

EATING HABITS, WEIGHT LOSS HABITS, AND
INJURY PREVALANCE IN COLLEGIATE
WRESTLING

By

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EATING HABITS, WEIGHT LOSS HABITS, AND
INJURY PREVALANCE IN COLLEGIATE
WRESTLING

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Abstract: **Objective:** Wrestling is one of many combat sports that place an emphasis on weight management to participate. **Purpose:** To investigate the eating habits, weight loss strategies, and injury prevalence in a NCAA Division 1 Wrestling Program. **Methods:** Forty young healthy males were recruited to participate in a survey that analyzed the eating habits, weight loss habits, and injury prevalence. **Results:** Twenty-six individuals participated in the study. Nineteen of the participants sustained an injury during the season. Food restriction, fluid restriction, and exercise were reported as the most used strategy for rapid weight loss. The participants scored higher in binge eating ($M = 15.5$, $SD = 3.14$), cognitive restraint ($M = 9$, $SD = 1.9$), purging ($M = 7.8$, $SD = 2.3$), restricting ($M = 9.808$, $SD = 2.5$), excessive exercise ($M = 12$, $SD = 1.76$), and negative attitudes toward obesity ($M = 10.2$, $SD = 2.5$) than the norms of college males. **Conclusions:** The results indicate that collegiate wrestlers are more susceptible to disorder eating than average college males. Further research is needed to investigate these findings. This supports the re-evaluation of current NCAA protocols for weight loss and weigh-ins for competition.

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CHAPTER I

INTRODUCTION

1.1 Introduction

The sport of wrestling is one of the oldest sports in human history. It is one of the original events in ancient Olympics and is a sport that can be found in many countries and cultures. Aside from the Olympics, collegiate wrestling is one of the biggest stages the sport has to offer. Many young wrestlers look and strive for the opportunity to participate on the collegiate level and can be one of the final 2 wrestling for a national championship with thousands of spectators watching. Unlike many sports that designate specific positions for an athlete, wrestling is unique that it designates an athlete's weight as what position or weight class they will participate in (Horswill, 1992). This designation was implemented to ensure fairness in a match and to have one athlete of similar size and shape be matched up with another athlete of similar proportions.

Weight management is one of the most important aspects of the sport of wrestling simply for the fact that if you cannot make the specific weight needed, you are disqualified from competition. As a result, weight regulation is a fundamental behavior in wrestlers as it is a requirement to participate. To reach this desired weight, wrestlers will engage in acts such as increased exercise, starvation, fluid restriction, laxative and diuretic abuse, and sauna

use (DeFeciani, 2015). Once a wrestler hits their target weight, they typically follow it up with a rapid consumption of food to quickly refuel their body. This combination of extreme weight loss followed by a significant increase in food intake is a precursor to many disordered eating patterns. While the societal pressures involved with male disordered eating patterns have been explored, there has been very little done to explore how these variables affect collegiate wrestlers.

Wrestlers show to have a higher binge eating and restrict food intake levels compared to college male population norms (Satterfield & Stutts, 2021). While food restriction is a concern for disordered eating, another thought that arises is the effect of energy deficiencies on injuries. According to the NCAA Injury Surveillance Program, wrestlers were injured at a rate of 8.82 injuries per 1000 athletic exposures or events (Powell et al., 2021). These injuries are typically acute and are a direct result of competition or practice in which the athlete is performing the sport. However, there is very limited research on the effects of weight cutting practices and the relationship of weight cutting and injuries in wrestling. Energy deficits have shown to play a role in an increased risk of injury (Umeda et al., 2004). There is a benefit to understanding the risks associated with weight cutting strategies and is important to maintain the health and wellness of wrestlers.

1.2 Purpose of the Study

The purpose of this study was to investigate the eating patterns, weight loss strategies, and injury prevalence in a division 1 NCAA Wrestling program. The goal is to identify trends and potential correlations between weight loss strategies, eating patterns, and injury prevalence to investigate the role the three variables play on each other. Additionally, a secondary goal is to draw attention to the prevalence of disordered eating in collegiate wrestlers and determine if specific weight cutting strategies are associated with disordered eating. Knowledge of the role they play on each other can lead to better education to wrestling student athletes to improve their

performance, and ensure proper health and safety is being implemented in the sport of wrestling. This knowledge and awareness of disordered eating prevalence can impact coaching practices and invigorate a conversation of potential rule changes for competition weigh ins in the sport of wrestling.

1.3 Research Question

The following research questions guided this study:

1. Is there disordered eating in wrestling?
2. Does disordered eating lead to more severe injuries in wrestling?
3. Does weight cutting practices lead to more severe injuries in wrestling?

1.4 Hypothesis

1. Wrestlers who participate in more extreme weight loss strategies will have more time loss due to injury.
2. Wrestlers who participate in more extreme weight loss strategies will demonstrate characteristics of disordered eating.

CHAPTER II

REVIEW OF LITERATURE

This literature review will focus on the characteristics of disordered eating, injury prevalence, and weight management in the sport of wrestling.

2.1 Disordered Eating in Wrestling

Disordered eating refers to a wide range of behaviors. Often mistaken with eating disorders, disordered eating are symptoms that can eventually develop into an eating disorder, but are not frequent enough to be characterized as such (Kotler et al., 2001). Disordered eating behaviors include, but aren't limited to, restricted caloric intake, fasting, binge eating, self-induced vomiting, excessive exercise, as well as laxative, diuretics, or diet pill abuse (Joy et al., 2016). These behaviors can occur in a variety of sports but are most prominently found in gymnastics, track and field, swimming, cycling, and wrestling (Anderson & Petrie, 2012). In regard to the general population and athletes, athletes are more likely to struggle with disordered eating compared to the general population (DiPasquale & Petrie, 2013).

In wrestlers, the most common behaviors observed are binge eating, purging, and food restriction (Satterfield & Stutts, 2021). This translates directly to how wrestlers behave when managing their weight before a match. When a wrestler needs to cut weight, they will look to restrict food to keep their weight down after they are finished practicing or working out. Binge

eating is described as episodes of excessive or overeating (Dingemans et al., 2002). Binge eating typically occurs following weigh in as once a wrestler has made the designated weight, they will look to consume as much food as they comfortably can to feel energized and ready for their match. Purging is defined as episodes of self-induced vomiting (Keel et al., 2005). Purging typically occurs during weight cutting as a wrestler may look to gain the feeling of satiety while also eliminating the food from their system to avoid gaining weight. Over time these behaviors can develop into disordered eating patterns that wrestlers struggle with throughout their careers. While disordered eating plays a role in the sport of wrestling, the body satisfaction of wrestlers does not change. Wrestlers have high body satisfaction even with characteristics of disordered eating (Satterfield & Stutts, 2021).

2.2 Injuries in Wrestling

During the 2014-2015 through the 2018-2019 NCAA Wrestling seasons, there was on average 8.82 injuries per every 1000 athletic exposure events (Powell et al., 2021). Of these injuries, 21% accounted for knee injuries, 13% accounted for shoulder injuries, and 13% accounted for head or face injuries. The most common type of injury sustained was sprains followed by muscular and tendon injuries. The most common severe injury found in the NCAAAs database was a concussion. Most injuries reported are acute-contact type injuries which reflects the nature of the sport and the techniques used to perform well in wrestling. Seventy-Four percent of the time, the athlete is injured during a takedown, and is typically when the athlete is at a disadvantage or in the defensive position (Hewett et al., 2005).

Injuries in wrestling can occur in a variety of settings including practice and competition. There were more injuries during the weight loss periods than during other periods of training in Korean Wrestlers (Kim & Park, 2021). However, there was no significant difference in the severity of an injury when participating following a massive weight cut and wrestling without a

massive weight cut. Like the NCAA injury database, most injuries recorded were sprains and most injuries were found in the lower extremities.

Some injuries in wrestling are much more significant than others and may require surgery. From 2002 to 2011, 74 surgeries were conducted on an NCAA Division 1 Wrestling Program (Otero et al., 2017). Of those 74, 72% returned from their surgery and competed again. Another interesting note, Otero et al. found that there was significant difference in matches, wins, and win percentage following surgery. They found that athletes who returned from surgery participated in more matches, wins, and win percentage following surgery. While surgery can be a long and lengthy recovery process, this positive association between surgery and return to competition demonstrates the opportunity for success following a significant injury.

2.3 Weight Management in Wrestling

The American College of Sports Medicine defines multiple activities that are used in wrestling to lose weight: excessive exercise, fluid restriction, food restriction, diuretic use, laxative use, dehydration strategies, and fasting (Oppliger et al., 1996). These strategies have been often been considered questionable and discouraged due to the increased risk of these strategies leading to the development of an eating disorder (Dale & Landers, 1999).

The three most used methods for cutting weight are carbohydrate restriction, dehydration, and increased exercise (Barley et al., 2018; Burke et al., 2021; Castor-Praga et al., 2021; 西牧 et al., 2020). In wrestling, 86% used increased exercise followed by 75% using thicker clothing, or “sweats” to increase dehydration, and 54% using fasting to lose weight (Castor-Praga et al., 2021). Skipping meals is higher in wrestling than other combat sports as a method for losing weight (Barley et al., 2018). While there have been many ways to cut weight that have been used, not every wrestler uses one or the other. Wrestlers who are cutting weight over a longer period

tend to use more weight loss strategies than wrestlers who are cutting weight over a shorter period (Brechney et al., 2019).

While cutting weight is important to qualify to participate in wrestling, it is also critical for wrestlers to rehydrate and refuel their bodies prior to wrestling. The NCAA currently requires weigh in to occur at least 2 hours prior to competition for wrestlers to have the opportunity to refuel and rehydrate. Current recommendations for rehydrating are to consume a volume 125-150% more fluid than what was lost and that the fluid should have a mixture of sodium and electrolytes to replenish the body with components that occur during sweat loss (Burke et al., 2021). Carbohydrate replenishment is recommended to be 5-10 g/kg of body mass approximately 2-3 hours before competition (Reale, 2018).

The weight loss strategies that have been a staple to the sport led to the creation of a Wrestling Weight Certification Program by the NCAA following the death of 3 wrestlers in 1997 (Davis et al., 2002). This program created what is defined as the minimum wrestling weight that a wrestler is allowed to participate in. This weight is calculated using body fat to determine the lowest healthy weight a wrestler can safely wrestle at (Brožek et al., 1963). To ensure a wrestler can safely wrestle at this weight, the wrestler must also pass a hydration test. The NCAA also implemented a minimum daily weight a wrestler can lose and it must be strictly followed in order to be able to participate, 0.3 lbs. per day ("Wrestling and Weight Control," 1967). The daily weight is correlated to a weight loss plan, which is constructed to guide a wrestler to a lower weight class. They must follow this plan strictly and the consequences for diverging from the plan are harsh. If a wrestler weighs in at a lower weight than what the weight loss plan states, they will be disqualified from competition.

There are many effects to rapid weight loss in the human body. To start, prolonged dehydration has shown to decrease blood plasma volume, performance, and muscular strength

(Hall & Lane, 2001). There is more of a decrease in aerobic performance than anaerobic performance with dehydration (Houston et al., 1981). When fluid loss exceeds 2% significant changes occur in submaximal work including an elevated heart rate, reduced stroke volume, and lowered cardiac output (Hewett et al., 2005). In a high endurance sport like wrestling, these deficits can have a severe impact on a wrestler and their performance. While many wrestlers believe that they are losing fat when cutting weight, there is little research to support this. Most weight loss is achieved through body water and glycogen content rather than body fat (Sherman et al., 1983; Steen Sn Fau - McKinney & McKinney). The use of a caloric deficit to lose weight was also shown to be meaningless, as total body water was the major component of body mass loss (Kondo et al., 2018).

CHAPTER III

METHODOLOGY

The purpose of this study was to investigate the prevalence of disordered eating, injuries, and weight loss habits in an NCAA Division 1 Wrestling program. This chapter will explain the details of the research study including the participants, the research design, the survey design, and the procedures utilized to administer the study.

3.1 Participants

40 participants from a NCAA Division 1 Wrestling program were recruited for this study. The participants were required to have been on the roster for the 2020-2021 wrestling season. The participants were instructed that it was completely voluntary to participate and that they may withdraw their consent at any time. Permission was requested from the coaching staff prior to the beginning of the study. Participants were informed their data would be anonymous and would only be distributed to the researchers and coaching staff following the study.

3.2 Research Design

A survey was used for collection data in this study. This study was submitted and approved by the Institutional Review Board for human subjects at Oklahoma State University prior to data collection. Approval was also received from wrestling coaches prior to data

collection to ensure that the data would not be able to reflect any of the participants or the wrestling program. All the participants were given a participant information sheet prior to administration of the survey. The participant information sheet was used to provide consent and must be acknowledged prior to the beginning of the survey to proceed.

3.3 Survey Design

The survey was constructed using the Qualtrics survey software. The survey utilized the anonymize option and disabled save and continue features and ballot box stuffing feature to ensure that anonymity was kept throughout the data collection. The data was stored on a password protected computer in a locked office. The survey consisted of a total of 68 questions broken down in to 4 categories.

The first category asked for the participant to identify when they began wrestling, what weight class the participating in, what they weighed in the off-season and what they weighed during the season, how much weight they lose in a week, how frequently they weigh themselves, if they sustained an injury and how much time they missed with an injury.

The second section investigated weight loss habits and asked the participants to rate how often they used an activity to lose weight. This section of the survey was referenced from a previous study looking at disordered eating and body image in wrestlers (Satterfield & Stutts, 2021).

The third section of the survey looked at the perceptions of fatigue when cutting weight. Participants were asked to rate their agreeance with the following statements: I feel I am not as strong when cutting weight, I feel more tired when I am cutting weight, I feel my endurance is not as good when I am cutting weight, and I feel that I do not perform as well when I cut weight.

The final section of the survey consisted of a questionnaire to identify characteristics of disordered eating. This section consisted of a 40-item questionnaire called the Eating Pathology Symptoms Inventory (EPSI) and participants were asked to rate how frequently each statement applied to them in the past four weeks (Forbush et al., 2013). The validity of this instrument has been researched extensively as a recommended tool to determine disordered eating prevalence in college males.

3.4 Procedures

The participants were recruited during a team meeting. The participants were informed on the content of the survey and informed that their participation was completely voluntary and anonymous. An email was then sent out to the 40 potential participants with instructions and a link to the survey on Qualtrics. The participants were given approximately one month to complete the survey. Once the time elapsed for the survey to be completed, the survey was paused, and participants were no longer able to access the survey. The participants responses were recorded and saved in the Qualtrics system until the duration of the survey had passed. Following this the survey was extracted into an excel file that was stored on a password protected computer in a locked office. Once the data was analyzed, a document with figures was created to present to the coaching staff to utilize in the future for this program.

3.5 Data Analysis

Descriptive data was analyzed for each response on the survey were calculated to analyze the data. Figures were then constructed to provide a visual to the coaching staff of the results.

CHAPTER IV

RESULTS

4.1 Descriptive Statistics

A total of 32 participants responded to the survey. Six of the 32 responses were not complete or excluded parts of the survey and were therefore excluded from the study. After the incomplete responses were excluded a total of 26 participants were included in this study. At least one individual from each participating weight class participated in the study. The most participants in the study were in the 141–156-pound weight class. This is illustrated in Table 1.

Table 1. Distribution of Weight Classes In-Season

Weight Class	Frequency	Percent	Valid Percent	Cumulative Percent
125-132	3	11.538	11.538	11.538
133-140	1	3.846	3.846	15.385
141-156	8	30.769	30.769	46.154
157-164	2	7.692	7.692	53.846
165-173	1	3.846	3.846	57.692
174-183	3	11.538	11.538	69.231
184-196	3	11.538	11.538	80.769
197-210	3	11.538	11.538	92.308
210 or Higher	2	7.692	7.692	100.000
Total	26	100.000		

4.2 Injuries

Of the 26 participants 19 (73%) sustained an injury during the 2020-2021 wrestling season. Of the 19 wrestlers injured, 31% of the participants missed less than a week with their injury and 31% missed 2 or more months with their injury. The injuries are illustrated in Table 2 and the time missed due to injury is illustrated in Table 3.

Table 2. Distribution of Injuries During the Wrestling Season

	Frequency	Percent	Valid Percent	Cumulative Percent
No	7	26.923	26.923	26.923
Yes	19	73.077	73.077	100.000
Total	26	100.000		

Table 3. Distribution of Time Missed from Injury During the Wrestling Season

Time missed due to injury	Frequency	Percent	Valid Percent	Cumulative Percent
1-3 Weeks	4	15.385	16.000	16.000
2 or More Months	8	30.769	32.000	48.000
4-6 Weeks	4	15.385	16.000	64.000
Less than a week	8	30.769	32.000	48.000
Prefer not to say	2	7.692	8.000	100.000
Total	26	100.000		

4.3 Weight Loss

Of the 26 participants 69% of the responses stated that they lose 10 or more pounds in a week. There were no participants who recorded losing 1-3 pounds a week which is within the

range of the current NCAA recommendations. Twenty-four of the 26 participants recorded that they weigh themselves daily each week while one participant recorded twice a week and another recorded weekly respectively. The average weight loss per week is illustrated in Figure 1 and the frequency of weigh ins is presented in Table 4.

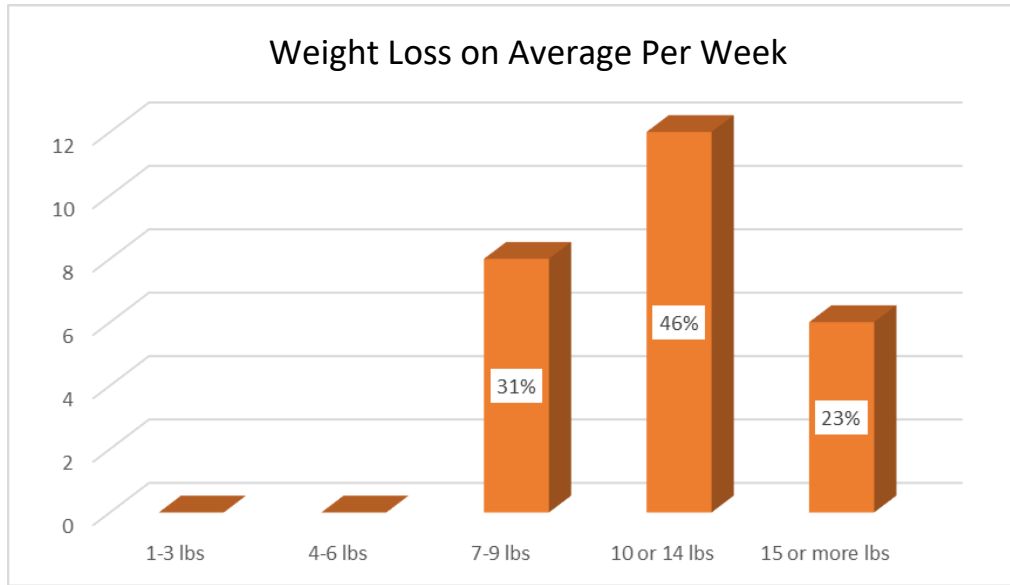


Figure 1. Weight Loss on Average Per Week

Table 4. Distribution of Weigh-In Frequency

Frequency of weigh in	Frequency	Percent	Valid Percent	Cumulative Percent
Daily	24	92.308	92.308	92.308
Twice a week	1	3.846	3.846	96.154
Weekly	1	3.846	3.846	100.000
Total	26	100.000		

4.4 Weight Loss Strategies

The most recorded weight loss strategy used was skipping meals with 100% of the participants stating they have used this strategy at least once to lose weight. Fluid restriction was also 100% recorded as being used at least once by the participants. The use of a heated wrestling room also had a 100% response rate of being used at least once to lose weight. In second, the use of a sauna had a 72% response rate of being used at least once for weight loss. Two participants stated they used laxatives rarely and sometimes to lose weight and one participant stated they use

diuretics sometimes to lose weight. The weight loss strategies are illustrated in Figure 2, Figure 3, and Figure 4 respectively.

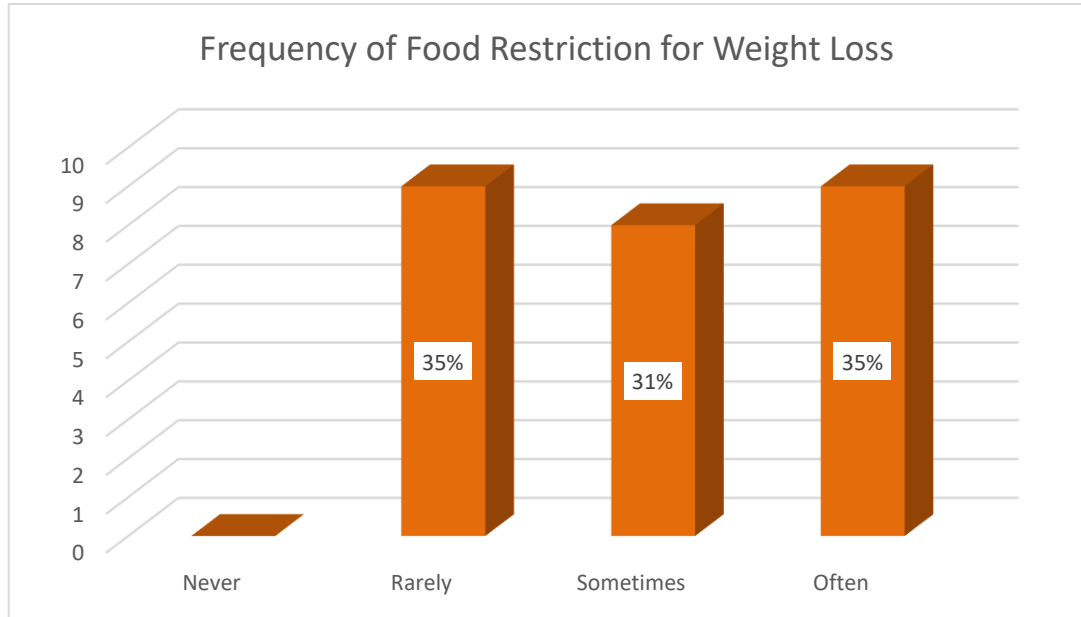


Figure 2. Frequency of Food Restriction for Weight Loss

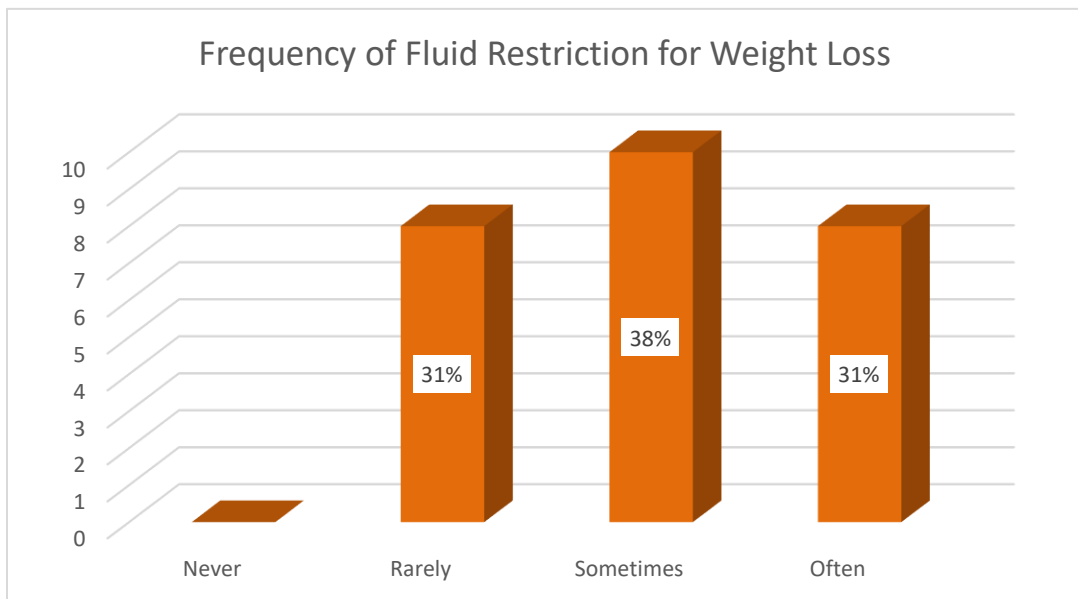


Figure 3. Frequency of Fluid Restriction for Weight Loss

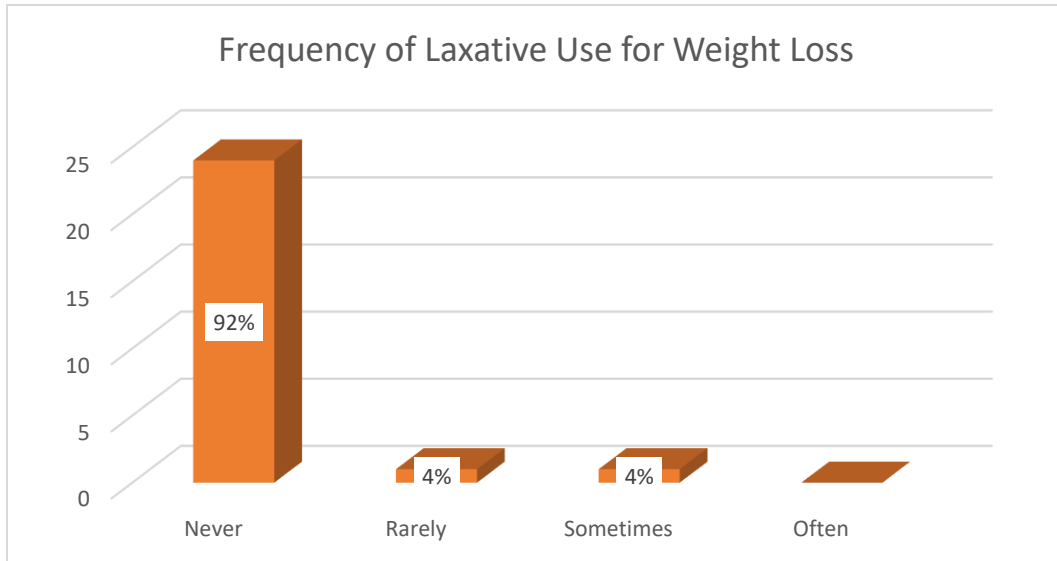


Figure 4. Frequency of Laxative Use for Weight Loss

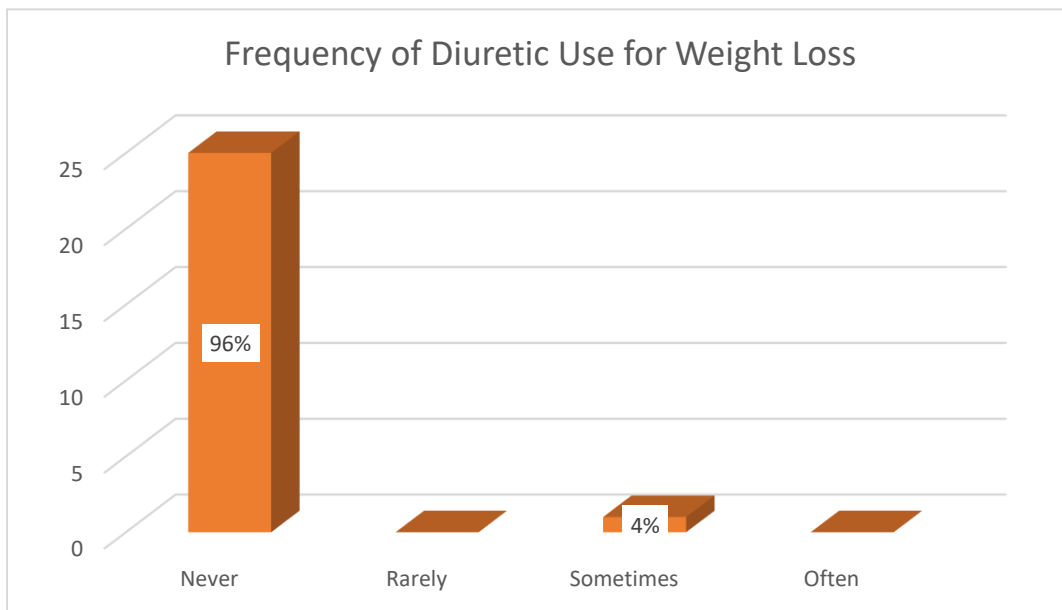


Figure 5. Frequency of Diuretic Use for Weight Loss

4.5 Perceptions of Fatigue during Weight Loss

Results for perceptions of fatigue during weight loss were as follows. Sixty-Four percent of the participants reported agreeing that they do not feel as strong when cutting weight. Eighty-Four percent reported feeling more tired when cutting weight. 64% reported feeling that their endurance was not as good when cutting weight. However only 30% agreed that they feel they do

not perform as well when they cut weight. The perceptions of fatigue are illustrated in Figures 6,7,8 and 9.

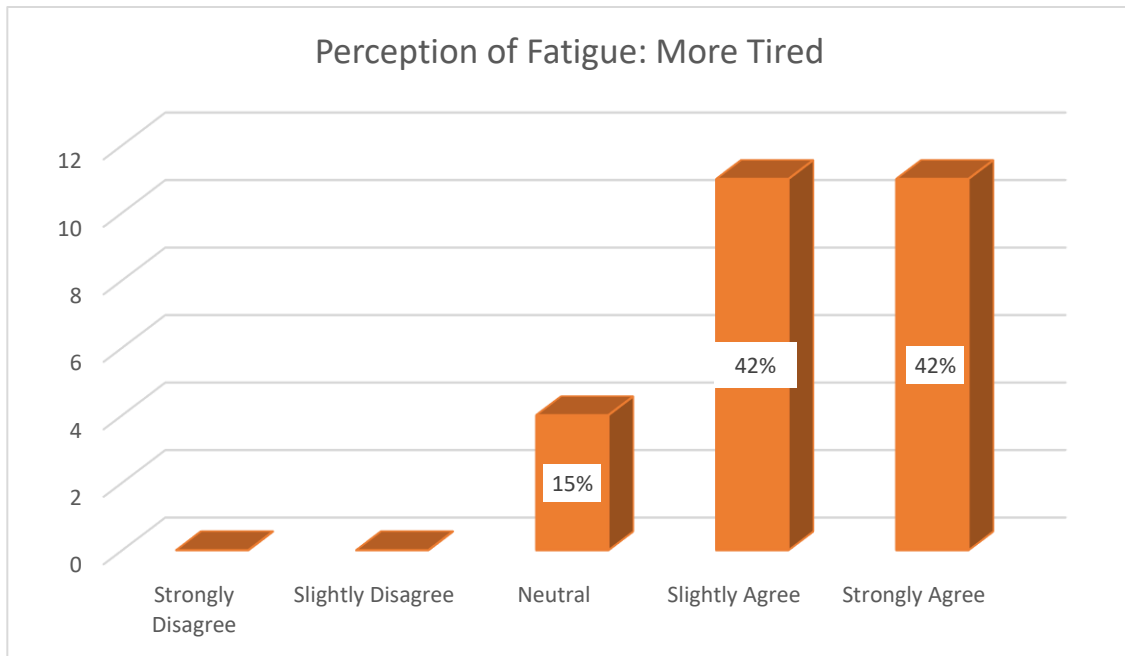


Figure 6. Perceptions of Fatigue: More Tired

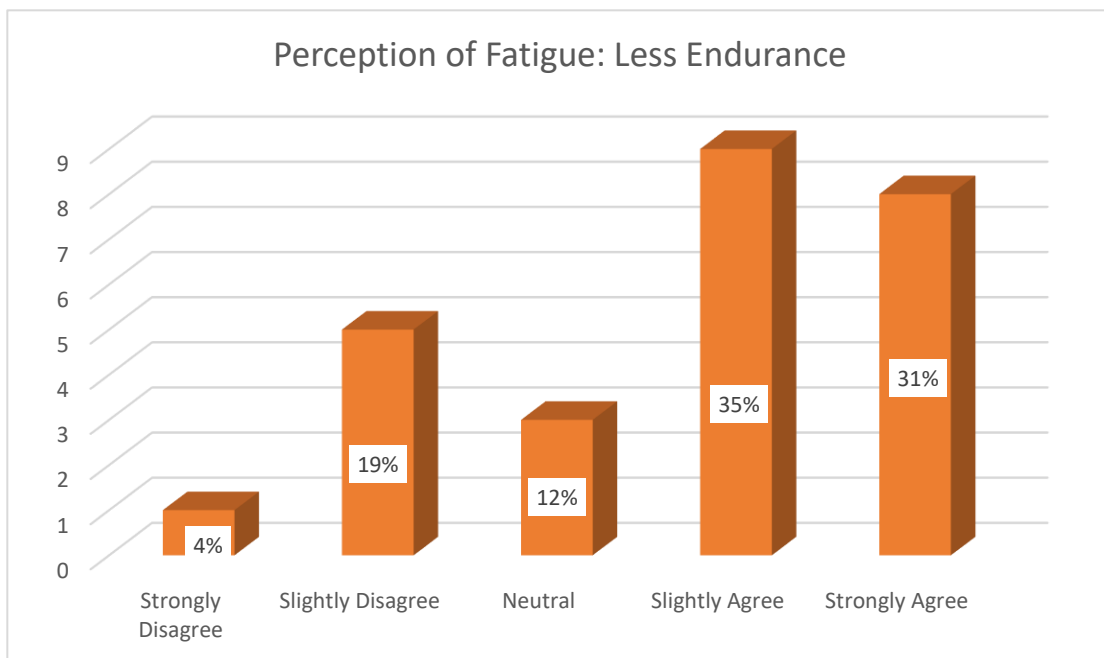


Figure 7. Perceptions of Fatigue: Less Endurance

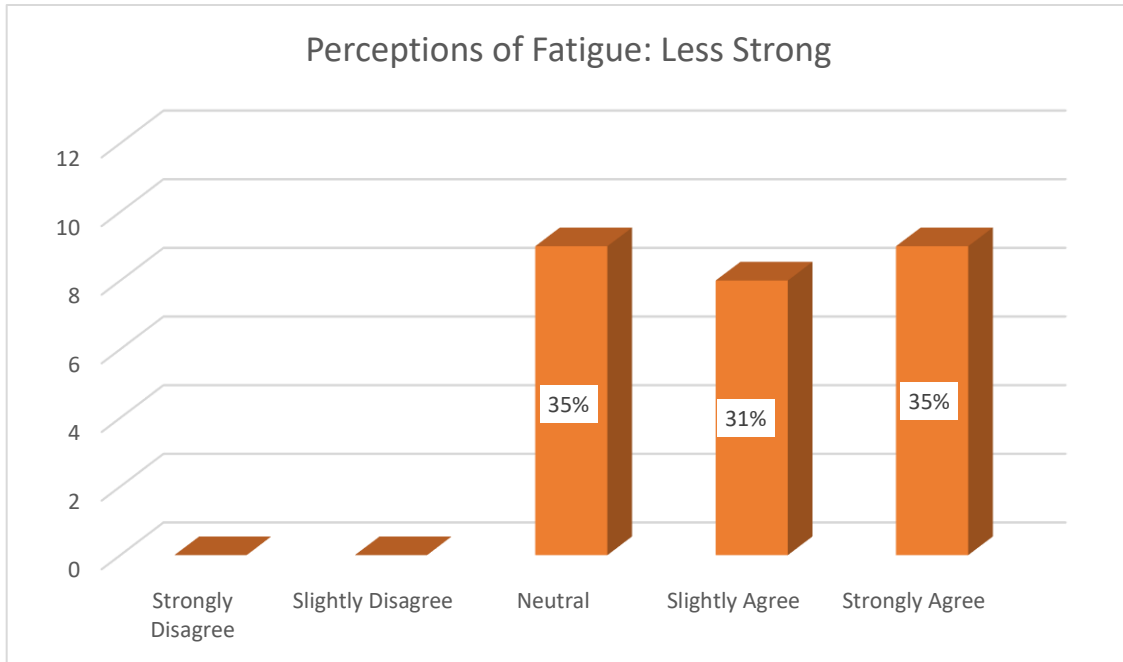


Figure 8. Perceptions of Fatigue: Less Strong

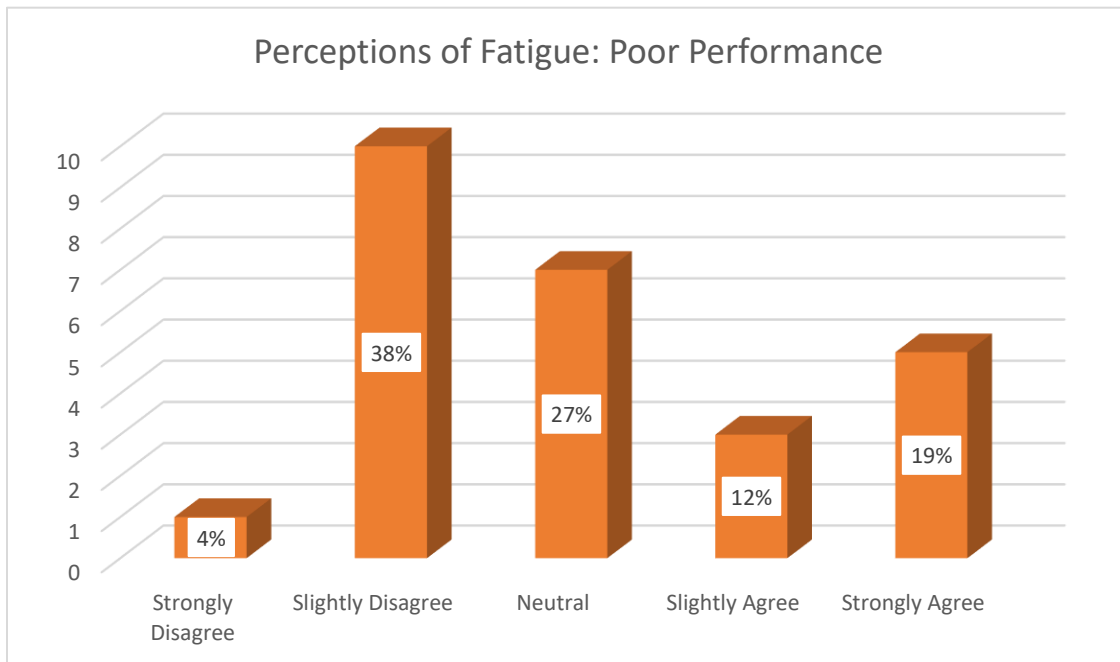


Figure 9. Perceptions of Fatigue: Poor Performance

4.6 Eating Pathology Symptoms Inventory

The responses of the EPSI were summed and placed in a category based on which question corresponded to that characteristic of disordered eating. The responses were then cross referenced with the college men norms as described by Forbush et al (2013). Participants recorded higher levels of binge eating ($M = 15.5$, $SD = 3.14$), cognitive restraint ($M = 9$, $SD = 1.9$), purging ($M = 7.8$, $SD = 2.3$), restricting ($M = 9.808$, $SD = 2.5$), excessive exercise ($M = 12$, $SD = 1.76$), and negative attitudes toward obesity ($M = 10.2$, $SD = 2.5$) than college males (Forbush et al., 2013). Table 5 illustrates the results of the EPSI section of the survey.

Table 5. Wrestler Norms for EPSI

	Body Dissatisfaction	Binge Eating	Cognitive Restraint	Purging	Restricting	Excessive Exercise	Negative Attitudes toward Obesity	Muscle Building
Valid	26	26	26	26	26	26	26	26
Mean	11.115	15.500*	9.038*	7.808*	9.808*	12.038*	10.192*	9.500
Std. Deviation	2.142	3.140	1.865	2.315	2.450	1.755	2.498	2.387
Minimum	7.000	9.000	5.000	6.000	6.000	9.000	5.000	5.000
Maximum	15.000	21.000	12.000	16.000	17.000	18.000	15.000	14.000

* = Higher than College Men Norms (Forbush et al. 2013)

4.7 Weight Loss and Injuries

Of the 19 participants who suffered an injury, 15 of the 19 (78.9%) participants lost more than 10 pounds per week. All the participants (100%) were cutting no less than 7 pounds per week who sustained an injury. Figure 10 illustrates weight loss and injury prevalence.

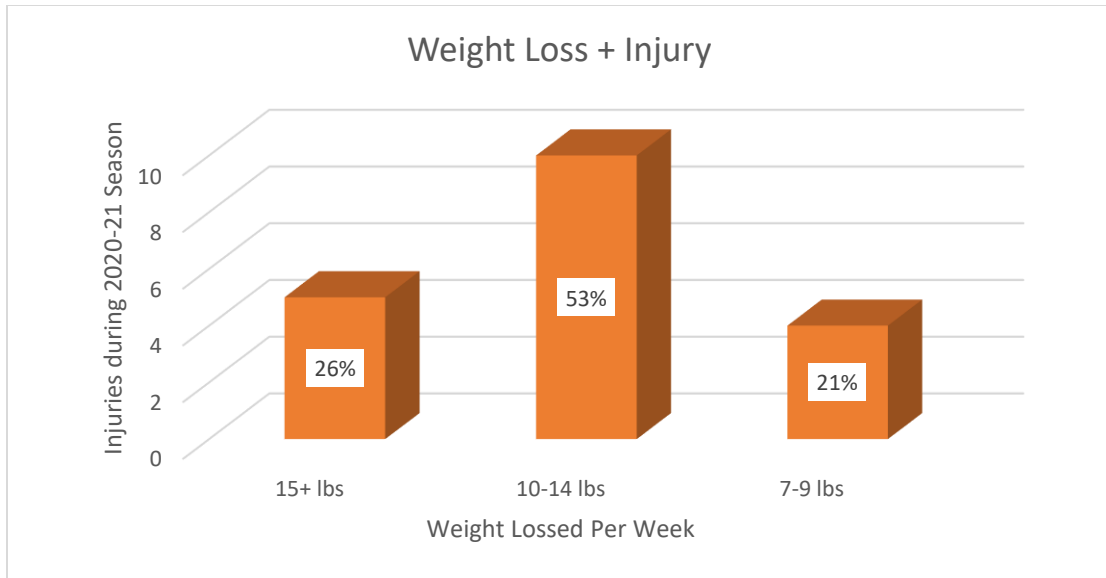


Figure 10. Weight Loss + Injury

4.8 Weight Loss, Injuries, and Perception of Fatigue

Of the 19 participants who suffered an injury, 12 reported losing at least 10 pounds a week and agreeing with the statement that they had less endurance while cutting weight. Twelve also reported losing at least 10 pounds a week and agreeing with the statement that they felt weaker when cutting weight. Thirteen of the participants who suffered an injury reported losing at least 10 pounds a week and agreed with the statement that they felt more tired when cutting weight. Figures 11, 12, and 13 illustrate the relationship between weight loss, injury, and perception of fatigue.

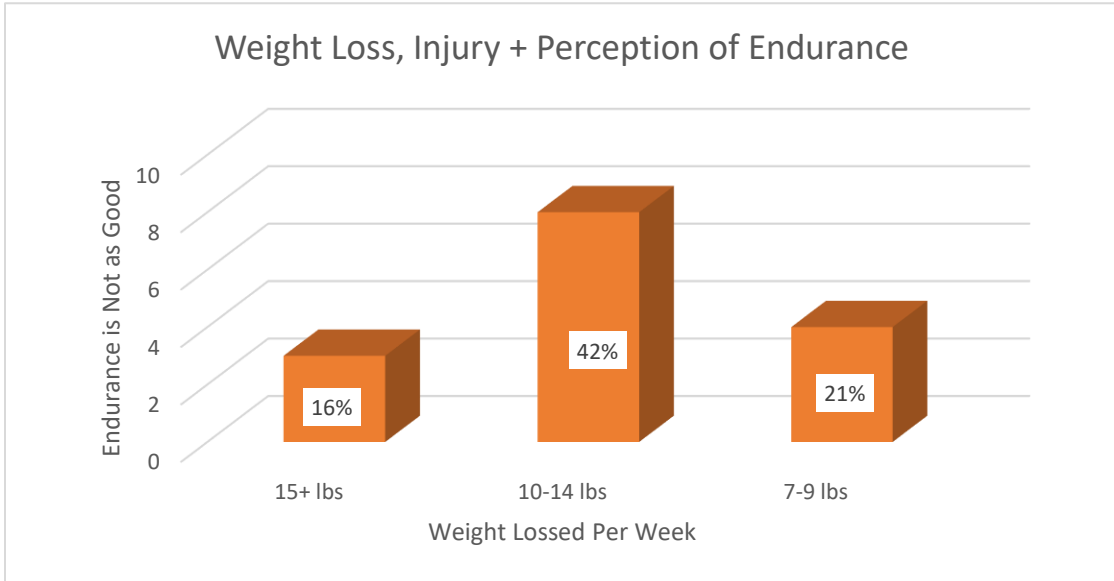


Figure 11. Weight Loss, Injury, + Less Endurance

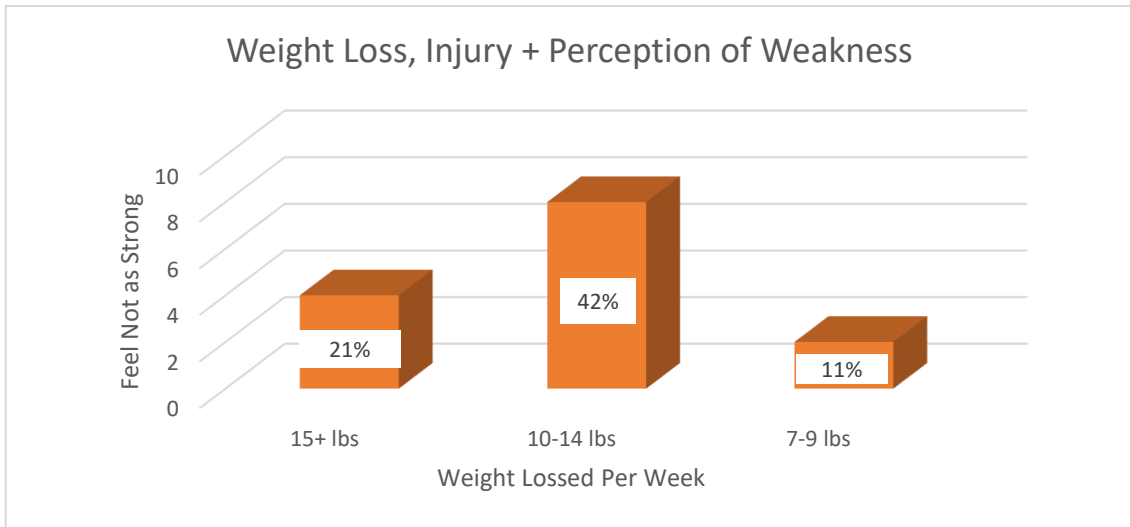


Figure 12. Weight Loss, Injury, + Not as Strong

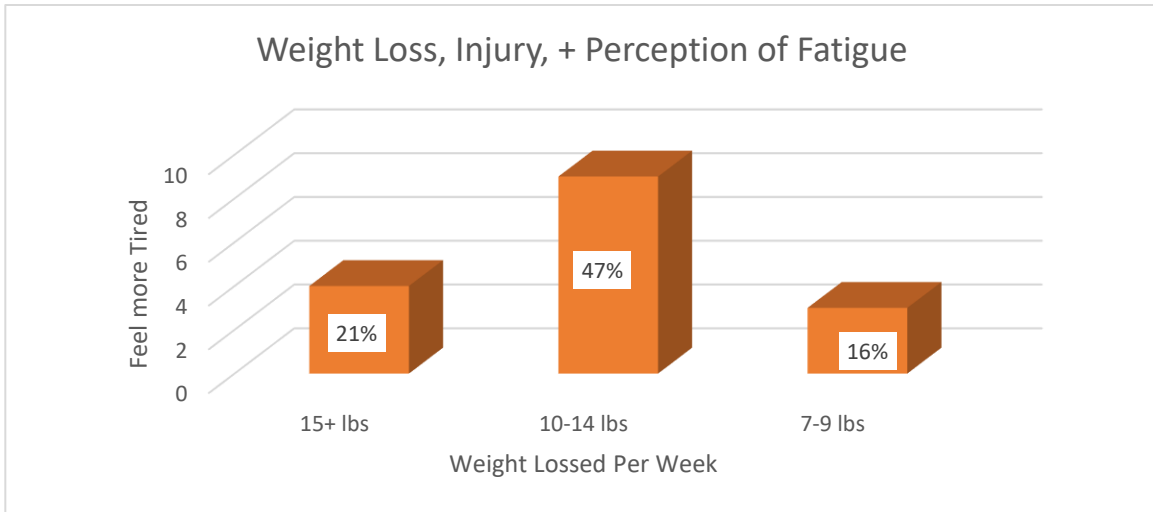


Figure 13. Weight Loss, Injury, + Feel More Tired

CHAPTER V

DISCUSSION

5.1 Discussion

The purpose of this study was to investigate trends among eating habits, weight loss strategies, and injury prevalence in a NCAA Division 1 Wrestling Program. It is well established that disordered eating is prevalent in wrestlers (Dale & Landers, 1999; DiPasquale & Petrie, 2013; Power, 2020; Satterfield & Stutts, 2021; Taylor, 2020). It has also been discussed that current weight loss practices are outdated and while carried on by tradition of the sport, they set the body up for failure and increase the risk of a potential injury (Barley et al., 2018; Burke et al., 2021; Castor-Praga et al., 2021; Davis et al., 2002; Houston et al., 1981; "Wrestling and Weight Control," 1967). For this reason, determining prevalence of disordered eating and unhealthy or even prohibited weight loss strategies are essential to preventing injury due to these factors and to determine if further education is needed by certified professionals regarding healthy weight loss strategies and proper nutrition.

The results from this study suggest that in this collegiate wrestling program, there is more prevalent characteristics of disordered eating than the norms of a college male (Table 5.) The results also suggest that individuals who lost more than 10 pounds a week and perceived that they are fatigued are more likely to sustain an injury than individuals who did not feel fatigued when

cutting weight (Figure 11, Figure 12, Figure 13). Fifty-seven percent of the participants reported sustaining an injury while losing more than 10 pounds a week and perceiving fatigue while cutting weight.

To help combat the prevalence of disordered eating in wrestling, proper nutrition and weight management is needed prior to competition and ensuring proper post-recovery nutrition is essential to the success of the athlete. Wrestlers should look to keep their body mass approximately 5-8% above their weight division approximately one week prior to competition (Burke et al., 2021). Diet considerations include the adoption of a low fiber diet 24-96 hours prior to competition is effective in reducing the weight of gut contents while continuing proper absorption of energy and macronutrients (Reale et al., 2017). Pre-competition nutrition should focus on the use of high glycemic index foods and the use of carbohydrate-rich fluids to facilitate rehydration and gut-discomfort following the consumption of solid foods (Reale, 2018).

Another aspect that should be considered is proper rehydration prior to competition. The majority of wrestlers present with serious or significant dehydration prior to weigh-in (Ceylan et al., 2021). However, wrestlers have shown to successfully regain their hydration and mass loss in body water before competition (Güder, 2020). For proper rehydration, it is recommended to consume 125-150% of the fluid deficit needs to be consumed to properly hydrate. An electrolyte and sodium solution are preferred to replenish components that leave the body during sweat loss. It is noted however that hypertonic solution (greater than 10% carbohydrate) can delay gastric emptying and delay rehydration and should be avoided prior to competition (Reale et al., 2017).

Some other recommendations to combat improper weight loss strategies in wrestling are to modify rules of weight cutting and weigh-ins. The more severe the weight cut will impair repeat-effort capacities and possibly carry negative health effects (Barley et al., 2019). There is also emerging evidence that cutting more weight significantly increases the chances of losing a

match (Brechtney et al., 2019). Ideas to combat this is to require a hydration test prior to competition. This would ensure that the athletes are safely cutting down to the required weight and will may eliminate the use of prohibited weight loss strategies. Another thought may be to have specific personal that are given the duty of regulating and conducting weigh ins. Currently this is done by a medical professional employed by the program and potential bias may be present in these cases that allow specific weight cutting practices to fall beneath the cracks. Having a non-bias practitioner may also decrease the number of individuals who practice prohibited weight loss strategies.

5.2 Limitations

There are some limitations to this study. To start, this study only observed the behaviors of one wrestling program and results may only be attributed to this specific program and may not reflect all collegiate wrestling. Another potential limitation is that not only is the sample size small, but the demographic statistics demonstrate that one weight class had more responses than other weight classes which may demonstrate a bias of the results to one weight class and may not reflect that of the entire wrestling program. There was no statistical analysis used to find a statistical significance in this study. This study's main purpose was to identify trends and correlations between disordered eating, weight loss habits, and injuries in collegiate wrestlers. A statistical analysis is needed to further support the evidence given and provide rationale to look at further change in the sport. Another limitation is that the survey was conducted following the conclusion of the 2020-2021 wrestling season. There is a possibility that the responses may change from the pre-season, in-season, post-season, and off-season and may provide a better outlook. Future studies should look to include an entire division or a conference to investigate trends between programs. Future studies should also look to possibly incorporate a dietary intake section to the questionnaire to investigate the relationship of nutrition and its factor on weight cutting and injuries.

5.3 Conclusion

The sport of wrestling is a storied sport that spans centuries of human history. With a storied history comes traditions that are carried on generation after generation. Not all traditions are beneficial to the sport, however. Weight loss strategies may lead to the development of disordered eating and an increased risk of injury. There is concern about the long-term effects of wrestling and if disordered eating characteristics are still present after wrestling. Further research is needed to validate these findings. These findings suggest that there may need to be some adjustments to rulings for weight ins and weight cutting to promote safe practices to ensure the health and wellbeing of the athlete is being met. Wrestling programs should educate their athletes on proper nutrition during weight cutting and pre-competition as well as rehydration to promote refueling the body after acute weight loss. Future studies should look to incorporate a bigger sample size, data collection during difference seasons of the sport, and possibly investigate diet and determine if any relationships exist.

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APPENDICES



Oklahoma State University Institutional Review Board

Date: 08/23/2021
Application Number: IRB-21-331
Proposal Title: Eating Habits, Weight loss Habits, and Injury Prevalence in Collegiate Wrestling

Principal Investigator: Nicholaus Goldstein
Co-Investigator(s):
Faculty Adviser: Doug Smith
Project Coordinator:
Research Assistant(s):

Processed as: Exempt
Exempt Category:

Status Recommended by Reviewer(s): Approved

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in 45CFR46.

This study meets criteria in the Revised Common Rule, as well as, one or more of the circumstances for which continuing review is not required. As Principal Investigator of this research, you will be required to submit a status report to the IRB triennially.


The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be approved by the IRB. Protocol modifications requiring approval may include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any unanticipated and/or adverse events to the IRB Office promptly.
4. Notify the IRB office when your research project is complete or when you are no longer affiliated with Oklahoma State University.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact the IRB Office at 405-744-3377 or irb@okstate.edu.

Sincerely,
Oklahoma State University IRB



Participant Information

Title: Eating Habits, Weight loss Habits, and Injury Prevalence in Collegiate Wrestling

Investigator(s): Nicholaus Goldstein, LAT, ATC, CES, Graduate Student, Health and Human Performance Department

Purpose: The purpose of the research study is to investigate the eating and weight loss habits of NCAA Division One Collegiate Wrestlers and the injury prevalence during the 2020-2021 wrestling season.

What to Expect: This research study is entirely administered online. Participation in this research will involve the completion of one questionnaire. This questionnaire will ask you a series of questions regarding eating, weight loss habits, and injuries. You may skip any questions that you do not wish to answer. You will be expected to complete the questionnaire once. It should take you approximately 8 minutes to complete.

Risks: There are no risks associated with this project which are expected to be greater than those ordinarily encountered in daily life.

Benefits: There are no direct benefits to you. However, you may gain an appreciation and understanding of how research is conducted.

Your Rights and Confidentiality: Your participation in this research is voluntary. There is no penalty for refusal to participate, and you are free to withdraw your

consent and participation in this project at any time.

Confidentiality: The records of this study will be kept private. Your response to this survey is anonymous. Any written results will discuss group findings and will not include information that will identify you. Research records will be stored on a password-protected computer in a locked office and only researchers and individuals responsible for research oversight will have access to the records. The information that is gathered in this study will not be used or distributed for future research. Data will be destroyed three years after the study has been completed.

Contacts: You may contact any of the researchers at the following addresses and phone numbers, should you desire to discuss your participation in the study and/or request information about the results of the study: Nick Goldstein, LAT. ATC. CES, Colvin Recreation Center, Dept. of Health and Human Performance, Oklahoma State University, Stillwater, OK 74078, 405-744-1340. If you have questions about your rights as a research volunteer, you may contact the IRB Office at 223 Scott Hall, Stillwater, OK 74078, 405-744-3377 or irb@okstate.edu

If you choose to participate: Please, click **NEXT** if you choose to participate. By clicking NEXT, you are indicating that you freely and voluntarily and agree to participate in this study and you also acknowledge that you are at least 18 years of age. It is recommended that you print a copy of this consent page for your records before you begin the study by clicking below.

Wrestling Questions

Which NCAA Division 1 Wrestling Program are you Currently apart of?

When did you begin wrestling?

- Elementary School
- Middle School
- High School
- Prefer not to say

What did you weigh out of season?

- 125-132
- 133-140
- 141-156
- 157-164
- 165-173
- 174-183
- 184-196
- 197-210
- 210 or Higher
- Prefer not to say

What did you weigh in-season?

- 125-132
- 133-140
- 141-156
- 157-164
- 165-173
- 174-183
- 184-196

- 197-210
- 210 or Higher
- Prefer not to say

What is the most weight lost in a week?

- 1-3 lbs
- 4-6 lbs
- 7-9 lbs
- 10 or 14 lbs
- 15 or more lbs
- Prefer not to say

How frequently do you weigh yourself in?

- Daily
- Twice a week
- Weekly
- Monthly
- Never
- Prefer not to say

Did you sustain an injury during the 2020-21 Wrestling Season?

- Yes
- No
- Prefer not to say

How long did you miss time with your injury?

- Less than a week
- 1-3 Weeks
- 4-6 Weeks
- 2 or More Months
- Prefer not to say

The following questions have typical weight loss strategies that may have been utilized. Select the best option that describes how **frequently** you use this strategy during **this past wrestling season (2020-2021)**.

	Never	Rarely	Sometimes	Often	Prefer not to say
How often do you use gradual dieting to lose weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you use food restriction (skipping meals) to lose weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you use restricting fluids (not drinking water) to lose weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you use increased exercise (Running on treadmill after practice) to lose weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you use a Sauna to lose weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you use a Heated Wrestling Room to lose weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you use Laxatives to lose weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you spit to lose weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you use diet pills to lose weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you use diuretics to lose weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you vomit to lose weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The below is statements that some wrestlers may have when cutting weight. Read each statement to determine how well it describes your experiences. Rank them on a scale of **0=Strongly Disagree to 5=Strongly Agree**. Then select the best option that describes **how frequently** each statement has applied to you **during the 2020-2021 wrestling season**.

	Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Strongly Agree	Prefer not to say
I feel not as strong when I am cutting weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel more tired when I am cutting weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel my endurance is not as good when I am cutting weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel that I do not perform as well when I cut weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Default Question Block

Below is a list of experiences and problems that people sometimes have. Read each item to determine how well it describes your recent experiences. Then select the option that best describes **how frequently** each statement applied to you **during the past four weeks, including today**.

	Never	Rarely	Sometimes	Often	Prefer not to say
I did not like how clothes fit the shape of my body	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tried to exclude "unhealthy" foods from my diet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Never	Rarely	Sometimes	Often	Prefer not to say
I ate when I was not hungry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People told me that I do not eat very much	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt that I needed to exercise nearly every day	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People would be surprised if they knew how little I ate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I used muscle building supplements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I pushed myself extremely hard when I exercised	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I snacked throughout the evening without realizing it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I got full more easily than most people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I considered taking diuretics to lose weight	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tried on different outfits, because I did not like how I looked	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought laxatives are a good way to lose weight	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought that obese people lack self-control	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought about taking steroids as a way to get more muscular	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I used diet teas or cleansing teas to lose weight	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I used diet pills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I did not like how my body looked	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I ate until I was uncomfortably full	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt that overweight people are lazy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I counted the calories of foods I ate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I planned my days around exercising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought my butt was too big	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I did not like the size of my thighs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I wished the shape of my body was different	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Never	Rarely	Sometimes	Often	Prefer not to say
I was disgusted by the sight of an overweight person wearing tight clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I made myself vomit in order to lose weight	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I did not notice how much I ate until after I had finished eating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I considered taking a muscle building supplement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt that overweight people are unattractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I engaged in strenuous exercise at least five days per week	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought my muscles were too small	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I got full after eating what most people would consider a small amount of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was not satisfied with the size of my hips	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I used protein supplements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People encouraged me to eat more	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If someone offered me food, I felt that I could not resist eating it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was disgusted by the sight of obese people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I stuffed myself with food to the point of feeling sick	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tried to avoid foods with high calorie content	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I exercised to the point of exhaustion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I used diuretics in order to lose weight	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I skipped two meals in a row	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I ate as if I was on auto-pilot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I ate a very large amount of food in a short period of time (e.g., within 2 hours)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

VITA

NICHOLAUS ALAN GOLDSTEIN

Candidate for the Degree of

Master of Science

Thesis: EATING HABITS, WEIGHT LOSS HABITS, AND INJURY PREVALANCE
IN COLLEGIATE WRESTLING

Major Field: Health and Human Performance

Biographical:

Education:

Completed the requirements for the Master of Science in Health and Human Performance at Oklahoma State University, Stillwater, Oklahoma in December 2021.

Completed the requirements for the Bachelor of Science in Athletic Training at University of Northern Colorado, Greeley, Colorado in May 2020.

Experience:

Served as a graduate assistant Athletic Trainer at Oklahoma State University

Professional Memberships:

Board of Certification Certified Athletic Trainer

National Athletic Trainers Association

National Academy of Sports Medicine – Certified Exercise Specialist