2017

# Evaluation of MyPlate Recommendations and Dietary Habits of EIU ROTC Cadets: A Mixed Methods Approach

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# Evaluation of MyPlate Recommendations and Dietary Habits of EIU ROTC Cadets: A Mixed Methods Approach

(TITLE)

BY

Lilibeth Nevarez

**THESIS**

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

Master of Science in Nutrition and Dietetics

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

2018

YEAR

I HEREBY RECOMMEND THAT THIS THESIS BE ACCEPTED AS FULFILLING
THIS PART OF THE GRADUATE DEGREE CITED ABOVE

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# Evaluation of MyPlate Recommendations and Dietary Habits of EIU ROTC Cadets: A Mixed Methods Approach

Thesis

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## Abstract

The purpose of this study was to determine if MyPlate recommendation knowledge, dietary habits, and eating for performance influence the daily consumption among Eastern Illinois University ROTC Cadets. The sample population included EIU ROTC cadets (n=19), between the ages of 18 to 28 years old. A mixed-method approach, using a questionnaire along with focus groups interviews of six to ten cadets from all class levels, was used to obtain data. Results indicated that the highest mean score was 18.9 for MyPlate recommendation knowledge. In addition, five themes were analyzed: Inconsistency of dietary intake, High cost of eating healthy, Post workout consumption, Dependable nutrition education from kinesiology majors, and Concerns over body composition. Struggles with cost of food as well as meeting body composition standards were results of dietary habits and eating for physical performance. Increased nutrition education on MyPlate recommendations is warranted within the ROTC program.

**Acknowledgements**

I would like to recognize my thesis advisor, Dr. Nichole Hugo, for the time, effort, and support that she has given me throughout this study. You have kept me focused on the task and inspired me to analyze. I would also like to thank my other committee members, Dr. Melanie Burns, Dr. Axton Betz-Hamilton, and Dr. Kathrine Shaw for their guidance and support. I would like to thank my family for all of their encouragement, love, and support. Finally, I would like to thank the EIU ROTC cadre and the participating cadets, without whom this project would not have been possible.

**Dedication**

I dedicate this work to all ROTC programs. The ROTC cadre strives to develop effective military leaders out of American college students.

"*The most important thing I learned is that soldiers watch what their leaders do. You can give them classes and lecture them forever, but it is your personal example they will follow.*" General Colin Powell

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# Chapter 1

## Introduction

Physical performance is a term commonly heard within the Reserve Officers' Training Corps (ROTC). ROTC cadets are rated on their performance in leadership training as well as regular physical fitness tests. One factor that affects how well cadets perform in military training is the quality and quantity of the food they eat. McClung & Gaffney-Stomberg (2016) support that, "Optimal nutrition is essential for maintaining peak health and performance of Warfighters." Nutrition status cannot be underestimated as it is a component of military readiness and insufficiency in essential nutrients may cause adverse health outcomes (Bukhari, Champagne, Cole, Hatch, Logan, McGraw, Montain, & Spanbauer, 2016; Cable, Dennis, Jackson, Jin, Prosser, Rawlings, Robinson, & Vo, 2013). Therefore, nutrition is a critical factor in a cadet's performance, both physical and mental. Given that ROTC cadets must perform at high intensity levels similar to athletes and athletes consider nutrition as a key part of their training and competition, importance on nutrition should also be applied among ROTC cadets.

The Eastern Illinois University Panther ROTC Battalion has been providing quality training to prepare leaders for the U.S Army for over 30 years (*Teaching the Leaders of Tomorrow*, n.d). Army ROTC training consists of fewer than 10 hours a week, allowing cadets to focus on their course work and other extracurricular activities in which they may be involved. According to Master Sergeant Jack Robison, Senior Military Science Instructor at EIU, there are approximately 60 ROTC cadets in EIU, between the ages of 18 to 28 years-old (Robison, personal communication, November 10, 2016). Each day, cadets participate in daily physical training for one hour. In the classroom, Army

instructors instruct cadets on leadership, ethics, Army values, and other critical skills once a week. On Thursdays, cadets put the lessons they learned in the classroom to the test for two hours during leadership lab. Upon graduation, EIU ROTC cadets qualify for appointment as officers in the U.S. Army, Army Reserve, or Army National Guard.

There are perceived associations with physical performance capabilities as they relate to body size, body composition, and a professional military appearance. There is an uncertainty that body composition standards are meant to predict performance, on the contrary, military body composition standards are meant to motivate fitness and build positive dietary habits that encourage individual physical readiness (Friedl, 2012).

Based upon the theory of effective leaders taking pride in their own level of physical fitness, the EIU ROTC program focuses on two critical components: body composition and physical training (PT). EIU Cadets are required to meet the Army's specific weight standards, which are based on their height, weight, and gender. Also, they must satisfactorily pass the Army Physical Fitness Test (APFT) with a minimum score of 240 to be evaluated as physically proficient (Robison, personal communication, November 10, 2016).

Consequently, any cadet failing to meet minimum standards at any application of the APFT will be assigned to a remedial physical fitness program. A cadet is classified as exceeding weight if he/she goes over the maximum percent body fat, which is measured (males 20 to 22 percent body fat and females 30 to 32 percent body fat) (Friedl, 2012). Bulathsinhala, Hill, Hruby, McKinnon, Montain, Smith, & Young (2017) reported the incidence of overweight and obesity was highest among 20 to 30-year-olds soldiers in the US Army. Excessive body fat may indicate a poor state of health, physical fitness, or

stamina. Also, it may reflect lack of personal discipline, thus detracting from the military appearance. In the event a cadet fails to meet weight standards, cadets are counseled by a cadre member. However, no direction is given to seek consult from a dietitian to lose weight to meet the specified weight standards. Since an ROTC cadet's level of physical fitness has a direct impact on his or her combat readiness, a cadet in the U.S. Army must be mentally and physically fit.

Master Sergeant Jack Robison, Senior Military Science Instructor at EIU, states "Emphasis on good nutrition, along with recovery, rest, and hydration, has been increased since the spring of 2016" (J. Robison, personal communication, September 30, 2016). The Performance Triad is a comprehensive initiative that is intended to help Army soldiers balance and maintain health through three main components: physical activity, nutrition, and sleep (United States Army, 2016). The Performance Triad was introduced to the ROTC cadets in the spring of 2016. These components are targeted since they interact to influence performance and the health of U.S. soldiers (United States Army, 2016). Nutrition in the Performance Triad briefly educates on the consumption of quality of food and hydration maintenance. A study found soldiers that met aerobic exercise recommendations had more than three times the odds of developing healthy eating habits than soldiers who did not (Purvis, Lentino, Jackson, Murphy, & Deuster, 2013).

EIU ROTC cadets undergo intense physical military training, similar to athletes. However, there may be a challenge for those cadets struggling to meet weight standards without the help of a registered dietitian nutritionist (RDN). Therefore, the nutrition knowledge of this population was evaluated to determine if there was a need for nutrition education. The importance for ROTC cadets to understand that optimal dietary habits

greatly enhances the ability to perform at maximum potential. Fueling for performance signifies changing the way one eats and it should be conducted on a daily basis. As ROTC cadets and the Army's future leaders, building an eating strategy that will complement the requirements of their mission is vital.

**Purpose Statement**

ROTC cadets are a unique mix of athletes and college students, and as members of the military, there is much research on physical performance. However, there is little research on the assessment of nutritional knowledge and dietary habits of ROTC cadets. Therefore, the purpose of this study was to determine the MyPlate recommendations knowledge, dietary habits, and whether eating for performance was a factor in the daily consumption among Eastern Illinois University ROTC Cadets. The results were reported to EIU ROTC cadre as it may help improve the nutrition curriculum offered as a part of the Performance Triad.

**Research Questions**

The following four questions guided this research study:

1. What is the MyPlate recommendation knowledge difference by length of time in the ROTC program?
2. Given the MyPlate knowledge of cadets, is there an influence of dietary habits?
3. Is there an influence in dietary habits among cadets from the nutrition education gained in ROTC?
4. Is there an influence from performance consumption to the daily consumption among cadets?

**Hypothesis**

It is important to prepare a hypothesis to conduct questions and collect data from the target population participating in the study. The hypothesis of this study evaluated the MyPlate knowledge, dietary habits, and eating for physical performance of EIU ROTC cadets. The researcher predicted the following:

1. EIU cadets with greater length of time in the ROTC program will have greater MyPlate knowledge than cadets with few length of time in the ROTC program.
2. MyPlate knowledge among EIU cadets will have no influence in dietary habits.
3. Dietary habits among EIU cadets have changed since entry into the ROTC program.
4. Nutrition education taught in the ROTC program has an influence on what EIU cadets eat.
5. Eating for performance will have an influence on the daily consumption among cadets.

**Definition of Terms**

**Army Physical Fitness Test (APFT)**: standard U.S. Army assessment that measures the physical performance capabilities, which consists of three events: 2 minutes of push-ups, 2 minutes of sit-ups, and a 2-mile run (Gist et al., 2015).

**Athlete:** a person who is skilled at a sport, trains, and possesses physical attributes such as muscular strength, power, endurance, speed, and agility (Martin, 2016, p 1).

**Body Composition:** an indicator of physical readiness that is related to an individual's fitness, endurance, and overall health as it reveals the proportion of fat and lean mass in the body (U.S. Department of the Army, 2013).

**Body Fat Standards:** maximum allowable body fat percentage for Army personnel based on age and gender:

1. Age group 17-20: Male 20% and Female 30%
2. Age group 21-27: Male 22% and Female 32%
3. Age group 28-39: Male 24% and Female 34%
4. Age group 40 and older: Male 26% and Female 36% (U.S. Department of the Army, 2013).

**Cadre**: an active duty military group that consists of: a professor of military science (PMS), who holds the rank of professor and department chair at the university; a major or captain in the United States Army who holds the rank of assistant professor of military science (APMS) at the university; a recruiting officer, and at least one noncommissioned officer, holding the rank of master sergeant in the Army and the rank of instructor at the university. These members serve in leadership roles to supervise all ROTC activities and events (Estes, Miller, & Majure, 2016; Fischer, 2015).

**MyPlate:** a tool that illustrates the five food groups and designed to promote building a healthy plate at every meal (Levine et al., 2012).

**Physical Training (PT)**: a mandatory requirement, at a minimum of 3 days a week, that targets to increase cadets' physical fitness development through cardiovascular and muscular endurance (Liguori, Krebsbach, & Schuna, 2012).

**Assumptions**

Assumption in this study is that participants are EIU cadets in the ROTC program. Also, participants answer survey and interview questions in an honest and candid manner.

**Importance of the Study**

The fuel each athlete needs for his/her level of activity is important. However, the dietary habits may not be supported by the recommended dietary guidelines outlined in MyPlate. Since ROTC cadets are a unique group of college athletes, it is important that they understand the MyPlate recommendations and know to consume the right amount of each food group at every meal. Since there is little research on MyPlate recommendation knowledge and dietary habits among ROTC cadets, the results gained in the study were given to the EIU ROTC commander and may serve to determine if any changes need to be made with the current ROTC nutrition curriculum at EIU.

# Chapter 2

## Literature Review

The Eastern Illinois University ROTC cadets are part of a larger program that is a division of the U.S. Army. ROTC cadets are developed to become leaders and serve as commissioned officers for a life-altering commitment and service to the country. Physical readiness is maintained with daily exercise that incorporates elevated levels of cardiovascular and muscular endurance. In order to determine a cadet's physical readiness, physical fitness tests are administered. There is an imperative within the U.S. Army ROTC program to adhere to strict guidelines regarding physical fitness. Physical training (PT) is a mandatory component of the ROTC program. Regular training and physical fitness testing are required in order to ensure cadets are prepared to meet the physical demands of their mission (Liguori, Krebsbach, & Schuna, 2012). Elevated levels of cardiovascular and muscular endurance are required in combat missions. "Soldiers need to be able to lift themselves over a wall, climb a rope, pull themselves into a boat, or fight in hand-to-hand combat" (Jones, DeBeliso, Sevene, Berning, & Adams, 2012, p. 54). This has led to serious issues with cadets who may appear to be "out of shape," as there is often times a great deal of pressure put on them to lose weight quickly (Jones, DeBeliso, Sevene, Berning, & Adams, 2012). This chapter reviews a description of obesity and injuries, cadets as athletes, nutrition knowledge and food-frequency studies of collegiate athletes, dietary supplement use of emerging adults, physical performance and mental health, and nutrition education of U.S. Army personnel and college athletes.

**Obesity and Injuries**

Body composition can be a significant predictor of health since it is linked to obesity and chronic diseases. Those who are overweight and participate in intense physical activity may be more likely to sustain an injury than those of normal weight (Friedl, 2012). The prevalence of overweight and obesity in the military among men is 34 percent and among women is 38 percent (Crombie, Liu, Ormsbee, & Ilich, 2012). On average, 30% to 50% of injuries among soldiers are likely from the intense physical training and athletic activities (Nindl, Williams, Deuster, Butler, & Jones, 2013). Stress fractures are the most common injuries in the military. According to McClung & Gaffney-Stomberg (2016), stress fractures arise due to repetitive equipment loading and unloading causing the skeletal areas to absorb the shock as opposed to the muscles in the body. Ma et al., (2016) examined the incidence and characteristics of meniscal injuries in ROTC cadets. It was found that injured overweight and obese cadets are more susceptible to sustain meniscal injuries than injured normal-weight cadets.

Diet, exercise and lifestyle changes are considered the most effective method of addressing weight loss and improving physical fitness. However, when an ROTC cadet is injured or becomes overweight, who is advising ROTC cadets on interventions? Not all universities have a Registered Dietitian Nutritionist (RDN) available for consultation. One problem may be that despite the injuries, ROTC cadets continue with high calorie intakes and reduced physical activity (Crombie, Liu, Ormsbee, & Ilich, 2012). Another problem may be that once an ROTC cadet, who is not injured, is found to be overweight and receives little nutritional guidance to meet the standard. They may either practice

unsafe dieting measures to make weight or they lose motivation to proceed with the ROTC program.

**Cadets are Athletes**

ROTC cadets conduct physical training train at a minimum of three times a week to meet military training standards (J. Robison, personal communication, November 10, 2016). ROTC cadets maintain a level of physical activity aligned with the recommendations from the American College of Sports Medicine and the American Heart Association (Crombie, Liu, Ormsbee, & Ilich, 2012) and are held to the same standard as military soldiers. Comparable to athletes, soldiers require similar strength and conditioning preparation (Adams, Berning, DeBeliso, Jones, & Sevene, 2012).

Scofield and Kardouni (2015) explain that tactical professions, such as military personnel, are similar to traditional athletes as they graded on a fitness standard to perform the occupation successfully. If ROTC cadets are considered athletes, their nutritional knowledge may reflect similar to their college athletic counterparts.

**Nutrition Knowledge and Food-Frequency Studies of Collegiate Athletes**

In a study by Torres-McGehee, Pritchett, Zippel, Minton, Cellamare, & Sibilia (2012), researchers investigated the nutrition knowledge among college athletes, coaches, athletic trainers, and strength and conditioning specialists. They determined that the participating college athletes had inadequate nutrition knowledge on macronutrients, micronutrients, supplements and performance, weight management and eating disorders, and hydration. To achieve optimal performance, college athletes need to understand the basic nutrient functions. Similarly, Parks et al., (2016) evaluated the diet of 345 college

athletes using a food-frequency questionnaire. Results showed that male athletes ate less nutrient-dense foods compared to female athletes.

Using a food-frequency questionnaire, researchers found that participating ROTC cadets did not meet recommendations of five servings per day for vegetables and fruit (Crombie, Liu, Ormsbee, & Ilich, 2012). Moran, Heled, Arbel, Israeli, Finestone, Evans, & Yanovich (2012) monitored the relationship between dietary intake and stress fracture incidence among 74 male combat recruits through a 6-month period. Nutrient deficiencies were found in a food frequency questionnaire, and the highest of the deficiencies were vitamin D and calcium. Moran et al., (2012) found that those recruits who were more deficient developed more stress fractures. Another study examined the nutritional habits and diets of male and female military members during military training. Beals, Darnell, Lovalekar, Baker, Nagai, San-Adams, & Wirt (2015) found that soldiers followed a meal plan that may not provide enough energy throughout the day as daily consumption of saturated fat was high and daily consumption of carbohydrates were limited (Beals, Darnell, Lovalekar, Baker, Nagai, San-Adams, & Wirt, 2015). ROTC cadets may benefit from education on consuming enough daily calories and carbohydrates to support the demands of physical and tactical training. In addition, ROTC cadets may be inclined to use dietary supplements.

**Dietary Supplement Use**

There is an increased use of dietary supplements among college athletes. Recent research describes the common use of dietary supplement usage among ROTC cadets. L-arginine has shown an increased trend in usage with resistance trainers due to significant results of lean muscle mass (Wax, Mayo, Hilton, Mareio, Miller, Webb, & Lyons, 2013).

In one study, researchers examined the effects of acute L-Arginine Alpha-ketoglutarate on 19 ROTC cadets. Wax, Mayo, Hilton, Mareio, Miller, Webb, & Lyons (2013) determined that L-Arginine Alpha-ketoglutarate supplement has no effect on muscular strength, endurance, or blood lactate concentration during resistance exercise in ROTC cadets.

There is also an increase trend in energy drink consumption among military members, including ROTC cadets. Knapik, Trone, Austin, Steelman, Farina, & Lieberman (2016) estimated that at least 25 percent of military personnel use nutritional supplements such as energy bars, sport drinks and gels, and meal-replacement beverages for hydration or carbohydrate-electrolyte replenishment as well as for weight control.

**Physical Performance and Mental Health.** Furthermore, another research study examined the associations of energy drinks usage, anxiety, and sleep disturbances in college students. Researchers determined that energy drinks are marketed as physical performance enhancers, college athletes and ROTC cadets may be inclined to use energy drinks based on the physical demands of their activities (Stasio, Curry, Wagener, & Glassman, 2011). College students, athletes and, 18 ROTC cadets were recruited during the first two weeks of the fall semester. Researchers found that frequent energy drink consumption increased anxiety and sleep disturbances among the participants. Stasio, Curry, Wagener, & Glassman (2011) predicted that ROTC cadets would use energy drinks more often than college students and college athletes. However, results indicated that ROTC cadets did not use energy drinks more often than either athletes or the controls group (Stasio, Curry, Wagener, & Glassman, 2011). Another study investigated the effects of six weeks of quercetin supplementation on energy, fatigue, and sleep quality in young people conducting military physical training. The U.S. Army had an interest in

finding out the possible effects of quercetin to enhance physical performance. Bigelman, Chapman, Freese, Trilk, & Cureton (2011) hypothesized that quercetin supplementation would improve energy and lower fatigue compared to six weeks of placebo ingestion and the effects of quercetin would interrupt a person's sleep. Researchers tested 57 male and female ROTC cadets between the ages of 18 to 40 and one ROTC instructor assigned to a quercetin group and a placebo group. The results from the (POMS-B) questionnaire, the Mental and Physical State Energy, and the Pittsburgh Sleep Quality Index did not detect significant change between the quercetin and placebo groups (Bigelman, Chapman, Freese, Trilk, & Cureton, 2011). Researchers found that the results did not support their hypothesis of quercetin effect on mood, sleep, and physical activity during military physical training. Also, researchers determined that quercetin supplementation did not affect the transient moods of energy, fatigue, and sleep quality of the participants (Bigelman, Chapman, Freese, Trilk, & Cureton, 2011).

**Nutrition Education**

ROTC cadets are athletes as well as college students; therefore, this population of college students may face the dual pressures of upholding high academic status and physical demands placed by the ROTC program. The increased pressures may wreak havoc on dietary habits of ROTC cadets.

**Nutrition education of U.S. Army personnel.** ROTC cadets are an underrepresented group in literature (Gilson, Latimer, and Lochbaum, 2014). As a result, there is little research regarding the nutrition education of ROTC cadets. However, the ROTC program produces over 70 percent of the second lieutenants who join the active Army, the Army National Guard and the U.S. Army Reserve (Morgado, 2017). Therefore,

much light should be shed on the assessment of the nutritional knowledge of ROTC cadets as they are the Army's future leaders. Friedl (2012) informs weight management interventions would be to educate soldiers and their families on preparing healthy meals and mindful approaches to physical activity without sustaining injuries. Kullen, Iredale, Prvan, & O'Connor (2016) assessed the general nutritional knowledge in military personnel. Using the General Nutrition Knowledge Questionnaire (GNKQ), researchers found that participants scored lowest in knowledge of diet and disease relationship. Knowledge gained from nutrition labels may influence dietary choices. Arsenault, Singleton, & Funderburk (2014) found promising results through the use of the Go-for-Green nutrition labeling, a traffic-light labeling system emphasizing performance nutrition; results showed that 47 percent of soldiers reported using the Go-for-Green nutrition labels to make dietary choices. These nutrition labels help soldiers identify nutrient-rich foods that are beneficial which can influence dietary choices to improve physical performance and military health and readiness.

**Nutrition education of college athletes.** College athletes' diet quality tends to be low in essential nutrients and fruit, vegetables, and dairy products (Hardy, Kliemann, Evansen, & Brand, 2016). Researchers believe that college athletes have confirmed a lack of dietary supplement knowledge (Bill, Kessler, Burns-Whitmore, & Jo, 2015). Moran, Heled, Arbel, Israeli, Finestone, Evans, & Yanovich (2012) suggests education should be addressed on proper nutrient intake while engaging in strenuous physical training to prevent bone fractures. Consequently, nutritional knowledge should be assessed to bring awareness and intervention. In one study researchers determined that considerable and beneficial changes in dietary habits were found in college students after the

implementation of nutrition interventions (Lin & Dali, 2012). Nutrition education appeared to be the best approach for improving college students' dietary habits and promoting health and wellness. One study investigated a sample of 231 college students to determine whether nutrition education is related to the consumption of unhealthy fats. Yahia, Brown, Rapley, & Chung (2016) found that college students who consumed less unhealthy fats and cholesterol had better knowledge on nutrition. In another study, researchers evaluated the acceptance and effectiveness of repetitive nutrition-related text messages on college students' knowledge and fruit and vegetable consumption. Researchers found that text messages were an acceptable and effective way to increase nutrition knowledge and promote positive dietary habits in college students (Brown, O'Connor, & Savaiano, 2014).

**Summary**

Since ROTC cadets are a unique population of study, there is limited research on the nutrition knowledge of this group. The training cadets undergo in the ROTC program is designed to prepare them for commissioning as second lieutenants upon successful completion and become effective leaders in the U.S. military. However, if more and more cadets are found to be unfit due to being overweight, then they should be provided nutritional guidance and a proper intervention plan. As an alternative to establish positive dietary habits, ROTC cadets may be consuming unnecessary dietary supplements without knowledge. Nutritional focus needs to be directed to ROTC cadets with the same concentration as college athletes.

# Chapter 3

# Methodology

## Design of the Study

The purpose of this study was to determine the MyPlate recommendation knowledge, dietary habits, and whether eating for performance was a factor in the daily consumption among Eastern Illinois University ROTC Cadets. A mixed-methods approach was used in this study to gain insight among the EIU ROTC cadets. Data were collected using a questionnaire and a focus group in search of emerging themes based on MyPlate recommendation knowledge, dietary habits, and eating for performance.

The mixed-method design of using a questionnaire and conducting a focus group interview was beneficial because it may lead to a greater depth of data collected (Hesse-Biber, 2010). The focus group design allowed the researcher to maximize recruitment as cadets may have been inclined to participate along with their peers and share information with ease, thus capturing a snapshot of the targeted population as well as gained a description of cadets' MyPlate recommendation knowledge, dietary habits, and consumption for performance as this may represent the general population of ROTC cadets.

Stalmeijer, McNaughton, & Van Mook (2014) suggest that an optimal size of a focus group is between six to ten participants on the grounds that groups be large enough to allow for various opinions and outlooks and small enough to allow each participant to contribute fully and be heard. For that reason, six focus groups of six to ten cadets were scheduled.

**Pilot Study**

After (17-053) IRB approval was obtained, a pilot study was conducted to test the questionnaire and focus group questions for clarity and to refine any questions from the questionnaire or focus group, if necessary. The pilot study also confirmed that the tool is effective in obtaining the information the researcher was seeking. The pilot study was tested on seven ROTC cadet volunteers from University of Illinois at Urbana-Champaign. University of Illinois at Urbana-Champaign also reflects on the same two critical components as the EIU ROTC program: body composition and physical training (PT) (*Get to Know Us*, n.d.). Permission to conduct a pilot study was obtained from the ROTC cadre at University of Illinois at Urbana-Champaign. Volunteers (n=7) signed and returned their informed consent form to the researcher. Volunteers completed the questionnaire and focus group interview. The completed questionnaires and responses from interview questions were analyzed for content validity to ensure that the questions were appropriately answered. The completed questionnaire and responses from the interview questions were analyzed for reliability. This provided confidence that similar data would be collected using the same questionnaire and interview questions to answer research questions (Plano Clark and Ivankova, 2015). Based on the results from the pilot study, conclusions were made that providing an image of the MyPlate logo during the focus group interview was ideal as it would clear any misperceptions from the participants on interview questions regarding MyPlate.

**Participants**

The population being studied were university cadets across the U.S. in the ROTC program. Researcher was seeking characteristics that matched the population. In

addition, with ease of availability as well as limited time and resources, 19 EIU ROTC cadet were able to participate out of approximately 60 EIU ROTC cadets. As a result, a convenience sampling method was used in the study.

The sample size of the population that was used in the study were groups of six to ten ROTC cadets from all class levels. They were both males and females and ranged in age from 18 to 28 years. The researcher requested permission from the EIU ROTC cadre for ROTC cadet participation in the study. An in-person announcement requesting for volunteers was made by the researcher prior to morning PT as all cadets are required to participate in all morning PT sessions. ROTC cadets who volunteered were provided a free meal incentive, funded by the researcher. Immediately following the focus group, the researcher directed participants to a self-serve cold food buffet.

**Instrument**

A mixed-method approach was utilized in this study to obtain comprehensive data in order to gain a better vision from statistics and perceptions of ROTC cadets. Mixed-method approach used a questionnaire to measure the MyPlate recommendation knowledge and focus group interview to assess the dietary habits and eating for performance of EIU ROTC cadets.

**Quantitative Approach.** The quantitative (questionnaire) approach asked seven questions pertaining to MyPlate recommendation knowledge. Since the researcher sought participants to select the most relevant responses, multiple-choice was the ideal choice. The MyPlate questions were derived from adult recommendations and information posted in chooseMyPlate.gov (Appendix A).

**Qualitative Approach.** The qualitative (focus group interview) approach asked ten open-ended questions along with probing questions to the focus groups. Each focus group was comprised of six to ten EIU ROTC cadets. Focus group interview questions were developed by the researcher to answer research questions (Appendix B).

**Data Collection Procedure**

During a morning PT session, the researcher announced details of the study and requested for participation. For those cadets that wanted to participate in the study, the confirmed participation on a sign-up sheet using their initials. Cadets initialed in a box that was assigned to a pseudonym (e.g. Alpha 1, Bravo 1) indicating the date and time of the focus group session they would attend. The data was collected during the evening hours on the first floor of Klehm Hall at Eastern Illinois University campus. The cadets who volunteered in the study turned in their signed informed consent form to the researcher and retained a copy for their records. The researcher explained the purpose of the study as well as clearly articulated that participation in the study was strictly voluntary and data collected remained anonymous. After the researcher explained the instructions to the ROTC cadets, they began the questionnaire. Once all participants completed the questionnaire, the researcher collected the completed questionnaire and began the focus group (Appendix C). The researcher served as facilitator and one undergraduate student served as a notetaker for all focus groups. The focus group interviews sessions were audio recorded.

**Data Analysis**

This study addressed the following questions:

1. What is the MyPlate recommendation knowledge difference by length of time in the ROTC program?

   A frequency count was utilized to compare characteristics (length of time in ROTC program).

2. Given the MyPlate recommendation knowledge of ROTC cadets, is there an influence of dietary habits?

   A mean score was computed for the MyPlate recommendation knowledge with responses from the focus group interview tabulated by theme.

3. Is there an influence in dietary habits among ROTC cadets from the nutrition education gained in the ROTC program?

   Responses from the focus group interview were tabulated by theme.

4. Is there an influence from performance consumption to the daily consumption among ROTC cadets?

   Responses from the focus group interview were tabulated by theme.

**Quantitative Approach.** There was a total of five MyPlate recommendation knowledge multiple-choice questions. Previous research examined nutritional knowledge among athletes and coaches using a multiple-choice system (Torres-McGehee, Pritchett, Zippel, Minton, Cellamare, & Sibilia, 2012). The MyPlate recommendation knowledge responses were scored one point for a correct response and zero points for any incorrect responses. Possible test scores ranged from zero to five.

**Qualitative Approach.** An Olympus Digital Voice Recorder WS-400S was used to audio record the focus group interview. Audio recordings of the focus group sessions were transcribed and analyzed by the researcher for emerging themes. The researcher developed a codebook to translate recurring terms used by the participants during the interview. The terms and quotes used by cadets were utilized to develop the emerging themes.

Since there is little research regarding general nutrition concerns of ROTC cadets, grounded theory is a start in providing qualitative research about the MyPlate recommendation knowledge, dietary habits, and consumption for performance among ROTC cadets. Grounded theory is a method of collecting and analyzing data. The main purpose of the method is to begin with the data and use the data collected to create a theory. Grounded theory was used in the focus groups since the theory offers an explanation and investigates the perceptions of the population (EIU ROTC cadets) and build theories based on their perceptions (Urquhart, 2013). The method enabled the researcher to conceptualize the MyPlate recommendation knowledge and dietary habits of EIU ROTC cadets through the constant comparison. The themes created from the perceptions of EIU ROTC cadets facilitated in resolving the hypothesis as well generated emerging themes to resolve the problem.

For researchers wanting to obtain a visual representation of ideas, Stalmeijer, McNaughton, & Van Mook (2014) propose grounded theory as it assists in obtaining a better synopsis of the various themes. Therefore, a grounded theory data analysis (open coding, axial, coding, and selective coding) was used to analyze notes and interview transcripts (Creswell, 2009). Grounded theory was used in the study since it allowed the

researcher to analyze data fluidly while still collecting data (Leedy, & Ormrod, 2005). This is essential since new theories may emerge from cadets' perceptions or theories may point to a different direction. Stalmeijer, McNaughton, & Van Mook (2014) explain when saturation is achieved, meaning no new information is revealed from participants, the data collection process should stop. Only three scheduled focus groups interviews were conducted, however additional data collected would have provided interpretive worth. Therefore, data saturation was not achieved in the study.

Nevertheless, grounded theory helped investigate the perceptions of EIU ROTC cadets in order to expand upon the limited research as well as offer education on MyPlate and proper portion sizes. Also, grounded theory evaluated data collected and, if the problem is found, provide education to improve the dietary habits and eating for physical performance. This is beneficial since the cadets' perceptions are based on personal experiences which are reciprocal to the relationship between data and theory.

**Summary**

This study was conducted to determine the MyPlate recommendation knowledge, dietary habits, and whether eating for performance was a factor in the daily consumption among EIU ROTC cadets. Chapter three discussed the design of the study, including the pilot study, participants, and the data collection and analysis process. The following chapter will explain the results and discussion.

# Chapter 4

## Results and Discussion

The purpose of this study was to determine the MyPlate recommendations knowledge, dietary habits, and whether eating for performance was a factor in the daily consumption among Eastern Illinois University ROTC Cadets. There were 19 EIU ROTC cadets who participated in the study. Each participant completed a MyPlate recommendation knowledge questionnaire and partook in the focus group interview. The responses from the questionnaire and focus group interview were used to evaluate and answer the research questions.

The following paragraphs will discuss each research question.

**What is the MyPlate recommendation knowledge difference by length of time in the ROTC program?**

The lowest score on the MyPlate recommendations knowledge questionnaire was zero and the highest score was three correct responses. Participating cadets (n=5) with three to four years in the ROTC program had a higher mean score of 24 (± 21.9) in the questionnaire. Followed by, participating cadets (n=6) with one to two or less in the ROTC program had a mean score of 23.3 (± 23.4) and participating cadets (n=8) with less than one year in the ROTC program had a mean score of 12.5 (± 10.3).

Participants demographics for length of time in ROTC program are shown in Table 1. Eight of the 19 participants (42.1%) were in less than one year in the ROTC program. Six of the 19 participants (31.6%) were in one to two years in the ROTC program. Five of the 19 participants (26.3%) were in three to four years in the ROTC program, while zero participants were in greater than four years in the ROTC program.

Education on MyPlate recommendations was not intensive in the ROTC program, as one cadet stated, *"I had prior knowledge prior to ROTC. I learned more in high school than the class in ROTC."* The results across the studied ROTC participants on MyPlate recommendation knowledge were below forty percent. There are multiple factors as to why participating ROTC cadets scored such a low average. MyPlate recommendations are not examined in ROTC curriculum. While the MyPlate logo is posted all over EIU campus for college students to promote healthy eating, it does not list specific recommendations for each food group. Therefore, participating ROTC cadets likely were approximating food group recommendations based on the MyPlate logo as opposed to actual MyPlate recommendations knowledge based on their age group. This expands the role of MyPlate education as a potential tool to advance nutritional education in the ROTC program.

**Given the MyPlate recommendation knowledge of ROTC cadets, is there an influence of dietary habits?**

Frequency of correct responses to the MyPlate recommendation knowledge questionnaire are presented in Table 2. The mean score for all participants 18.9 (± 5.6). Participants less than one year in the ROTC program had a mean score of 12.5 (± 10.3). Participants with one to two years in the ROTC program had a mean score of 23.3 (± 23.4). Participants with three to four years in the ROTC program had a mean score of 24 (± 21.9). There were zero participants with greater than four years in the ROTC program. A comparison of mean score of all groups is shown in Figure 1.

Previous research describes no significant association between nutrition knowledge and food choices among college students (Yahia, Brown, Rapley, & Chung,

2016). There is a possibility participating ROTC cadets are visualizing the MyPlate logo and comparing it to their daily consumption as oppose to what is recommended per food group. The influencing factor of a cadet's dietary habits may not be due to MyPlate recommendation knowledge but could be due to financial constraints ROTC cadets encounter as college students. Researchers reported several college students believed they possessed inadequate cooking skills, money to buy food and money to prepare food, as a result, they may be more inclined to purchase convenience foods or ready prepared foods more often (Gaines, Robb, Knol, & Sickler, 2014). One cadet stated, *"cost of food, if it's expensive we're not going to buy it."*

There are a number of factors that could wreak havoc on a college students' diet. Friedl (2012) suggests body composition such as stress effects the pattern of where fat gets distributed in the body. Factors can include increased stressors from academics, lack of sleep, poor dietary choices, and possibly an increase of alcoholic consumption. As a result, these can all contribute to weight gain and prevent a cadet from meeting body composition standards in ROTC.

**Is there an influence in dietary habits among ROTC cadets from the nutrition education gained in the ROTC program?**

The ROTC program provides general nutrition knowledge for cadets. As a result, the nutrition education provided may influence a diet change to occur. The nutrition education taught in the ROTC program was predicted to have an influence on what EIU ROTC cadets consume. Previous study found that educational programs are needed to boost awareness of MyPlate recommendations to promote healthy eating (McKinley, Lee, & Policastro, 2012). Though, supposing that focus on MyPlate daily food group amounts

were promoted, ROTC cadets may potentially improve better dietary habits. There is a possibility that all cadets, whether they use the dining halls or not, can benefit from a food demonstration on how to prepare easy to make foods.

Many participating cadets agreed that chocolate milk after PT consumption has increased due to guidance by the ROTC cadre. While ROTC cadre provide suggestions for cadets to consume for physical performance, they are not distributing chocolate milk to ROTC cadets post PT. Though, further research evaluating the consumption of chocolate milk of ROTC cadets post PT is needed to determine if true consumption is based on physical performance or merely taste.

In addition, one of the themes depicted that kinesiology majors were looked to for recommendations on food. One cadet stated, *"I did learn more from other cadets or cadets with a kinesiology major. They recommend what to eat to lose or gain weight..."* There are nutrition courses that are required in the KSS program that may contribute the competence to provide nutrition guidance to ROTC cadets struggling with the weight requirements. However, KSS majors should be cautious with providing nutrition guidance as nutrition therapy is not in their scope of practice.

Also, dietary habits among EIU ROTC cadets were predicted to have changed since entry into the ROTC program. There were not enough responses from participating cadets to indicate that there was a change in dietary habits since entry into the ROTC program. One cadet stated, *"I definitely eat a larger breakfast,"* while another cadet stated, *"My water intake has tripled."* Since hunger strikes after morning PT session, cadets may be improving eating habits by consuming breakfast. Compared to their eating habits prior to entering the ROTC program where breakfast may have been skipped.

Banna, Richards, & Brown (2017) explain that combining college students' insights of real meals, meals, and snacks may increase the importance of nutrition education messages as the daily consumption of college students' is less than adequate in meeting the Dietary Guidelines of American (DGA).

**Is there an influence from performance consumption to the daily consumption among ROTC cadets?**

ROTC cadets undergo through strenuous training and adequate daily consumption is required for performance and recovery. Nutrition and physical activity are viewed as integral components to a healthy lifestyle (Golenbock, Kazman, Krauss, & Deuster, 2017). Therefore, eating for performance was hypothesized to have an influence on daily consumption among EIU ROTC cadets. Half of participating cadets reflect on how eating for performance does have an effect on their daily consumption. However, EIU ROTC cadets modify their dietary intake based on when an APFT approaches. One cadet stated, *"I feel like uh, we have an APFT once a month. So during that time we get reminded, 'hey you guys should be eating healthy' so like once we hear that then we do."* Another cadet stated, *"When we have an APFT coming up, I just focus more on my diet than I actually would. In general, my diet is pretty bad. When it gets closer to the APFT event, about five to seven days, I will start eating chicken, fish, and salads, I will cut back on all the greasy foods."* Eating for performance was not found to have an effect on the daily consumption. Though, it is the events, such as the APFT, that influence ROTC cadets to make temporary modifications to their daily consumption that lead to eat for performance. There is much pressure for cadets to perform well during the APFT in addition to maintain height and weight standards to remain enrolled in the ROTC program. However, previous

researchers studied a small group of ROTC cadets and found that total APFT score did not reflect percent body fat as there was no association between total APFT score and any method of percent body fat assessment (Steed, Krull, Morgan, Tucker, & Ludy, 2016).

While the other half of participating cadets consider eating for performance does not have an effect on their daily consumption. One cadet mentioned, *"I feel like it kinda depends on the certain person because some people might look at the specific event that prepares specifically for it. Given the days before or the days after it. I don't normally change my habits. I eat the way I eat, and I do what I do."* Another cadet mentioned, *"I consider it but it's not on a regular basis. I just have a set number of meals I eat. Unless there is a strenuous event coming up I would act on."* Besides the APFT being the biggest event, there are ROTC events that vary throughout the semester in which cadets make modifications to their diet which ultimately leads to eating for performance, such as the Ranger Challenge and field training exercise (FTX).

Table 1

*Demographic Characteristics Frequency of Participants*

| Length of Time in ROTC | N | Percent |
|---|---|---|
| <1 year | 8 | 42.1 |
| 1 to 2 years | 6 | 31.6 |
| 3 to 4 years | 5 | 26.3 |
| > 4 years | 0 | 0 |

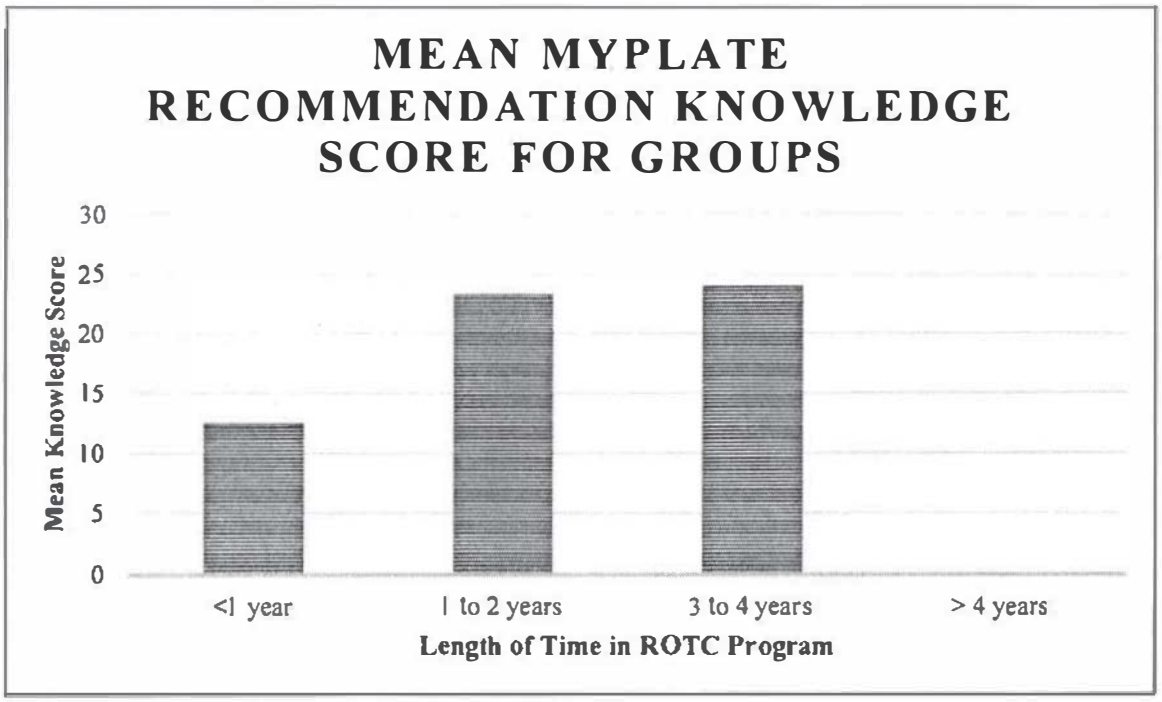
Table 2

*Responses of ROTC Cadets to MyPlate Recommendation Knowledge*

| Correct Responses to MyPlate Knowledge Question | N | (%) |
|---|---|---|
| What is the minimum amount of vegetables you should eat every day? | 7 | 37% |
| What is the minimum amount of fruit you should eat every day? | 6 | 32% |
| How many ounces of grains should you eat every day? | 1 | 5% |
| How many ounces of protein should you eat every day? | 2 | 11% |
| What is the minimum amount of dairy you should eat every day? | 4 | 21% |

Figure 1

*Mean MyPlate Recommendation Knowledge Score for All Groups*



**Qualitative Results**

There were three focus group sessions in which a total of 19 EIU ROTC cadets that participated in the interview. Also, the findings of the data from the interviews lead to seven code categories: dietary intake, expensive food, post workout consumption, nutrition education, body composition, events, and physical events preparation. Of the seven categories, five major themes were derived.

**Themes of the Study.** There were five main themes that emerged from the data: inconsistency of dietary intake, high cost of eating healthy, post workout consumption, dependable nutrition education from kinesiology majors, and concerns over body composition.

**Inconsistency of dietary intake.** This represents that not all ROTC cadets are eating three meals a day or consuming the proper amounts per MyPlate guidelines. Some cadets rely on the dining facilities for all three meals. While some cadets are focused on high protein intake and follow a diet that works for them, some cadets are consuming small amounts of food just to get them through classes.

*"I just know I don't eat like I should. So like today, I think I only had like 2 granola bars and that's about it."*

*"I don't eat as much vegetables as I should. Especially me being in college and on my own, my mom usually makes the vegetables."*

*"Food is the last thing that I worry about."*

*"I'm in class from like 10:00 am to 3:00 pm every day so I never eat lunch."*

*"I can't have 3 meals a day because of my meal plan. I'd rather struggle where I can then not have any food."*

*"I only eat 2 meals a day."*

*"The majority of what I eat is protein and then vegetables and fruit and grains are kinda lacking. I have little dairy. With those it's because the residence halls fruits and vegetables are on the lines of foods and sit out for hours and hours and you can see them starting to get a little slimy. So if I'm not there when they first start taking them out I don't eat them."*

*"I eat like 3 meals a day. They do not sound like the best meals but I try to get in meat and a balanced meal throughout the day to sustain my goals but I always feel like I can do better."*

**High cost of eating healthy.** Measuring the relationship between eating healthy and the price of food can be challenging among ROTC cadets. As college students, they are faced with a full-time course schedule in addition to arranging time for studying and partaking in school activities or group projects. The time remaining may be spend earning money through a part-time job. Since income may be limited, expenses are heavily scrutinized. Like most college students, they will base purchases within the limits of their price range, even purchases such as food. There is a high consensus among ROTC cadets that while being on a fixed college budget, eating healthy is too expensive. A small number of ROTC cadets prefer consuming foods with a shorter shelf life, such as fresh fruits and vegetables, at home because their parents purchase the groceries. However, most of the ROTC cadets that are living on their own would rather purchase a quick, less nutrient dense meal than purchase fresh fruits and vegetables due to short funds.

*"It's hard because we are broke college students and I eat dining hall food."*

*"Vegetables and fruits are actually pretty expensive compared to the proteins and carbohydrates I can get. So I just make a base meal out of like maybe chicken breast or throw down some ground beef with tuna helper or something like that. It's been really cheap, I'm a college student, I'm pretty broke. I can't find fresh fruits and fresh vegetables and stuff like that."*

*"Fruits are expensive. I live at home and so I travel and get gas every day. If I buy bread, carrots, meat, and milk for the week that will be like $25. But then if I added fresh grapes it will add about $10, which will total to $35 dollars. If I do eat fruit it is canned fruit."*

*"Cost of food, if it's expensive we're not going to buy it."*

*"Vegetables and fruits are actually pretty expensive compared to the proteins and carbohydrates I can get. It's been really cheap, I'm a college student, I'm pretty broke. I can't find fresh fruits and fresh vegetables and stuff like that."*

*"Fruits are expensive. I live at home and so I travel and get gas every day. If I buy bread, carrots, meat, and milk for the week that will be like $25. But then if I added fresh grapes it will add about $10, which will total to $35 dollars. If I do eat fruit it is canned fruit."*

*"When I'm at home with my mom. She doesn't have to be the one cooking, I can cook but it makes a big difference when you're not the one that has to pay for the food."*

*"Cost of food, if it's expensive we're not going to buy it."*

**Post workout consumption.** Since entering the ROTC program, some cadets state that they consume a larger breakfast as well as increase their water intake to prevent dehydration. Cadets stated,

*"ROTC has put emphasis on what you should do immediately after a workout and prior to a workout which has helped in regards to my breakfast and actually eating breakfast."*

*"I definitely drink more water. I really feel it when I am dehydrated in the morning."*

*"My water intake has tripled"*

*"I try to eat breakfast more."*

*"After morning PT, I'll eat something nutritious like egg or oatmeal."*

*"Not paying attention to what you eat afterwards, I feel that people have focused on eating a nutritious breakfast after going to PT."*

There is a large number of ROTC cadets that consume chocolate milk after PT.

*"I drink chocolate milk after PT"*

*"I definitely eat a larger breakfast"*

*"Refuel with chocolate milk, I feel like people have focused on eating a nutritious breakfast after going to PT.*

Also, chocolate milk intake following morning PT is advised by ROTC cadre. Although there is no specified amount, chocolate milk is encouraged to cadets for post workout consumption. During muscle strength and endurance training, muscle fibers are torn and in order to rebuild those fibers proper protein consumption after morning PT is essential. Milk, especially chocolate milk, has an abundance of carbohydrates and protein

to restore muscle fibers and energy (Lewis, Baxter, Spaccarotella & Andzel, 2017). However, chocolate milk is preferred among cadets over plain milk due to taste. *"Not too many drink plain milk unless it's with cereal."*

**Dependable nutrition education from kinesiology majors.** The nutrition education taught in ROTC may not have strong influence on what cadets eat. Since the nutrition class taught in the ROTC program is very brief, the information taught can be easily purged by those cadets not affected by the body composition. However, new cadets entrust on the advice of cadets studying Kinesiology. Nutrition guidance is given by those cadets that are Kinesiology majors to cadets that are struggling with body composition.

*"We have Kinesiology majors in the ROTC program, and they will recommend advice on food."*

*"I did learn more from other cadets or cadets with a kinesiology major. They recommend what to eat to lose or gain weight or exercises that you do. They try to help out when the can."*

ROTC cadets in the Kinesiology and Sports Studies (KSS) undergraduate program in Exercise Science at EIU discover the relationship among movement, exercise, and skill. The KSS program advances students' understanding of exercise physiology, biomechanics, and exercise psychology (*Eastern Illinois University Kinesiology and Sports Studies Exercise Science*, n.d.). Some of the nutrition courses in the KSS curriculum are Personal Nutrition and Nutrition for Physical Performance. Personal Nutrition is one of the nutrition courses offered in the KSS curriculum and it introduces students' to the effect of food behaviors on individuals and families and approaches to encourage healthy lifestyles changes (Program Kinesiology and Sports Studies Sport

Management Concentration (B.S.), n.d.). Another course is Nutrition for Physical Performance, in which students learn to analyze the metabolism and energy systems related to physical performance and prepare ideal diets for performance (Program Kinesiology and Sports Studies Sport Management Concentration (B.S.), n.d.). This may explain why ROTC cadets with the KSS background may have some influence on what other cadets eat.

**Concerns over body composition.** Most ROTC cadets appear physically fit, which gives one the assumption that they do not experience stress during weigh-ins. However, a number of cadets are not passing the tape test, making them not in compliance with the body fat percentages.

*"Right now, I am not passing the tape test and I am not at the weight that I should be and so I really cut back on carbs for the most part. I eat grains, I don't eat bread anymore. I will occasionally eat potatoes only for breakfast right after PT. So cutting out the refined foods and processed foods has helped me because it really hard for me to lose weight. I'd say in the last semester and a half, I've lost maybe 5 lbs which is a miracle."*

*"There are people that are struggling to lose weight"*

*"Probably for the MSI and MS2, to get contracted, you have to pass APFT and the height and weight because that is a really big driving factor."*

*"When we go to the gym, if you are not passing tape test but you're very close to passing, cadre will tell certain people to stay on the ellipticals and treadmills and do as much cardio as they can. While the other people are allowed to go and lift or do other workouts."*

*"Body composition, people start to get worried about that. I'm usually up in the higher percentage range just because I'm a bigger person in general. So when it comes around those times, I cut back a lot on the high calorie foods."*

Though, body composition is not heavily concerned until the APFT approaches which causes some cadets to make dietary changes shortly prior to the APFT event. This may cause some concern as some cadets may be taking drastic measures just to make weight.

*"The day before we get taped, I kinda fast just because I am always 1 or 2 percent over the requirement."*

*"Same, I'll fast as well. I try not to fast as much because I do not want my body to think it's a normal thing and I'll back on fat."*

Littman et al., (2013) describe that military personnel are believed to be at higher risk for eating disorders because of their requirement for weight and body standards. In particular, there is limited research regarding ROTC cadets and eating disorders.

On the opposite side of the spectrum, body composition can also include not meeting standards due to being underweight. In the late 1800's, height-weight tables were used to reject recruits from serving due to being malnourished, however as improvements in nutrition changed between 1864 and 2000, the concern for underweight soldiers in the U.S. Army also changed averaging at 30-lb lean mass (Friedl, 2012). While body composition for being underweight may be rare, it is still a concern among ROTC cadets.

*"I feel like I'd probably would be still trying to gain weight, be in the gym, and eat nutritiously if I wasn't in ROTC..."*

**Summary**

Chapter four reported the results of the data analysis for the study. MyPlate recommendation knowledge was not found to differ among length of time in the ROTC program. Though, the mean score was 18.9 percent of the MyPlate recommendation knowledge among all participating ROTC cadets. Results indicate that nutrition education on MyPlate recommendations may need to be emphasized more in the ROTC program.

Five themes were found in the study. "Inconsistency of Dietary Intake". A number of cadets expressed not consuming enough food throughout the day. This could be due to the next theme, "High Cost of Eating Healthy". Many cadets feel fresh fruits and vegetables are too expensive being on a college budget. The third theme was "Post Workout Consumption". An improvement in dietary consumption is reflected based on what cadets consume after morning PT. The fourth theme was "Dependable Nutrition Education from Kinesiology Majors". Cadets with a Kinesiology major are counted on by other cadets in need of nutrition guidance. The fifth theme was "Concerns Over Body Composition". Amongst many evaluations in the ROTC program, body composition is one that struggling cadets find stressful. Although it is a small number of cadets, there are some cadets who are unable to meet body fat percentages for their age and gender. A diet regime may work for one cadet however it may not work for all struggling cadets. Therefore, health professional guidance should be directed for dietary consultation and weight management for ROTC cadets struggling in body composition.

# Chapter 5

## Summary, Conclusion, Limitation, Implication

### Summary

This study sought to determine an understanding of the MyPlate recommendations, dietary habits, and if eating for performance was a factor in the daily consumption among EIU ROTC Cadets. A Mixed-methods approach generated ample data regarding the nature of MyPlate recommendation knowledge, consumption habits and for performance from the perspectives of the study participants. A grounded theory approach allowed the researcher to construct emerging categories to shape the data collection while simultaneously analyzing the data collected from the experience of the researched ROTC cadets. As a result, the researcher was able to develop a view that advanced the understanding of the phenomenon in which ROTC cadets prioritized their world around meals.

### Conclusion

**Research question 1: What is the MyPlate recommendation knowledge difference by length of time in the ROTC program?**

Education expanded with time invested in the ROTC program, especially with respect to physical readiness and nutritional consumption. The researcher hypothesized that EIU cadets with greater length of time in the ROTC program would have greater MyPlate recommendation knowledge than cadets with few length of time in the ROTC program. There was no difference of length of time in the ROTC program with respect to MyPlate recommendation knowledge.

**Research question 2: Given the MyPlate recommendation knowledge of ROTC cadets, is there an influence of dietary habits?**

The researcher hypothesized that MyPlate recommendation knowledge among EIU cadets will have no influence in dietary habits. MyPlate recommendation knowledge did not appear to influence dietary habits among cadets. Many of the participating cadets agreed that their plate does not reflect the MyPlate recommendations.

**Research question 3: Is there an influence in dietary habits among ROTC cadets from the nutrition education gained in the ROTC program?**

Minor dietary habits among EIU ROTC cadets have changed since entry into the ROTC program. Participating cadets reported that chocolate milk after PT consumption has increased due to guidance by the ROTC cadre. Also, ROTC cadets that are Kinesiology majors provide some nutrition guidance to cadets struggling with body composition.

**Research question 4: Is there an influence from performance consumption to the daily consumption among ROTC cadets?**

Eating for performance did not have an influence on the daily consumption of ROTC cadets. However, events, such as the APFT, influence ROTC cadets to make temporary modifications to their daily consumption that lead to eat for performance.

**Limitations**

The study was completed shortly after spring FTX. The study was conducted a week before finals which may have resulted in low participation rate. As a result of another limitation, the sample size was too small and results may not reflect the ROTC population. Another limitation was the presence of a cadre member during the first focus

group interview. Cadre presence may have influenced some responses or lack of responses.

**Implications**

The results of this study uncover several implications valuable of future research. The average results of the MyPlate questionnaire were low, therefore the implementation of MyPlate recommendations in the curriculum may benefit the EIU ROTC program. While the size of the participants in the study was limited, concerns of body composition were present. This study suggests that there are ROTC cadets who struggle with meeting body composition standards, either being underweight or exceeding body fat requirements. Concerns over body composition would be valuable to further examine as they may precede to disordered eating among ROTC cadets. Also, chocolate milk was found to be consumed among cadets at post workout. Previous research explains the benefits of chocolate milk as a post-workout beverage. However, during the focus group study, ROTC cadets claimed their eating habits changed while being in ROTC one of them being due to consuming chocolate milk. Further research examining the consumption of chocolate milk of ROTC cadets post morning PT sessions is needed. Future research focusing on solely on performance consumption as certain events in ROTC were found to influence cadets to make temporary alterations in their daily consumption to eat for performance.

Suggested recommendations on future research would be to evaluate the amount of sleep ROTC cadets are receiving as lack of sleep can lead to an increased dependency on caffeine consumption, poor eating habits, and weight gain, which can interfere with physical performance and nutrition. Also, recommend a qualitative study to identify time

frames when ROTC cadets are experiencing high stress as this may also interfere with eating behaviors and or fluctuating body composition. Finally, this study suggests that EIU ROTC cadets lack MyPlate recommendation knowledge, therefore recommendations for a nutrition education program focusing on daily MyPlate recommendations and the amounts to modify in preparation for performance events, periods of illness or injury, and weight-lift training. In addition, nutrition education focusing on macronutrients and how they function in the body before and after physical training. Lastly, nutrition education emphasizing a well-balanced diet, the amount of fluids, iron, and calcium as these nutrients develop optimal performance for the ROTC population as they are a unique population of college students, athletes, and future military leaders.

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IRB Approval

April 13, 2017

Lilibeth Nevarez
Family & Consumer Sciences

Thank you for submitting the research protocol titled, "A Mixed-Methods Evaluation of the MyPlate Recommendation Knowledge, Dietary Habits, and Eating for Physical Performance of EIU ROTC Cadets" for review by the Eastern Illinois University Institutional Review Board (IRB). The IRB has reviewed this research protocol and effective 4/13/2017, has certified this protocol meets the federal regulations exemption criteria for human subjects research. The protocol has been given the IRB number 17-053. You are approved to proceed with your study.

The classification of this protocol as exempt is valid only for the research activities and subjects described in the above named protocol. IRB policy requires that any proposed changes to this protocol must be reported to, and approved by, the IRB before being implemented. You are also required to inform the IRB immediately of any problems encountered that could adversely affect the health or welfare of the subjects in this study. Please contact me, or the Compliance Coordinator at 581-8576, in the event of an emergency. All correspondence should be sent to:

Institutional Review Board
c/o Office of Research and Sponsored Programs
Telephone: 217-581-8576
Fax: 217-581-7181
Email: eiuirb@www.eiu.edu

Thank you for your cooperation, and the best of success with your research.

John Bickford, Chairperson
Institutional Review Board
Telephone: 217-581-7881
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## Appendix A- MyPlate Recommendation Knowledge Questionnaire

1. Number of years in the EIU ROTC program (circle one)

   <I, 1 – 2, 3 – 4, >4

2. What is the minimum amount of vegetables you should eat every day.

   2 cups 2 ½ cups 3 cups 3 ½ cups 4 cups

3. What is the minimum amount of fruit you should eat every day?

   2 cups 3 cups 4 cups 4 ½ cups 5 cups

4. How many ounces of grains should you eat every day?

   2 ounces 3 ounces 4 ounces 5 ounces 6 ounces

5. How many ounces of protein should you eat every day?

   3 ounces 3 ½ ounces 4 ounces 5 ounces 5 ½ ounces

6. What is the minimum amount of dairy you should eat every day?

   2 ½ cups 3 cups 3 ½ cups 4 cups 4 ½ cups

## Appendix B- Focus Group Questions

1. How does your plate look like MyPlate at every meal?

    Probe: Tell me more about that.

2. How often does your plate reflect the MyPlate recommendations?

    Probe: What makes you say this?

3. How have your eating habits changed while being in ROTC?

    Probe: What makes you say this?

4. Tell me about the nutrition education you have learned while being in ROTC?

5. Do you feel the nutrition education gained in ROTC plays a role in what you currently eat?

    Probe: Why?

6. What are different ways cadets are eating for performance?

    Probe: Can you tell me more about that?

7. What has contributed to the way cadets are eating for performance?

    Probe: What makes you say this?

8. How often is eating for physical performance typically practiced?

    Probe: Can you tell me more about that?

9. Are there any specific events that dictate whether cadets practice eating for performance?

    Probe: What are they?

10. How often is food considered when preparing for physical events?

    Probe: Can you tell me more about that?

## Appendix C- Codebook

**Dietary Intake**
Refers to the consumption of food among the ROTC cadets.

**Expensive food**
Refers to the high cost of food due to a cadet's college budget.

**Post Workout Consumption**
Refers to what cadets eat after morning PT.

**Nutrition Education**
Refers to the nutrition classes taught or advice on nutrition gained while in the ROTC program.

**Body Composition**
Refers to the requirement to meet the Army's minimum weight or body fat percentage standards.

**Events**
Includes the important occasions that cadets practice eating for performance.

**Physical Events Preparation**
Refers to how often food is considered when cadets prepare for physical events.

**MS I (Military Science I)**
Refers to the first year of a cadets' introduction to the ROTC program.

**MS II (Military Science II)**
Refers to a cadets' second year in the ROTC program.

**PT**
Refers to physical training conducted in the morning.

**APFT (PT Test)**
Refers to the three-event physical performance test used to measure a cadet's muscular strength, endurance, and cardiovascular respiratory fitness.

> Diagnostic APFT- refers to measuring a cadet's physical performance to determine their current level.
>
> Record APFT- refers measuring a cadet's physical performance for official records.

**Weigh-Ins**
Refers to obtaining a cadet's height and weight from a scale.

**Tape test**
Refers to obtaining a cadet's body fat percentage to determine if they meet the percentage for their age and gender.

**Ranger Challenge**
An extra-curricular activity in ROTC that tests a team of cadet's physical and mental abilities during a multi-day competition against other universities.

**FTX (Field Training Exercise)**
Refers to a weekend training event where cadets participate in Squad Training Exercises (STX) Lanes and learn how to operate effectively as an Army squad.

**CST Camp (Cadet Summer Training)**
Refers to a four-week (28-day) event that introduces cadets to Army life and leadership training of the ROTC program.

**MRE (Meal, Ready-to-Eat)**
Refers to a self-contained, individual field ration given to cadets during the FTX due to the unavailability of organized food facilities.

**Ruck March**
Refers to an event performed by cadets which requires a fast walking pace over a distance, carrying military gear.

## Appendix D- Codes and Quotes

### Dietary Intake

*"I just know I don't eat like I should. So like today, I think I only had like 2 granola bars and that's about it."*

*"I don't eat as much vegetables as I should. Especially me being in college and on my own, my mom usually makes the vegetables."*

*"Food is the last thing that I worry about."*

*"I'm in class from like 10:00 am to 3:00 pm every day so I never eat lunch."*

*"I can't have 3 meals a day because of my meal plan. I'd rather struggle where I can then not have any food."*

*"I only eat 2 meals a day."*

*"I eat like 3 meals a day. They do not sound like the best meals but I try to get in meat and a balanced meal throughout the day to sustain my goals but I always feel like I can do better."*

### Expensive food

*"It's hard because we are broke college students and I eat dining hall food."*

*"Vegetables and fruits are actually pretty expensive compared to the proteins and carbohydrates I can get. It's been really cheap, I'm a college student, I'm pretty broke. I can't find fresh fruits and fresh vegetables and stuff like that."*

*"Fruits are expensive. If I buy bread, carrots, meat, and milk for the week that will be like $25. But then if I added fresh grapes it will add about $10, which will total to $35 dollars. If I do eat fruit it is canned fruit."*

*"Cost of food, if it's expensive we're not going to buy it."*

### Post Workout Consumption

*"I drink chocolate milk after PT."*

*"I definitely eat a larger breakfast."*

*"ROTC has put emphasis on what you should do immediately after a workout and prior to a workout which has helped in regards to my breakfast and actually eating breakfast."*

*"I definitely drink more water. I really feel it when I am dehydrated in the morning."*

*"My water intake has tripled."*

*"I try to eat breakfast more."*

*"Refuel with chocolate milk, I feel like people have focused on eating a nutritious breakfast after going to PT."*

*"After morning PT, I'll eat something nutritious like egg or oatmeal."*

**Nutrition Education**

*"A couple semesters ago, we had an impromptu nutrition class gave by MSG. Um, he just kinda gave like a general review of like good foods you should get while you're on campus. Like the good fats you could get through nuts and stuff. How many carbs you should intake you know try to eat a lot of protein. Get the digestive carbs from natural sugars, vary your veggies and go for deep greens. That's helped."*

*"I had prior knowledge prior to ROTC. I learned more in high school than the class in ROTC. The class in ROTC did not go over the differences in metabolism and individual needs... if they discussed eating for body types that would help a lot."*

*"I did learn that from being in ROTC that chocolate milk was nutritious after a workout."*

*"I did learn more from other cadets or cadets with a kinesiology major. They recommend what to eat to learn or gain weight or exercise that you do. They try to help out when they can."*

*"Cadets that are prior service with knowledge of diets and have been weight lifting long enough. They give their recommendation on what's worked for them."*

*"ROTC will go over basic information like eat good oils, eat protein, don't eat too much carbs, or eat all your vegetable that sort of thing."*

*"We have Kinesiology majors in the ROTC program, and they will recommend advise on food."*

**Body Composition**

*"I'd say kind of. Right now, I am not passing the tape test and I am not at the weight that I should be and so I really cut back on carbs for the most part. I eat grains, I don't eat bread anymore. I will occasionally eat potatoes only for breakfast right after PT. So cutting out the refined foods and processed foods has helped me because it really hard for me to lose weight. I'd say in the last semester and a half, I've lost maybe 5 lbs which is a miracle."*

*"Probably for the MS1 and MS2, to get contracted, you have to pass APFT and the height and weight because that is a really big driving factor."*

*"When we go to the gym, if you are not passing tape test but you're very close to passing, cadre will tell certain people to stay on the ellipticals and treadmills and do as much cardio as they can. While the other people are allowed to go and lift or do other workouts."*

*"The day before we get taped, I kinda fast just because I am always 1 or 2 percent over the requirement."*

*"Same, I'll fast as well. I try not to fast as much because I do not want my body to think it's a normal thing and I'll back on fat. I do try to eat lighter things the day before the taping and pray for the rest but it's still 3 percent over."*

*"Body composition, people start to get worried about that. I'm usually up in the higher percentage range just because I'm a bigger person in general. So when it comes around those times, I cut back a lot on the high calorie foods."*

**Events**

*"I feel like uh, we have an APFT once a month. So during that time we get reminded, "hey you guys should be eating healthy" so like once we hear that then we do."*

*"APFT and the weigh-ins. Like when you get weighed and taped."*

*"This year for Ranger Challenge we had pasta right before hand."*

*"Events like the FTX or preparation for CST camp. The cadets heading for CST which is an introductory to the Army. Um, they kinda have to prepare mentally and even change their diet and get ready to be performance driven so I feel like they might eat better leading up into there and know how to eat during the events so they don't pass out from the heat."*

*"During the FTX, I'll just pack a bunch of snacks so I don't have to eat MREs."*

*"APFT event. Diagnostic or record. More so for record."*

*"Ranger Challenge. The unknown running distance which ended up being a 15K, cadets will need something to sustain yourself so I'll see cadets eating all day."*

*"Also, now that I know what an FTX entails, I would probably eat more before arriving to the FTX. I don't know if its MREs in general or if the environment but I will not feel hungry, even though I had warning signs in my head that signaled I should probably eat something but I just wasn't very hungry. I don't think I ate a full MRE the entire FTX."*

*"The ruck march during the FTX plays a role."*

*"Before big events, we have carb/hydrate days because of how much we burn."*

*"When we have an APFT coming up, I just focus more on my diet than I actually would. In general, my diet is pretty bad. When it gets closer to the APFT event, about five to seven days, I will start eating chicken, fish, and salads, I will cut back on all the greasy foods."*

**Physical Events Preparation**

*"I think it's considered, well for me anyway, a big part of it because I mean that's your energy that you're using during these events."*

*"I consider it but it's not on a regular basis. I just have a set number of meals I eat. Unless there is a strenuous event coming up I would act on."*

*"Every day. When you start putting terrible foods in your body for something that is important you're just going to do terrible. So I try to eat the best I can for best results."*