confidential. Consents will be monitored online, but any hard data obtained will be stored for a minimum of 3 years in a locked filing cabinet (and locked room) in the principal investigator's office, lab, or storage of the TCU Nutritional Sciences Department office. All identifying information of the participants will be de-identified, and no individual names will be used in the presentation of the data. If you would like a hard copy of the consent form, please request it from one of the investigators.

Your participation is voluntary, and you can stop taking part in the study at any time. You can withdraw from the study at any time, without penalty or consequences by closing the browser.

Please notify the people below if you must withdraw or have any questions regarding the study:

Jade Frederickson, Student Investigator

Ginny Ho, Student Investigator

Dr. Lyn Dart, PhD, RD, LD, Principal Investigator

Dr. Jada Stevenson, PhD, RDN, LD, Principal Investigator

Contact the people below if you have any questions regarding your rights as a study participant:

Dr. Michael Faggella-Luby, Chair, TCU Institutional Review Board, m.faggella-luby@tcu.edu

Dr. Dru Riddle, Chair-elect, TCU Institutional Review Board, d.riddle@tcu.edu

By choosing "I agree" below you indicate that you have read or been read the information provided above, you have received answers to all of your questions and have been told who to call if you have any more questions, you have freely decided to participate in this research, and you understand that you are not giving up any of your legal rights.

1. Please choose "I agree" to provide consent to participate in this research study.*

I agree

Pre-Study Questionnaire**Please fill in the following accordingly.****Name:** _____

1. Do you or have you previously used mobile apps to track exercise and nutrition habits?
 Yes
 No
 Sometimes

2. If yes, which app:
 MyFitnessPal
 Lose It!
 Weight Watchers
 Fitbit
 Apple Health App
 Other: _____
 No specific preference

3. If you have stopped using an app, why did you stop?
 Time commitment
 Forgot to log
 Did not see any results
 Other: _____

4. On a scale of 1-10, what is your typical energy level? (sliding scale)
1-3 (no energy) 4-7 (often tired) 8-10 (feel good)

5. Do you eat your first meal within 30 minutes of waking up?
 Yes
 No
 Sometimes

6. Do you eat or drink something with calories (alcohol excluded) every 3-4 hours?
 Yes
 No
 Sometimes

7. What would be a main reason for missing or skipping a meal or snack? (Check all that apply)
 Class
 Budget
 Practice/Lift
 Lack of Planning
 Don't know what to eat
 Forgot
 Other: _____

8. How often do you eat breakfast?
- Never
 - Rarely (1-2x/week)
 - Sometimes (3x/week)
 - Usually (4-5x/week)
 - Always (6-7x/week)
9. How many times per week do you eat something within 1 hour **BEFORE** practice?
- 0
 - 1
 - 2
 - 3
 - 4
 - 5
10. How many times per week do you eat something within 1 hour **AFTER** practice?
- 0
 - 1
 - 2
 - 3
 - 4
 - 5
11. If you were required to track your nutritional habits, what would be your preferred method?
- Written Log
 - Picture Log
 - Mobile App
 - Mental Tracking
 - Other: _____
 - No preference

Thank you for your participation in the study!

2. Post-Study Questionnaire

Post-Study Questionnaire

Please fill in the following accordingly.

Name: _____

1. Will you continue to use a mobile app to track nutritional habits?
 Yes
 No
 Maybe

2. On a scale of 1-10, what is your typical energy level? (sliding scale)
1-3 (no energy) 4-7 (often tired) 8-10 (feel good)

3. Do you eat your first meal within 30 minutes of waking up?
 Yes
 No
 Sometimes

4. Do you eat or drink something with calories (alcohol excluded) every 3-4 hours?
 Yes
 No
 Sometimes

5. What would be a main reason for missing or skipping a meal or snack? (Check all that apply)
 Class
 Budget
 Practice/Lift
 Lack of Planning
 Don't know what to eat
 Forgot
 Other: _____

6. How often do you eat breakfast?
 Never
 Rarely (1-2x/week)
 Sometimes (3x/week)
 Usually (4-5x/week)
 Always (6-7x/week)

7. How many times per week do you eat something within 1 hour **BEFORE** practice?
 0
 1
 2
 3
 4

- 5
8. How many times per week do you eat something within 1 hour **AFTER** practice?
- 0
 1
 2
 3
 4
 5
9. If you were required to track your nutritional habits, what would be your preferred method?
- Written Log
 Picture Log
 Mobile App
 Mental Tracking
 Other: _____
 No preference
10. Did you like the Eat2Win App?
- Yes
 No
 Somewhat
11. If yes, or somewhat, what did you like?
- Convenient
 Time Alerts
 Scoring points
 Saw results
 Changed eating habits
 Other: _____
12. If no, what did you not like about the Eat2Win App: _____

Thank you for your participation in the study!

3. Athlete Logging Reminder Sheet

5 BIG TAKEAWAYS FROM TODAY

1. Ginny and Jade will serve as the nutrition monitors. We will comment on your posts 1-2 times per day with preset information from Brooke and Brittany.
2. **M/W/F** - take a picture for **pre-fuel** and **post-fuel/breakfast**.
T/Th - take a picture for **breakfast**, **pre-fuel/lunch**, and **post-fuel/dinner**.
3. On days when you are recording breakfast, please make sure to put the time you woke up at in the comments.
4. Turn on “nutrition monitor” push notifications (under settings).
5. You will be receiving a post-study questionnaire link via email on Tuesday, October 16th. Please complete this when you receive it!

THANK YOU FOR YOUR PARTICIPATION!

4. Meal Logging Comments (comments researchers sent to athletes)

A) PRE-WORKOUT COMMENTS

Scenario: Athlete posted within the time frame for appropriate pre-fuel.

Comment for Mon/Wed/Friday mornings.

This applies if athlete posted a pre-fuel picture between 5:15-6:15AM.

Comment: Hi *NAME*, you ate close enough to your workout keep yourself fueled – good work! As a reminder, some good snack options before morning workouts are: yogurt, pretzels, applesauce pouches, fruit, juice, or cereal. Keep up the good timing!

Comment for Tuesday/Thursday afternoons.

This applies if athlete posted a snack picture between 1:00-2:00PM or a lunch between 12:00-2:00PM.

Comment: Hi *NAME*, you ate close enough to your workout to keep yourself fueled – good work! As a reminder, if you are having a snack close to practice or lift, some good options would be: yogurt, pretzels, applesauce pouches, fruit, juice, or cereal. If lunch is the last thing you eat before practice, some good options are: a sandwich or wrap with deli meat + low-fat cheese + a side of fruit, or a balanced plate without any high-fat foods (fried foods, desserts, creamy sauces/dressings, etc.) Keep up the good timing!

Scenario: Athlete posted but it was too early to be considered appropriate pre-fuel.

Comment for Mon/Wed/Friday mornings.

This applies if the athlete posted before 5:15AM – won't likely happen often if at all. (Lift is at 6:15AM)

Comment: Hi *NAME*, it looks like you did not eat close enough to your workout to be properly fueled up! As a reminder, the goal before workouts is to eat something within 1 hour before your workout. So tomorrow, try to eat closer to workouts. Choose foods that are mostly carbohydrates and don't have much fat. Some good snack options before morning workouts are: yogurt, pretzels, applesauce pouches, fruit, juice, or cereal. Try one of these options next time before lift and make sure to eat it within 1 hour before for optimal energy!

Comment for Tuesday/Thursday afternoons.

This applies if the athlete posted a snack picture before 1:00PM, or a true lunch picture before 12:00PM. (Practice is at 2:00PM.)

Comment: Hi *NAME*, it looks like you did not eat close enough to practice to fuel up! As a reminder, the goal is to either eat a snack within 1 hour before or a meal within 2 hours before practice. So tomorrow, try to eat closer to practice time. If you choose to eat a snack, it should be mostly carbs and minimal fat. Some examples of that would be: yogurt, pretzels, applesauce pouches, fruit, juice, or cereal. If lunch is the last thing you eat before practice, it should contain mostly carbs, some protein, and minimal fat. An example would be: a sandwich or wrap with deli meat + low-fat cheese + a side of fruit, or a balanced plate without any high-fat foods (fried foods, desserts, creamy sauces/dressings, etc.) The next time you have practice, try to adjust your timing to fit within the suggested window before practice for optimal energy!

B) POST-WORKOUT COMMENTS

Scenario: Athlete posted within the time frame for appropriate post-fuel/recovery.

Comment for Mon/Wed/Friday mornings. This would apply if the athlete posted from 9:30-10:30AM.

Comment: Hi *NAME*, it looks like you ate within an hour after the end of practice – good work! As a reminder, what you eat post-lift/practice for recovery can be a snack or a meal. The three components you need for your choice to “count” as recovery are carbohydrates, protein and fluids. So, if you are looking for something on-the-go (more of a snack) then the fueling station shakes, a Greek yogurt + fruit, a chocolate milk, or something similar would be a good option. If you are going to sit down and eat breakfast, just make sure you get some carbs (fruit, oatmeal, potatoes, etc.) + some protein (eggs, yogurt, or milk) + fluids (water or juice). This will ensure your muscles get the right nutrients to start rebuilding and recovering!

Comment for T/Th afternoons. This would apply if the athlete posted from 5-6 PM.

COMMENT: Hi *NAME*, it looks like you ate within an hour after the end of practice – good work! As a reminder, what you eat post-lift/practice for recovery can be a snack or a meal. The three components you need for your choice to “count” as recovery are carbohydrates, protein and fluids. So, if you are looking for something on-the-go (more of a snack) then the fueling station shakes, a Greek yogurt + fruit, a chocolate milk, or something similar would be a good option. If you are going to sit down and eat dinner close to practice time, just aim for a balanced plate with carbs (potatoes, rice, pasta) + protein (meat, fish, yogurt) + fluids (milk, unsweet tea, or water). This will ensure your muscles get the right materials to start rebuilding and recovering!

Scenario: Athlete posted but it was too late to be considered appropriate pre-fuel

Comment for Mon/Wed/Friday mornings. This would apply if the athlete posted after 10:30AM.

Comment: Hi *NAME*, thank you for posting. It looks like you ate too late for this to be considered appropriate recovery fuel. As a reminder, you should eat a snack or meal within 1 hour after the end of your lift/practice for optimal recovery. So tomorrow, try to eat closer to the end of workouts. If you wait past this window to eat, your muscles may not have the time and nutrients needed to recover fully before your next workout. The three components you need for your choice to “count” as recovery are carbohydrates, protein and fluids. So, if you are looking for something on-the-go (more of a snack) then a fueling station shake, a Greek yogurt + fruit, a chocolate milk, or something similar would be a good option. If you are going to sit down and eat breakfast, just make sure you get some carbs (fruit, oatmeal, potatoes, etc.) + some protein (eggs, yogurt, milk) + fluids (water or juice). This will ensure your muscles get the right materials to start rebuilding and recovering!

Comment for Tuesday/Thursday afternoons. This would apply if the athlete posted after 6:15PM.

Comment: Hi *NAME*, thank you for posting. It looks like you ate too late for this to be considered appropriate recovery fuel. As a reminder, should eat a snack or meal within 1 hour after the end of your practice for optimal recovery. So tomorrow, try to eat closer to the end of practice. If you wait past this window to eat, your muscles may not have the time and nutrients needed to recovery fully before your next workout. The three components you

need for your choice to “count” as recovery are carbohydrates, protein and fluids. So, if you are looking for something on-the-go (more of a snack) then a fueling station shake, a Greek yogurt + fruit, a chocolate milk, or something similar would be a good option. If you are going to sit down and eat dinner close to practice time, just aim for a balanced plate with carbs (potatoes, rice, pasta) + protein (meat, fish, yogurt) + fluids (milk, unsweet tea, or water). This will ensure your muscles get the right materials to start rebuilding and recovering!

C) BREAKFAST COMMENTS T/TH

Scenario: Athlete eats breakfast within 30 minutes of her reported wake up time.

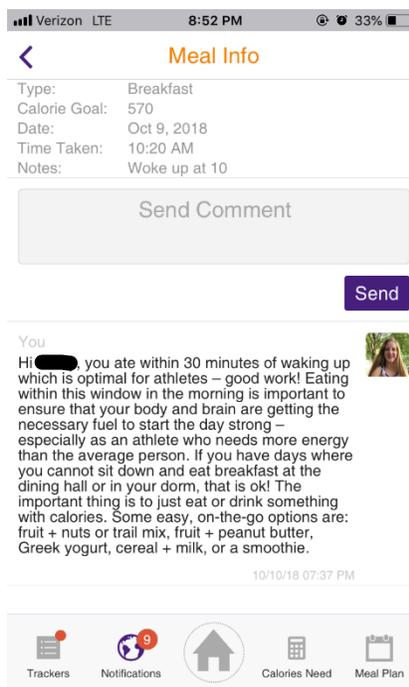
Comment: Hi *NAME*, you ate within 30 minutes of waking up which is optimal for athletes – good work! Eating within this window in the morning is important to ensure that your body and brain are getting the necessary fuel to start the day strong – especially as an athlete who needs more energy than the average person. If you have days where you cannot sit down and eat breakfast at the dining hall or in your dorm, that is ok! The important thing is to just eat or drink something with calories. Some easy, on-the-go options are: fruit + nuts or trail mix, fruit + peanut butter, Greek yogurt, cereal + milk, or a smoothie.

Scenario: Athlete eats breakfast later than 30 minutes of her reported wake up time. X

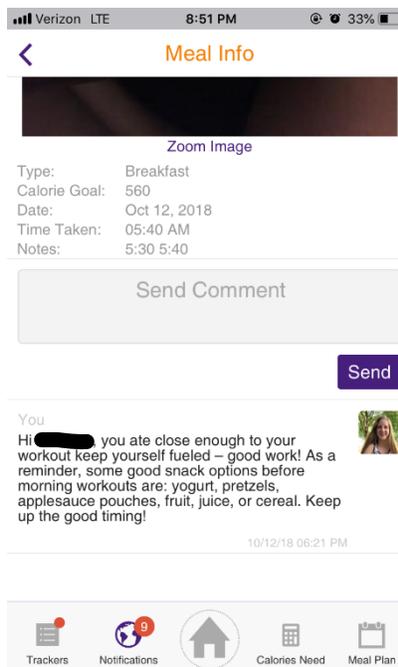
Comment: Hi *NAME*, it looks like you ate for the first time today longer than 30 minutes after waking up. Eating early in your day is important to ensure that your body and brain are getting the necessary fuel to start the day strong – especially as an athlete who needs more energy than the average person! Within the first 30 minutes of waking up is the optimal time to eat your first meal or snack, so tomorrow try to eat closer to when you wake up. If you have days where you cannot sit down and eat breakfast at the dining hall or in your dorm, that is ok! The important thing is to just eat or drink something with calories within 30 minutes of waking. Next time, try to incorporate an easy, on-the-go idea like: fruit + nuts or trail mix, fruit + peanut butter, Greek yogurt, cereal + milk, or a smoothie.

5. Examples of meal logging and comments from the researcher's perspective

[1]



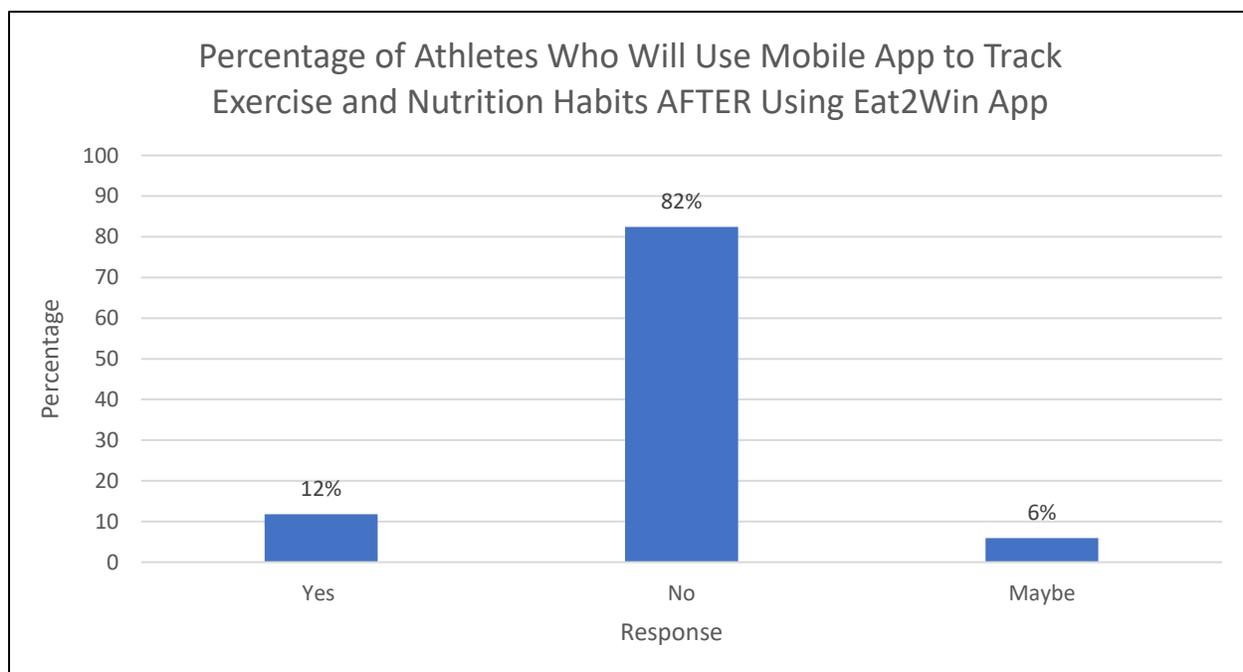
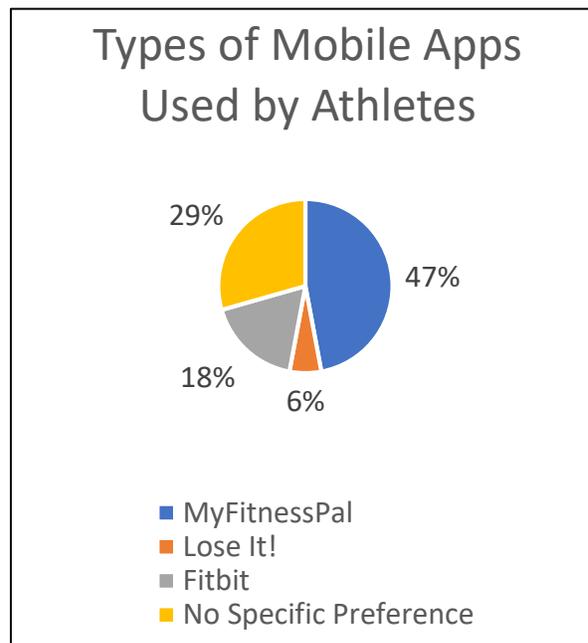
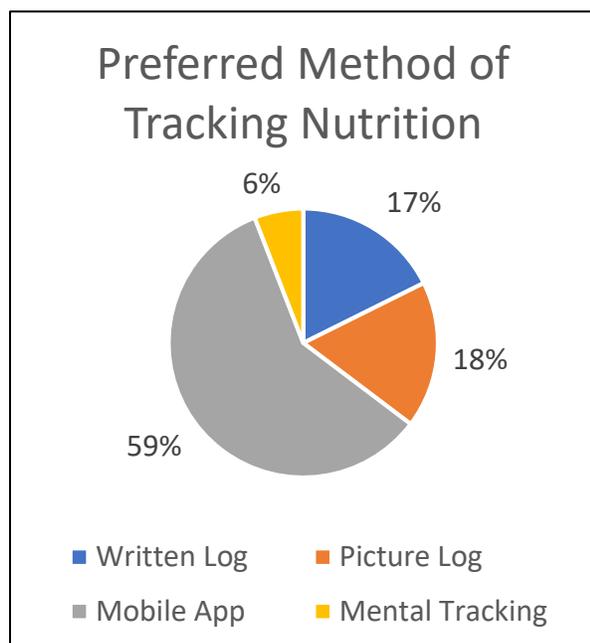
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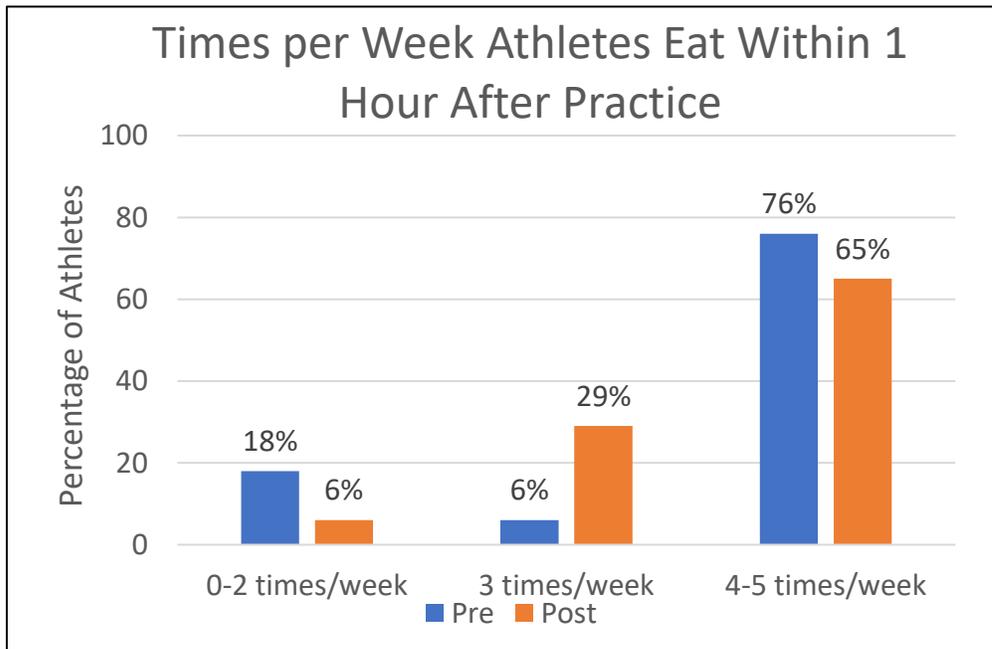
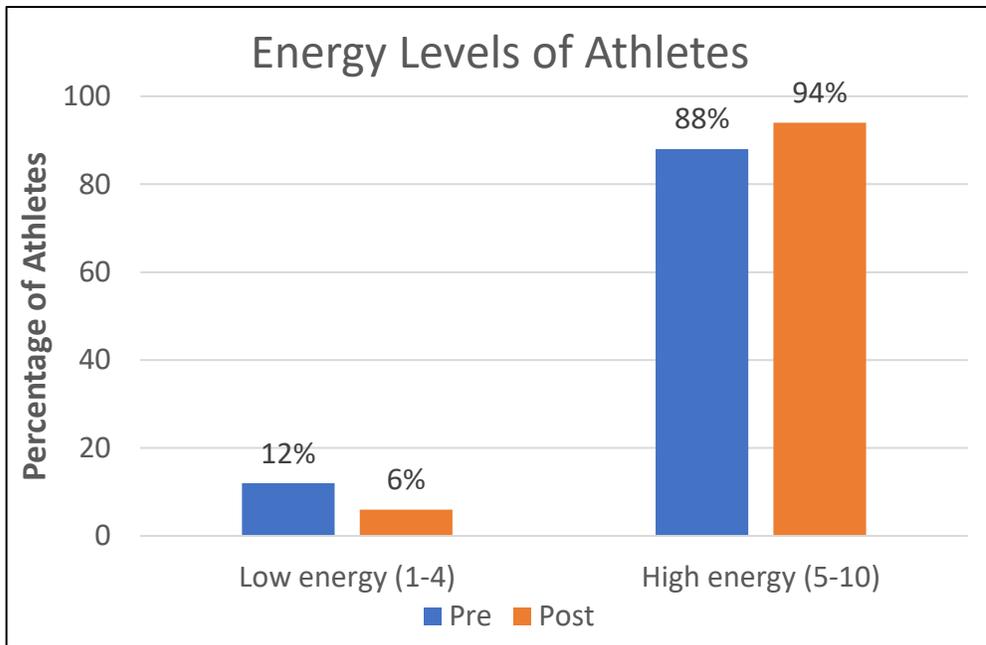


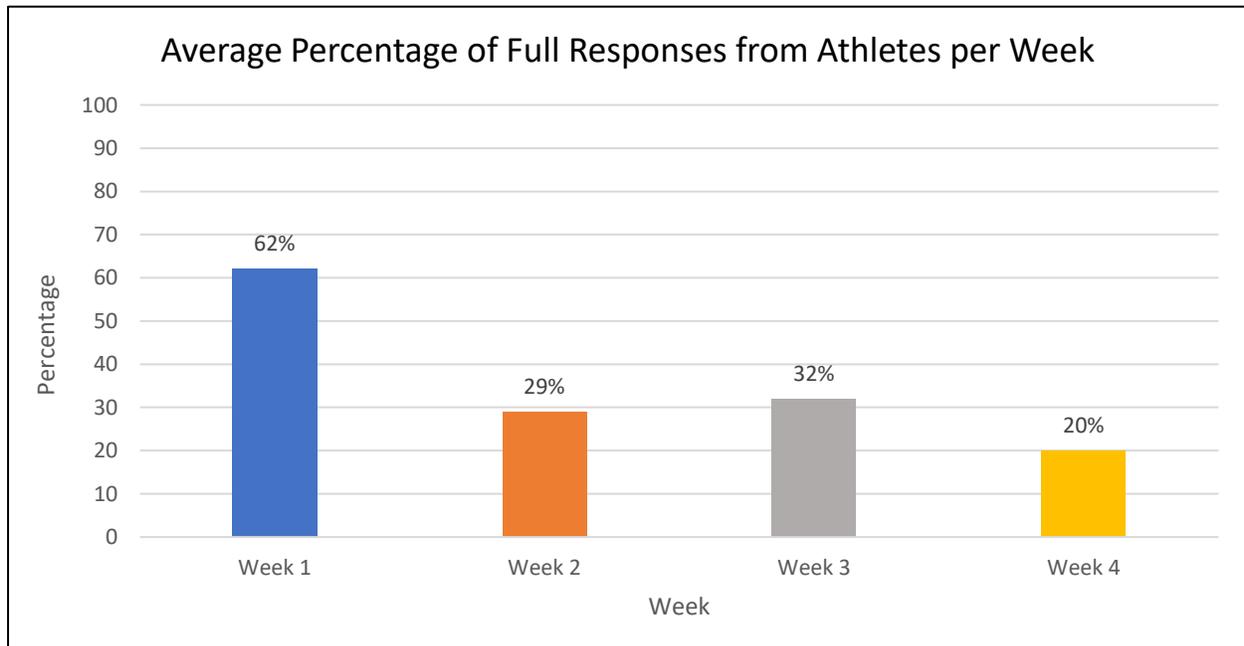
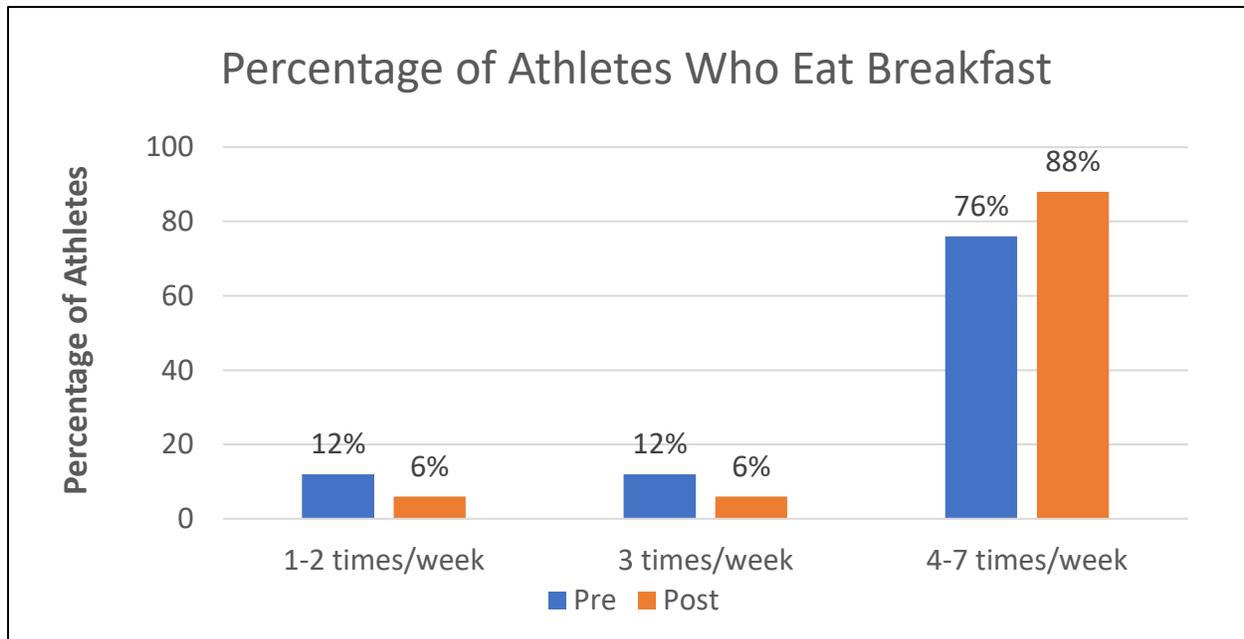
6. Meal Logging Schedule graphic

Monday Morning Practice		Tuesday Afternoon Practice			Wednesday Morning Practice		Thursday Afternoon Practice			Friday Morning Practice	
Pre Workout	Post Workout OR Breakfast	Breakfast	Pre Workout OR Lunch	Post Workout OR Dinner	Pre Workout	Post Workout OR Breakfast	Breakfast	Pre Workout OR Lunch	Post Workout OR Dinner	Pre Workout	Post Workout OR Breakfast

7. Data Representation







8. Athlete responses to why they did not like the Eat2Win app

“It didn’t work very well most of the time and it would crash.”

“You had to take pictures every time you ate and if you didn’t have enough storage you would have to delete things from your phone to send in pictures of your meal.”

“Took up too much time.”

“It never worked for me and was very slow.”

“Slow, inconvenient to open before I ate anything especially when my phone wasn’t nearby; wasn’t looking for results so didn’t need.”

“Crashed a lot.”

“The app eventually stopped opening completely on my phone and even with redownloading it multiple times it still would not open.”

“It has a lot of glitches, which made it difficult and time-consuming.”

“Not convenient, not reliable, not easy to use.”

“It constantly glitched or would not load the food that I was trying to track.”

“It was not effective and very inconvenient to my busy schedule.”

“Crashed all the time and was super slow, outdated.”