

## ABSTRACT

### Burnout, Diet Quality, and Sleep Quality in College Student Athletes vs. Physically Active College Students

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Burnout in sport may be on the rise given the pressures of an intense training schedule, balancing academics with a social life, eating a healthy diet, and getting adequate rest. College student athletes and physically active college students (PA college students), students that participate in 30 minutes of moderate to vigorous physical activity for a minimum of twice per week, were asked to complete an Athlete Burnout Questionnaire, Pittsburg Sleep Quality Index, and the Rapid Eating Assessment for Patients – Short Version. Results showed no significant differences in emotional exhaustion, devaluation, REAPS between athletes and PA college students. However, there was a significant difference between college student athletes and PA college students with the risk for burnout, specifically concerning personal accomplishment. There was a significant difference between college student athletes and PA college students with regards to sleep quality.

Burnout, Diet Quality, and Sleep Quality in  
College Student Athletes vs. Physically Active College Students

by

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A Thesis

Approved by the Department of Human Sciences and Design

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Submitted to the Graduate Faculty of  
Baylor University in Partial Fulfillment of the  
Requirements for the Degree  
of  
Master of Science

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## ACKNOWLEDGMENTS

Thank you to all that have assisted in the research, data collection, interpretation, and the writing of this research project. L. Funderburk, PhD, W. Hou, MS, A. Gallucci PhD, A. Vineyard MAT, M. Cholewinski, K. Adair, MS, J. Heilesen, E. Frank.

## DEDICATION

To my parents, Al and Janice, thank you for the support, guidance, and the constant encouragement of my love for learning. Thank you for all the sacrifices you made throughout my life to ensure that I could pursue higher education. To Jordan Crocker, who has been a source of encouragement throughout the process of writing the thesis. Thank you for always believing in me and reminding me that I am capable of great things.

## CHAPTER ONE

### Introduction

#### *Background*

Stress is defined as any change that causes physical, emotional, or psychological strain <sup>1</sup>. Stressors are triggers that elicit a stress response. A stress response can be an increase in heart rate, difficulty breathing, decrease in digestive activity, or liver releasing glucose for energy <sup>2</sup>. Stressors in athletes can be categorized as either a competitive stressor or an organizational stressor <sup>3</sup>. Competitive stressors are defined as demands associated directly with the athlete's performance. Organizational stressors include lack of financial support, personal issues like lack of nutrition, and the team atmosphere. Athletes are more likely to experience higher stress from organizational stressors rather than competitive stressors <sup>3</sup>. This is ironic as an organization, such as a team, is traditionally viewed as a support system for athletes. However, many athletes frequently cited challenges with leadership and goals and expectations that were set based on their previous performances as stressors that affected their performance. <sup>4</sup>

The theoretical model of "emotional labor" (EL) was defined by Grandey as "the process of regulating both feelings and expressions for organizational goals" <sup>5</sup> and explains some of these organizational stressors. Coakley argued that the social organization of a sport hinders normal identity development in young athletes and limits their autonomy <sup>6</sup> which may serve as an explanation as to why some athletes experience burnout and others do not. Grandey has reported that one of the long-term consequences



of EL on wellbeing is burnout <sup>5</sup>. Burnout has been defined as a psychological syndrome resulting in exhaustion (physical and emotional), cynicism (indifference or a distant attitude to work in general), and reduced professional efficacy (low expectation of continued effectiveness) <sup>7</sup>. While burnout was initially studied in healthcare professions (e.g. doctors, nurses), Freudenberger implied that sport was another area that had high burnout-inducing potential (“Sport and Business Coaching: Perspective of a Sport Psychologist,” n.d.). Burnout in sport has three key characteristics: exhaustion, reduced accomplishment, sport devaluation <sup>8</sup>. Due to the increasing demands of competitive and training stress on athletes, burnout in athletes may be rising <sup>9</sup>. Athletes often express frustration with an intense training schedule and little results to show for following such an intense training regimen. This is best explained by the effort-reward imbalance model which states that a lack of balance between high effort and low reward leads to emotional distress and increases burnout risk <sup>10</sup>. Athletes that participated in Gustafsson et al’s study on burnout in Swedish elite athletes reported that their feelings of burnout were directly related to excessive training and overtraining syndrome <sup>11</sup>. Four of the athletes in Gustafsson et al’s study reported having a very little or non-existent off season. Athletes reported that they had very little time off during season (e.g. one week for vacation) or only few days off between seasons for necessary recovery. One athlete reported that the training pressures and anti-rest culture was prevalent in his experience <sup>11</sup>. A study completed with rugby players had similar findings that an anti-rest culture was associated with burnout in athletes <sup>12</sup>. In addition to a lack of recovery time, athletes expressed frustration that their schedules were centered around their sport and allowed for little time

for relaxation or socializing. These athletes reported having an initial love of their sport, but the time commitment and rigorous schedule eventually led to burnout <sup>11</sup>.

Diet may also have a role in reducing and preventing burnout as it can influence neurotransmitters and neurotransmission <sup>13</sup>. Tyrosine increases the production and release of dopamine and norepinephrine, which was discovered to be lessened in exhausted individuals <sup>14</sup>. Neri et. al found that administering tyrosine was associated with a significant improvement of the typical performance decline on a psychomotor task and a significant reduction in lapse probability on a vigilance task in the group that received 150mg/kg-1 tyrosine. This research shows that tyrosine may be useful in counteracting decreased performance in sleep deprived individuals <sup>15</sup>. A study done by Alexandrova-Karamanova et. al found that burnout was significantly positively associated with higher fast food consumption and higher alcohol consumption in healthcare professionals <sup>16</sup>. A study done by Brown et. al that focused on trauma surgeons and work-life balance found that a healthy diet was a factor that was associated with reported satisfying work-life balance <sup>17</sup>. Dutch dentists with a high burnout risk reported more unhealthy behaviors such as an increase in alcohol consumption and an unhealthy diet <sup>18</sup>.

The Mediterranean Diet is characterized by a diet high in fruits, vegetables, whole grains, monounsaturated fats, omega-6 and omega-3 fatty acids, and low in saturated fats <sup>19</sup>. This diet has been widely reported to be one of the most healthy diets and has a possible impact on mental health. Parletta et al. tested the effect of the Mediterranean Diet supplemented with fish oil on mental health for 6 months. The Mediterranean Diet group reported a greater reduction in depressive symptoms at 3 months and reduced depression was significantly correlated with an increased adherence to the Mediterranean

Diet at 6 months <sup>20</sup>. Athletic performance is also enhanced by a high-quality diet. The Academy of Nutrition and Dietetics reports that athletes need to consume adequate fluids, electrolytes, energy, and carbohydrates to ensure optimal performance and rapid recovery <sup>21</sup>. Carbohydrates are a necessary component of the athlete's diet as they are most efficiently metabolized by the body to provide energy during periods of high-intensity exercise. However, data indicates that many athletes have inadequate carbohydrate intake and are unable to fully replenish their muscle glycogen stores, which can lead to decline in performance <sup>22</sup>. While protein is essential for muscle recovery and to enhance performance, many athletes are consuming adequate protein or overconsuming protein. Overconsumption of protein can lead to a decrease in carbohydrate and increase in fat intake which can lead to inadequate skeletal muscle glycogen levels which can limit the athlete's ability to perform high-intensity exercise <sup>23</sup>.

Sleep is considered critical to human physiological functions and for an athlete's optimal performance. Inadequate sleep has been linked to increased reports of burnout in college students <sup>24</sup>. In exercise responses, a decrease in sleep quality and quantity can result in autonomic nervous system imbalance, which simulates symptoms of overtraining syndrome <sup>25</sup>. The CDC guidelines recommend that adults ages 18-60 years old sleep 7 or more hours per night <sup>26</sup>. College students typically do not meet the recommended amount of sleep as they are faced with the challenge of balancing academics and a social life. Students typically use sleep deprivation to extend study time. College athletes must dedicate time to training, academics, and sleep. However due to their demanding training and travel schedules, athletes are often sleep deprived. In a study among male cyclists, sleep time and sleep efficiency decreased during a high

training block <sup>27</sup>. Sleeping less results in further exhaustion, which as a result, develops a chronic cycle of burnout and exhaustion <sup>24</sup>.

Inadequate sleep and low diet quality are associated with weight gain.

Haghighatdoost et. al found that female college students that slept less than 6 hours per day were more likely to be overweight or obese. These students also had consumed more calories, more carbohydrates, and less fiber <sup>28</sup>. Sleep quality can be enhanced or reduced depending on diet quality <sup>29</sup>. In a study done by Riegler et. al, college athletes completed a comprehensive neuropsychological test battery at baseline and or/post concussion. This study found that athletes with insufficient sleep the night prior to baseline testing reported greater symptoms from the Post-Concussion Symptom Scale which can make an athlete without a concussion appear similar to a concussed athlete with sufficient sleep <sup>30</sup>. In a study done by Mah et. al, 11 healthy athletes on a college men's basketball team were instructed to sleep as much as possible at night with the goal of spending 10 hours in bed each night for 5-7 weeks. Measures of athletic performance including a timed sprint and shoot accuracy were recorded after each practice. Athletes indicated a faster timed sprint, a free throw percentage increased by 9% and 3 point field goal percentage increased by 9.2% <sup>31</sup>. Napping may be beneficial for athletes suffering from sleep loss. Waterhouse et. al researched the effect of a midday nap on sprint performance following sleep deprivation (4 hours of sleep). After a 30 minute nap, 20 m sprint performance and alertness were increased when compared to the no-nap trial <sup>32</sup>.

This study evaluated whether there was a difference in diet quality and stress/burnout amongst college student athletes compared to physically active college students. It was hypothesized that there would be a difference in diet quality between

college student athletes and physically active college students. It was also hypothesized that due to the greater stressors placed on student athletes, there would be a difference in stress/burnout between the two groups.

### *Objectives*

Our primary objective was to determine if there was a difference in diet quality and stress/burnout in college athletes vs physically active college students.

## CHAPTER TWO

### Materials and Methods

#### *Selection and Recruitment*

The study population was physically active (PA) college students enrolled in courses at Baylor University, between 18-30 years of age that participate in a minimum of 30 minutes of moderate to vigorous physical activity for a minimum of twice per week. These students will be referred to as “PA college students” in this study. The population included both male and female students. Exclusion criteria were student-athletes that do not fall within the 18-30 age range and are not listed on an active Baylor Athletics roster. For student athletes, a recruitment email and informed consent were sent to all athletes that met criteria for the 2020-2021 academic year through the TeamWorks platform. The TeamWorks system is utilized by Baylor Athletics and allows staff to send communication to student athletes. Athletes and PA college students that chose to participate completed an initial survey, which served as informed consent, and a Qualtrics survey.

Other physically active college students attending Baylor University were invited to participate if they met criteria. Recruitment emails and informed consents were sent to Baylor University professors that were teaching courses during the summer 2020 term. These professors were asked to distribute the study opportunity to their students. The recruitment email included a link to the Qualtrics survey along with informed consent and study information.

### *Design and Methods*

Students that volunteered for the study were given a survey six times over the duration of the Summer and Fall 2020 semesters. The survey was distributed once a month (July, August, September, October, November, December). The study was completed at the end of the Fall 2020 semester. The monthly survey included an Athlete Burnout Questionnaire <sup>33</sup>, the Pittsburgh Sleep Quality <sup>34</sup> to measure sleep quality, and the Rapid Eating Assessment for Patients - Short Version to assess monthly dietary habits <sup>35</sup>. All the validated questionnaires were combined into the monthly survey. Demographic (age, ethnicity, gender, name, Baylor email address, year in school, etc.) questions were included in the first survey and removed in the following surveys as the surveys were sent directly to the participant's provided email address.

### *Statistics*

A cross-sectional time series survey of a convenience sample of participants was used. Target sample size was a minimum of 30 eligible participants, with 33 participants completing the questionnaires or surveys. Target sample size was set to 30 participants as this is the minimum for a normal distribution. Survey responses to the Athlete Burnout Questionnaire (ABQ) were scored using a Likert Scale and averaged, responses to the Rapid Eating Assessment for Patients - Short Version (REAPS) were scored and averaged, and Pittsburgh Sleep Quality Index (PSQI) scores were totaled. Averages were used to determine the diet quality and level of burnout for the students. The total from the PSQI was used to determine problematic sleep. A one-way ANOVA test was used to

show if there were differences in diet quality, burnout, and sleep between athletes vs PA college students. All statistical procedures were performed using JMP® Pro 16 and a significance level set at  $\leq 0.05$ .



## CHAPTER THREE

### Results

#### *Participants*

Surveys were distributed among 33 athletes and PA college students. Survey demographics male/female ratio of about 27%/73% in the college student athlete group and 45%/55% in the PA college student group. Survey demographics similar to the University's male/female ratio of 40%/60% <sup>36</sup>. College student athletes were active roster members of the baseball team, track and field, golf, equestrian, cross country, football, and acrobatics and tumbling. Participants were mostly first year undergraduates (13, 39%), followed by third year undergraduates (8, 24%) and fourth year undergraduates (6, 18%). Second year undergraduates (3, 9%) and graduate students (3, 9%) were the lowest represented groups. Demographics of research participants can be found in Table 3.1.

Table 3.1 Demographics

Demographics	Athletes	PA College Students
Age Mean (+ SD)	19 (+ 1.2)	22 (+ 3.1)
Sex	Female –16 (73%) Male – 6 (27%)	Female – 6 (55%) Male – 5 (45%)
White	16 (73%)	5 (45%)
Hispanic or Latino	2 (9%)	3 (27%)
Black	3 (14%)	0 (0%)
Asian or Pacific Islander	1 (5%)	2 (18%)
Biracial/Multiracial	0 (0%)	1 (9%)

### *Burnout*

Students completed an Athlete Burnout Questionnaire (ABQ) to assess burnout. Students answered the 15-question survey. The Athlete Burnout Questionnaire's (ABQ) questions correlate to three categories of burnout - emotional exhaustion, devaluation, and reduced personal accomplishment. Their responses were scored on a 5-point Likert scale with "almost never" (1), "rarely" (2), "sometimes" (3), "frequently" (4), and "almost always" (5). The scores were totaled, and a mean score was calculated for each student. Scores above "3" suggested "high burnout." A mean score below "3" suggested not a high level of burnout. Three participants did not provide responses to this survey. Participants scored mostly less than 3 in each category of burnout, suggesting low levels of burnout. There was a significant difference between college student athletes and PA college students, specifically concerning personal accomplishment (p-value of 0.00697). Emotional exhaustion and devaluation did not have a significant difference (p-values of 0.92339 and 0.07489). Data can be found in Table 3.2 and Table 3.3.

Table 3.2 Mean ABQ Results for Athletes

	Emotional Exhaustion	Devaluation	Personal Accomplishment
$\geq 3$	20% (n=4)	10% (n=2)	15% (n=3)
$< 3$	80% (n=16)	90% (n=18)	85% (n=17)
Mean Score ( $\pm$ SD)	2.26 ( $\pm$ 0.9)	1.87 ( $\pm$ 0.8)	2.18 ( $\pm$ 0.7)

Table 3.3 Mean ABQ Results for PA College Students

	Emotional Exhaustion	Devaluation	Personal Accomplishment
> 3	20% (n=3)	0% (n=0)	20% (n=2)
<3	70% (n=7)	100% (n=10)	80% (n=8)
Mean Score ( $\pm$ SD)	2.3 ( $\pm$ 0.8)	2 ( $\pm$ 0.5)	2.5 ( $\pm$ 0.7)

### *Diet Quality*

Students were asked to complete REAP-S survey questions to assess monthly dietary habits. Students answered with “usually/often,” “sometimes,” “rarely/never,” or “does not apply to me.” All questions in this survey can be found in the REAPS questionnaire <sup>35</sup>. Scores for this survey were calculated “usually/often” received 1 point, “sometimes” received 2 points, and “rarely/never” or “does not apply to me” received 3 points. A mean score for a typical adult consuming an omnivorous diet is 32 <sup>37</sup>. A lower REAPS score is associated with a lower quality diet <sup>37</sup>. Three participants did not provide survey responses. Both the athlete and PA college student groups scored below 32, indicating a lower quality diet. There was no significant difference between the college student athletes and PA college students (p-value of 0.17821). Data is represented in Table 3.4.

Table 3.4 REAPS Survey Results

REAPS Score	% Athletes	% PA College Students	Overall Mean Score ( $\pm$ SD) For Both Groups
>32	30% (n=6)	30% (n=3)	29.77 (+ 3.6)
<32	70% (n=14)	70% (n=7)	

### *Sleep Quality*

The Pittsburgh Sleep Quality Index (PSQI) was used to measure the monthly sleep quality. Only questions 1-9 from the PSQI were used to evaluate sleep quality. The student responses were assigned a numerical score of 0 to 3. A score of “0” indicated no difficulty with their sleep habits and a score of “3” indicated more problematic sleep for each individual question. A total score of 5 or higher indicated poor sleep quality. Six participants did not complete the survey. Most participants scored above 5, indicating poor sleep quality. There was a significant difference between the two groups with a significant p-value of 0.00059. Data is shown in Table 3.5.

Table 3.5 PSQI Survey Results

PSQI Score	% Athletes	% PA College Students Score Groups	Overall Mean (+ SD) For Both
> 5	93.75% (n=15)	80% (n=8) 5.3)	9.96 (+
<5	6.25% (n=1)	20% (n=2)	

### *Difference between College Student Athletes and PA College Students*

No significant difference was found between emotional exhaustion, devaluation, REAPs for athletes vs PA college students. As shown in Table 3.6, there was a significant

difference in PSQI (p-value <0.001) and personal accomplishment (p-value = 0.007) between college student athletes vs PA college students.

Table 3.6 Difference in Burnout, Diet Quality, and Sleep Quality between College Student Athletes and PA College Students

Variable	p-value
Emotional Exhaustion	0.92339
Devaluation	0.07489
Personal	0.00697
Accomplishment	0.17821
REAPS	0.00059
PSQI	

\*p<0.05

### *Limitations*

Limitations of this study include convenience sampling that may not represent the true demographics of collegiate athletes aged 18-30 in the United States. Other limitations include the small sample size, which may have provided different results versus if a larger sample size was used. If this study was performed again, a larger sample size would be recommended to confirm the relationship between the diet quality of the athletes and PA college students. Survey results suggest there is no significant difference in diet quality between college athletes vs PA college students. The surveys required participants to self-report data. With self-reporting, there is a risk for self-report bias where participants either consciously or unconsciously alter their responses to be more desirable <sup>38</sup>. Thus, incorrectly estimating the results for the participant's burnout level, diet quality, and sleep quality may have occurred.

## CHAPTER FOUR

### Discussion

#### *Risk for Burnout*

Our results suggest that there is a difference between college student athletes and PA college students and risk for burnout specifically concerning personal accomplishment. Eighty-five percent of college student athletes scored  $< 3$  in personal accomplishment, which suggests low burnout. Eighty percent of PA college students scored  $< 3$  in this same category. Fifteen percent of college student athletes scored  $\geq 3$  in personal accomplishment, indicating high burnout. Twenty percent of PA college students scored  $\geq 3$  in this category. This result may be explained by the effort-reward imbalance model which states that a lack of balance between high effort and low reward leads to a feeling of low expectations despite high effort (ex. rigorous training schedule)

<sup>10</sup>. There was no statistically significant between emotional exhaustion or devaluation burnout for college student athletes vs PA college students. However, the risk for devaluation - loss of interest in sport, was interesting as it was close to statistically significant with a p value of 0.07489 .

### *Diet Quality*

The survey results suggest there is no significant difference in diet quality between college athletes vs PA college students. Seventy percent of college athletes and seventy percent of PA college students scored  $< 32$  on the REAPS, indicating a lower quality diet. College female athletes during a competitive season in Nepocatych et. al's study had below the recommended intakes of carbohydrate, protein, fiber, and high intakes of sodium <sup>39</sup>. A common misconception is that college athletes will have a higher quality diet due to their access to nutrition education, dining halls for collegiate athletes, and post training recovery shakes/snacks. However, college athletes have diets that are similar to a typical American college student. In Webber et. al's study assessing the diet quality of collegiate athletes, college athletes had excessive intakes of sodium and percent fat and inadequate fiber, fruit, and vegetable intakes <sup>40</sup>. College students are far from adhering to the Mediterranean Diet, which is considered one of the healthiest diets and is high in fruits, vegetables, whole grains, monounsaturated fats, omega-6 and omega-3 fatty acids, and low in saturated fats <sup>19</sup>. The college student's diet more closely follows the average American's diet, which is high in saturated fats, added sugars, and sodium and lacking in fiber <sup>41</sup>. Our hypothesis that there would be a significant difference between athletes vs PA college students is not supported by this data.

### *Sleep Quality*

Most college student athletes responded to the PSQI with scores  $\geq 5$ , indicating poor sleep quality. Ninety-three percent of college student athletes had poor sleep quality in this study. Eighty percent of PA college students scored above 5 on the PSQI, also

indicating poor sleep quality as shown in Table 5. The poor sleep quality results among the athlete group may be related to the anti-rest culture that was noted in many studies regarding athlete burnout and poor recovery <sup>11</sup>. The sleep quality was significantly worse in the athlete group vs the PA college students. College athletes are faced with the challenge of balancing demanding practice schedules and traveling due to their sport requirements. This explains why the sleep quality would be worse in the athlete group as well as an anti-rest culture found amongst athletes. In Gustafsson et al's study on burnout in elite Swedish athletes, athletes reported having a very little or non-existent time off needed for recovery. An athlete in this study reported that the demands of a training schedule and anti-rest culture within the team was prevalent in his experience <sup>11</sup>. In Mah et.al's study on collegiate student athlete's sleep quality, 42.4% of athletes experienced poor sleep quality and reported lower sleep quality when on campus than when traveling for competition <sup>42</sup>.

### *Diet Quality and Sleep Quality*

While sleep quality was worse in the athlete group, diet quality scores indicated no significant difference between the two groups. Chaput's study discovered that short sleep duration, poor sleep quality, and a later bedtime was associated with increased food intake, poor diet quality, and excess body weight <sup>43</sup>. Zuraikat et. al's study with women ages 20-76, found that higher PSQI scores were associated with lower unsaturated fat intake, higher volume of food and added sugars consumed, and lower intakes of whole grains <sup>44</sup>. Both studies indicated that a higher PSQI/poor sleep quality were associated with increased food consumption and overall poor diet quality. However, our study did



not find a significant difference between poor sleep quality and diet quality in college student athletes and PA college students.

## CHAPTER FIVE

### Conclusion

The results of this study indicate that there is a significant difference between college student athletes and PA college students with the risk for burnout, specifically with the feelings of reduced personal accomplishment. Results also show that there was a significant difference in sleep quality in the athlete group vs. PA college students. There was no significant difference in diet quality between groups. Both athletes and PA college students reported diets that scored below 32 on the REAPS, indicating a poor diet quality in both groups of participants. However, limitations with this study include the small sample size, convenience sampling of college students attending Baylor University, and the use of self-reported data.

Based on this study's results, these findings point to an important relationship between sleep quality and the risk for burnout in college student athletes. College student athletes often have demanding schedules between training, classes, and traveling for games. Lack of rest is a common problem cited by many athletes due to their training demands<sup>27</sup>. To combat this issue, athletes and coaching staff need to emphasize the importance of adequate rest to prevent burnout and cultivate a team culture that encourages their athletes to take the necessary time to sleep and recover. Future studies should evaluate diet quality, sleep quality, burnout, and social support networks within the team.

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