

2015

# The Perceptions of NSAID use Among One Midwestern DIII Athletic Department

Katherine L. Cialella

Otterbein University, [katherine.cialella@gmail.com](mailto:katherine.cialella@gmail.com)

Follow this and additional works at: [http://digitalcommons.otterbein.edu/stu\\_dist](http://digitalcommons.otterbein.edu/stu_dist)

 Part of the [Other Social and Behavioral Sciences Commons](#), [Sports Sciences Commons](#), and the [Sports Studies Commons](#)

---

## Recommended Citation

Cialella, Katherine L., "The Perceptions of NSAID use Among One Midwestern DIII Athletic Department" (2015). *Distinction Papers*. Paper 18.

This Distinction Paper is brought to you for free and open access by the Student Research & Creative Work at Digital Commons @ Otterbein. It has been accepted for inclusion in Distinction Papers by an authorized administrator of Digital Commons @ Otterbein. For more information, please contact [library@otterbein.edu](mailto:library@otterbein.edu).

THE PERCEPTIONS OF NSAID USE AMONG ONE MIDWESTERN  
DIII ATHLETIC DEPARTMENT

Katherine L. Cialella  
Department of Health and Sport Sciences  
Otterbein University  
Westerville, OH 43081

6 April 2015

Submitted in partial fulfillment of the requirements for  
graduation with Distinction

Advisory Committee:

Robert Braun, PhD, MPH, CHES  
Distinction Advisor

\_\_\_\_\_  
Advisor's Signature

Shelley Payne, DHS, PT, ATC, AT  
Second Reader

\_\_\_\_\_  
Second Reader's Signature

Shelley Payne, DHS, PT, ATC, AT  
Distinction Representative

\_\_\_\_\_  
Distinction Rep's Signature

## Acknowledgements

I am extremely grateful for all the support Dr. Robert Braun has given me throughout the duration of this project. I have learned immensely from his guidance, critique, and assistance. Thank you for giving me this opportunity and supporting me throughout this process. I would also like to thank Dr. Shelley Payne for her help and encouragement as my second reader. I greatly appreciate all your suggestions and input. Additionally I would like to thank Dr. Bill Harper for all his expertise and assistance with the data analysis portion of this project. Lastly I would like to thank my parents and family for their endless support throughout my undergraduate studies.

## **Abstract**

Nonsteroidal anti-inflammatory drugs (NSAIDs) are commonly used amongst athletes for a variety of reasons. The purpose of this research is to compare the usage of NSAIDs among different athletic teams and to gain insight on Division III athletes' views and opinions of NSAIDs. The population participating in this study would include one Midwestern DIII athletic department. The goal of this research was to identify statistically significant behaviors, perceptions, and knowledge of NSAIDs between various athletic teams and determine if the athlete's' perceptions and actions align with the appropriate use of NSAIDs.

Of the 77 athletes that took the survey, 47 took NSAIDs for athletic reasons. By utilizing the Theory of Planned Behavior, this study found Attitude Toward Behavior as the strongest predictor of Behavioral Intentions. Both Perceived Behavioral Control and Intention were statistically significant predictors of behavior. Surprisingly athletes perceived less than 25% of their teammates as taking NSAIDs. Further assessment should include more athletes in a wider variety of sports to get a better representation of the athletic department.

## Table of Contents

Acknowledgements.....	ii
Abstract.....	iii
Table of Contents.....	iv
List of Tables.....	v
List of Figures.....	vi
Introduction.....	1
Methods.....	6
Results.....	9
Discussion.....	14
Conclusion.....	17
Future Research.....	17
Limitations.....	18
References.....	32
A Survey Instrument.....	19
B Cover Letter for Panel of Experts.....	24
C IRB Application.....	25
D Approval Form.....	30
E Letter to Participants.....	31

## **List of Tables**

Table 1- Internal Consistency Results.....	8
Table 2- Participant demographics .....	9
Table 3- Descriptive Statistics and Correlations for the ATB, SN, PBC, and BI .....	11
Table 4- Linear Regression on Behavioral Intentions using the TPB.....	12
Table 5- Student Athletes' Behaviors and Uses of NSAIDs .....	13

## List of Figures

Figure 1- Path Diagram for NSAID Users.....	14
---	----

## **Introduction**

Nonsteroidal anti-inflammatory drugs (NSAIDs) are amongst one of the most commonly purchased over the counter (OTC) medications. NSAIDs are used for a variety of reasons including: treatment of pain, soft tissue swelling, and fever. Drug therapy is a common intervention used to help promote recovery to return one back to normal activities (Houglum, 1998). These types of drugs are sold over the counter because there is a low risk for misuse (Stasio, Curry, Sutton, & Glassman, 2008). Nevertheless, as with any drug, there are side effects if the medication is abused and it is important to ensure consumers are optimizing dosage, intervention interval, and duration of therapy (Houglum, 1998). With the proper dosage, NSAIDs can be a very beneficial intervention reducing pain and one's inflammatory response. However, pain is often a sign of an injury and when painkillers are taken they mask the injury, it could lead to making the condition worse (Smith & Collina, 2007).

To an extent, pain is necessary for protection and avoidance of worsening an injury. When the body is injured a series of events occur to promote the natural healing process. The inflammatory response is essential for allowing an increase of blood flow to the injured area and promotes the recruitment of inflammatory cells such as satellite cells (Smith & Collina, 2007). The human body has an enzyme called cyclooxygenase (COX). The function of this enzyme is to catalyze the transformation of arachidonic acids, a fatty acid released from a cellular membrane following a tissue injury, to prostaglandins (Smith & Collina, 2007). Prostaglandins have pro-inflammatory and pain-sensitizing effects on the body which explains why they are targeted by NSAIDs (Krentz, Quest, Farthing, Quest, & Chilibeck, 2008). Prostaglandins are mediators that have a direct role on platelets, endothelial cells, uterine cells, and mast cells (Chen & Dragoo, 2013). The function of COX is essential to the human body and needs to be present at all time. There are two forms of this enzyme: COX-1 and COX-2. Some of COX-1 functions would include protection of the gastric mucosa and platelet aggregation (Smith & Collina, 2007). Also COX is responsible for triggering vasodilation and edema with the purpose of

providing protection to the injured site (Ho, Bedair, Fu, & Huard, 2004). If pain ranges from mild to moderate certain medications like NSAIDs can be taken to make pain tolerable (Pawlak, 2013).

The purpose of nonsteroidal anti-inflammatory drugs is to decrease pain, stiffness, and inflammation which is achieved by suppressing the inflammatory response (Correa et al., 2012). NSAIDs have analgesic, anti-inflammatory, and anti-pyretic properties. NSAIDs work by inhibiting the action of COX-1 and COX-2. The inflammatory response is essential for natural healing to occur. COX-2 has the function of stimulating proliferation, classification, and the fusion on myoblasts and satellite cells. Inhibiting COX-2 function can interfere with muscle anabolism (Correa et al., 2012). One needs to be cautious when they taking certain doses of NSAIDs to ensure they are not impairing the healing process.

NSAIDs are offered both over the counter and prescription at various doses. There have been many studies done to determine the proper dosage of NSAIDs and if the drug is actually beneficial to the healing process (Houglum, 1998). Many studies have been done comparing different doses of NSAIDs and its effect on the human body (Correa et al., 2012; Houglum, 1998; Krentz, Quest, Farthing, Quest, & Chilibeck, 2008). Typically normal doses of are between 200 mg – 600mg. Studies show that large doses of ibuprofen (1200 mg) inhibit muscle synthesis immediately after the completion of an exercise program. The group that took 1200 mg of ibuprofen exhibited a 41% lower muscle protein fractional synthesis rate than the placebo group. This suggests that more moderate doses of ibuprofen will also have a negative effect on skeletal muscle protein metabolism. Therefore to maximize pain relief using NSAIDs one should take a moderate dose for optimal results (Krentz, Quest, Farthing, Quest, & Chilibeck, 2008).

There has been an increased usage of painkillers, specifically NSAIDs over the past two decades to manage athletic injuries (Pawlak, 2013). College student athletes often face numerous stressors during

their student athlete experience. Student athletes can potentially face issues such as academic difficulties, emotional difficulties, and interpersonal relationships. Compared to non-student athletes, student athletes encounter harsh and heavy demands on their body including: repetitive and strenuous training, frequent away competitions, injuries, pressures to win, and competitions between teammates. All these stressors can be very strenuous on an athlete's body, and injuries are very common among sports teams. In many instances an athlete will take painkillers to play through an injury or even sometimes taken to avoid competing with pain (Lu, Hsu, Chan, Cheen, and Kao, 2012). The human body exhibits pain to alert that normal homeostasis has been disrupted. Pain to an extent, is essential to returning back to normal health. If an athlete did not feel pain whenever they hurt themselves, they would continue to injure themselves impairing the body's ability to return to normal health (Pawklak, 2013).

Athletes take NSAIDs for a variety of reasons and sometimes it is questionable whether they are abusing them. A study was done on Division I athletes focusing on their views of taking painkillers prior to a game. This study used the Theory of Planned Behavior to support and interpret the underlying motivators to why athletes are taking NSAIDs. The survey instrument in this research was the King Drug in Sport Questionnaire (KDISQ). Out of the 563 students surveyed, 165 (29%) said that they did not think anything was wrong with taking drugs prior to participating in their sport (Tricker, 2000). There are many instances where an athlete feels pressured to play even though they are injured. A profession or athletic scholarship could be in jeopardy, causing an athlete to do whatever it takes to play. A friend, teammate, or parent can often be responsible for pressuring an athlete to play through an injury. This study shows that athletes often do not want to be viewed as the person that is faking an injury or unmotivated. Former Olympian, Hal Connolly, said that the majority of athletes would do anything to improve themselves or continue playing even when injured (Tricker, 2000). Results showed

athletes used painkillers for a variety of reasons including: preventing pain on competition days (29%), taking them when injured to be able to compete (21%), for recovery from previous sporting activities (33%), and undecided (33%). One of the statements included “If injured, I would take painkilling drugs so that I could continue to compete,” 47.1 % athletes agreed with this statement (Tricker, 2000). This raises an ethical question if the athletes are abusing painkillers and are they worsening their injuries.

From Tricker’s study there were many significant findings including over 25% of the athletes did not realize there were side effects to ibuprofen. Over 62% of the athletes reported that they have previously used painkillers after difficult workouts when their muscles were sore. More than half of the athletes obtained the painkiller from friends, teammates, and family. This shows the external influence from others. One of the most important findings from the study was that the majority of athletes said they were sure and also ‘undecided’ that they would use painkillers to mask an injury to continue to participate. Many athletes do not think there is anything wrong with taking ibuprofen before a game to reduce pain. Although some would view this ethical controversy differently, 25% of NCAA Division I athletes find no issue with taking painkillers (Smith & Collina, 2007). There comes a point when an athlete has to decide which is more important, relieving short-term pain to participate or facing possible long- term consequences of potentially increasing injury severity (Smith & Collina, 2007).

Among all of the NCAA divisions, Division III is the largest accounting for more than 170,000 student- athletes at 444 institutions (Division III, 2014). One of these Division III institutions, the Midwestern University chosen for this study, holds 18 different sports teams for men and women. Currently, there are almost 500 student athletes playing sports at this university. As previously explained, student athletes face many pressures, which frequently includes maintaining a scholarship, reputation, pressure to win, and to balance the strenuous schedule of a student athlete. As explained previously Tricker’s study showed that two Division I institutions and found out that 63% of their

athletes said that they would take painkillers to mask an injury to continue participation. Division III institutions, do not give out athletic scholarships, however, the question arises if Division III athletes will go to such extremes as Division I to continue playing. There has been literature discussing the harmful effects of taking NSAIDs to perform through an injury (Houglum, 1998). However, there are gaps in the literature with regard to the intentions of Division III athletes and the determining factors that motivate these athletes to perform certain actions, specifically taking NSAIDs to continue competitive athletics.

The Theory of Planned Behavior (TPB) focuses on constructs which incorporate various factors that determine the likelihood of performing a specific behavior (Montano & Kasprzyk, 2008). This theory makes the assumption that best indicator of whether an action will be executed or not is a person's Behavioral Intention. Furthermore, the various constructs that contribute to a person's intention include their Attitude Toward Behavior, Subjective Norm, and Perceived Behavioral Control. The constructs that contribute to behavior include Perceived Behavioral Control and Behavioral Intentions (Montano & Kasprzyk, 2008).

The person's Attitude Toward the Behavior is the first construct of the Theory of Planned Behavior. This construct assesses how a person thinks and feels about a behavior. Specifically this construct assesses the degree to which performing the behavior is positively or negatively valued. Questions regarding this construct will determine where a person falls on a semantic differential scales (Montano & Kasprzyk, 2008). Using antonyms such as: Unfavorable-Favorable, Bad-Good, Harmful-Beneficial, Unimportant-Important, and Unhelpful-Helpful can help to establish the Attitude toward Planned Behavior. The second construct of the Theory of Planned Behavior is the Subjective Norm. This construct analyzes one's perceived social pressure to engage or not to engage in a certain behavior (Montano & Kasprzyk, 2008). Subjective Norm measures one's perceived support or discouragement

given by significant others. Survey questions regarding this construct are scored -3 to 3 on a bipolar Disagree-Agree scale or an Unlikely-Likely scale. The last construct of the Theory of Planned Behavior is the Perceived Behavioral Control. This refers to people's perceptions of their ability to perform a given behavior. Perceived Behavioral Control focuses on a person's capability and confidence about executing certain behaviors. Survey questions regarding this construct are also scored -3 to 3 on a bipolar Difficult- Easy and Not Under My Control- Under My Control scale (Montano & Kasprzyk , 2008). By utilizing the Theory of Planned Behavior it was determined what causes an athlete to take NSAIDs and what influences an athlete's intention to take NSAIDs.

As explained previously athletes often experience enormous amounts of pressure to be the best they can be. The source of the pressure can either be internal or external. As seen from Tricker's study much of an athlete's external pressure can come from coaches, teammates, friends, or family. Also athletes often have internal pressure to keep playing through an injury and be motivated. Division III athletes do not receive scholarships for playing sports. It is interesting to see how not having the pressure of maintaining athletic scholarships or the fear of losing a job effects athletes from this DIII university. A research goal of this study is to determine if Division III athletes have the same outlooks on using NSAIDs as Division I schools. The purpose of this research is to identify the statistically significant behaviors, perceptions, and knowledge of NSAIDs between various athletic teams.

## **Methods**

### *Participants*

This research focused on Division III athletes. The sample for this study consisted of college students from a Midwestern private liberal arts university with an enrollment of approximately 3000 students. A meeting with the Athletic Director of the University was held to gain permission to use the athletic department as the subject pool. The Perceptions of NSAID Use among One Midwestern DIII

Athletic Department survey was sent to Otterbein's athletic department by email. The Athletic Director sent the survey link to the coaches of the athletic teams which was then forwarded on to the athletes. The survey was not sent out to fall sports due to the concern of recall bias since data collection occurred during winter and spring sports. The survey was sent out to baseball, basketball, golf, lacrosse, softball, tennis, and track and field.

### *Instrument*

This instrument analyzed the behavior, perceptions, and knowledge of NSAID use among the university's athletic department [Appendix A]. Survey Monkey was used in the design of this instrument. The survey included questions from previous surveys as well as questions developed specifically for this survey instrument while incorporating the Theory of Planned Behavior. Specific questions were developed based upon the various constructs of this theory. The four constructs that were integrated in this survey instrument include: Attitude Toward the Behavior, Subjective Norm, Perceived Behavioral Control, and Behavioral Intention. To assess Attitude Toward the Behavior and Perceived Behavioral Control semantic differential questions were utilized. To assess Subjective Norm and Behavioral Intentions, Likert scales were used. All scales were developed based upon the suggestions by Montano and Kasprzyk (2008).

This survey allowed for multiple variables to be analyzed. In addition to the questions directly targeting the Theory of Planned Behavior, questions were also included about the athlete's current behavior, perceptions, and knowledge of NSAID use. This study was approved by the Otterbein Institutional Review Board [Appendix D]. Informed consent was given with completion of the survey.

Face and Content validity assess the accuracy of measuring the behavioral intention and behavior. Validity was established after an extensive review by a panel of six experts. The experts were composed of two professors of Public Health, one Associate Dean in Student Wellness, one ATOD

director, one Health and Sport Sciences professor, and one Athletic Trainer. The expert review panel all had a minimum of a health related Master’s degree. The experts evaluated the survey design, format, and organization of the instrument. The experts received a letter asking for their assistance in evaluating this instrument [Appendix B].

Reliability analysis of the instrument was used to evaluate the consistency in survey measurement using Cronbach’s alpha (Table 1). Internal consistency measures how closely the responses provided by the participants match up with Theory of Planned Behavior constructs. The highest Cronbach’s alpha value for internal consistency analysis was Subjective Norm ( $\alpha=0.96$ ), followed by Attitude Toward Behavior ( $\alpha=0.94$ ), Behavioral Intention ( $\alpha=0.85$ ), then Perceived Behavioral Control ( $\alpha=0.82$ ).

Table 1: Internal Consistency Results

<b>Characteristic</b>	<b><math>\alpha</math></b>
Construct	
Attitude Toward Behavior	0.94
Subjective Norm	0.96
Perceived Behavioral Control	0.82
Behavioral Intentions	0.85

### *Procedure*

This study received IRB approval on September 8, 2014 [Appendix C]. An approved addendum this project was approved October 8, 2014. The purpose of the study was explained through the online survey and it was expressed that this study is optional, confidential, and names are not required. The Athletic Director sent an email [Appendix E] with the link of the survey out to the coaches. The individual coaches then forwarded the email to their athletes, who then had access to the survey link where they had the option to participate in the study. This occurred in three different waves, one week apart from each other.

## Data Collection

To assess the results, the Statistical Package for the Social Sciences (SPSS) v. 20 was used. Descriptive and inferential statistics were computed to determine themes or statistical significance. Descriptive statistics including means, frequencies, and standard deviations were analyzed. Inferential statistics including multiple regressions based on the outcome variable, behavioral intention, and for correlations between constructs.

## Results

There were a total of 77 participants in this study (Table 2). Participants included 35 males (45.5%) and 42 females (54.5%) with a mean age of 20 years ( $\pm 1$  years). First-year undergraduate students made up the largest portion of respondents (41.6%;  $n=32$ ), followed by 2<sup>nd</sup> year (22.1%;  $n=17$ ), 4<sup>th</sup> year (20.8%;  $n=16$ ), and 3<sup>rd</sup> year (15.6%,  $n=12$ ). Athletes that played baseball made up the largest portion of respondents (29.9%;  $n=23$ ), followed by track and field (23.4%;  $n=18$ ), basketball (19.5%;  $n=15$ ), lacrosse (14.3%;  $n= 11$ ), tennis (9.1%;  $n=7$ ), and softball (3.9%;  $n=3$ ).

Table 2: Participant demographics

Characteristic	Frequency	Percent	Standard
<b>Gender</b>			
Male	35	45.5	
Female	42	54.4	
<b>Age</b>	20		20 $\pm$ 1
<b>Year in School</b>			
1 <sup>st</sup> Year	32	41.6	
2 <sup>nd</sup> Year	17	22.1	
3 <sup>rd</sup> Year	12	15.6	
4 <sup>th</sup> Year	16	20.8	
<b>Primary Sport</b>			
Baseball	23	29.9	
Basketball	15	19.5	
Lacrosse	11	14.3	
Softball	3	3.9	
Tennis	7	9.1	
Track and Field	18	23.4	

### *Research Question 1*

#### **How does NSAID usage differ among various athletic teams?**

Using crosstabs to analyze NSAID usage by athletic team yielded curious results. The tennis team produced the highest percentage of players who took NSAIDs (85.7%; n=6), followed by the baseball team (73.9%; n=17), basketball (73.3%; n=11), softball (66.7%; n=2), and track and field (44.4%; n=8). A Chi-square analysis was performed and no one sport was more likely than any other to use NSAIDs.

### *Research Question 2*

#### **What are Division III athlete's views and opinions of NSAIDs?**

Numerous NSAID knowledge questions existed in this survey. Although 61% (n=47) of the respondents said they took NSAIDs for athletic related issues, only two athletes said they were concerned about the frequency they use NSAIDs (3.3%). There were 22 athletes (34.9%) that had previously heard about athletes on their team using more than the recommended dose of NSAIDs. Next, the athletes were asked to identify what symptoms they thought would be reduced or eliminated from taking NSAIDs. Muscle soreness was the symptom that was identified by the most athletes (90.0%; n=63), followed by headaches (82.9%; n=58), joint discomfort (68.6%; n=48), fever (51.4%; n=36), colds (21.4%; n=15), and dehydration (7.14%; n=5), diarrhea (2.9%; n=2). The symptoms that were only identified by one respondent included: influenza, acne, and pregnancy (1.4%; n=1).

The athletes were then asked about potential side effects from taking NSAIDs. The highest side effect identified was stomach irritations (79.4%; n=54), followed by kidney dysfunction (72.1%; n=49), allergic reactions (50%; n=34), prolonged bleeding (39.7%; n=27), Reye's syndrome (39.7%; n=27), and sterility (16.2%; n=11). Another question related to social norming. The respondents were asked to acknowledge what percent of all athletes do they think take NSAIDS. The highest range was 1-25% of

teammates (35.1%; n=27), followed by 51-75% (28.6%; n=22), 26-50% (22.1%; n=17), 0% (6.5%; n=5), unsure (5.2%; n=4), and 76%-100% (2.6%; n=2) of all teammates take NSAIDs.

*Research Question 3*

**Using the Theory of Planned Behavior what influences an athlete to take NSAIDs?**

Correlation matrices display the relationships among the Theory of Planned Behavior constructs. In Table 3 means, standard deviations, and correlations are presented for all the constructs assessing behavioral intentions. The closest relationship seen is between Attitude Toward Behavior and Subjective Norms having a Pearson correlation value of .72 indicating a strong correlation between these constructs. The correlation matrix displays that Perceived Behavioral Control as the weakest construct with the smallest Pearson correlation compared with other constructs.

**Table 3: Descriptive Statistics and Correlations for the ATB, SN, PBC, and BI (n=71)**

Measure	1	2	3	4	Mean	SD
1. ATB	-	.72***	.41***	.66***	17.9	7.9
2. SN		-	.51***	.60***	24.8	8.6
3. PBC			-	.34**	30.8	5.7
4. BI				-	8.5	4.8

\* Due to missing data n might not exactly equal 71

\*:  $p < 0.05$ ; \*\*:  $p < 0.01$ ; \*\*\*:  $p < 0.001$ .

Note: ATB= Attitude Toward the Behavior; SN= Subjective Norm; PBC= Perceived Behavioral Control; BI = Behavioral Intentions.

Attitude Toward Behavior was the only statistically significant predictor of behavioral intentions ( $p=0.001$ ). Subjective Norms approached significance ( $p=0.052$ ) while the Perceived Behavioral Control had no influence on intentions ( $p=0.971$ ) (Table 4). Furthermore, using Behavioral Intention as the outcome variable in the same analysis, all three constructs collectively predicted 42% (adjusted  $R^2$ ) of the variance in the intention to take NSAIDs (Table 4).

Table 4: Linear Regression on Behavioral Intentions using the TPB

IBM Construct:	Means	Standard Deviation	Beta	<i>p</i> value
ATB	17.97	0.918	0.437	0.001
SN	24.76	0.918	0.275	0.052
PBC	30.76	0.675	0.004	0.971

$F=17.67, df=3, p<0.001; R^2= 0.44, \text{Adjusted } R^2= 0.42$

According to the Theory of Planned Behavior the main predictor of behavior is the intention to perform that behavior coupled with the perceived behavioral control one has over that behavior. In our logistic regression analysis, both the Behavioral Intention ( $p=0.001$ ) and the Perceived Behavioral Control ( $p=0.001$ ) were statistically significant (figure 1). In addition, using behavior as the outcome variable in the same analysis, both constructs collectively predicted 62% of the variance in behavior (Nagelkerke  $R^2$ ).

#### *Research Question 4*

#### **What reasons are athletes using NSAIDs?**

The main reasons for NSAID use from this research were to block pain, treat injuries (ex. sprains and strains), decrease muscle soreness, and improve performance. By completing a crosstabs analysis the athletes' behaviors were compared before practice, after practice, before a game, and after a game. Out of the 47 athletes that said they took NSAIDs for athletic reasons, 51.1% ( $n=24$ ) claimed they take NSAIDs before practice to block pain. That number decreases to 44.7% ( $n=21$ ) for athletes that take NSAIDs after practice to block pain. The percentage of athletes that take NSAIDs before a game to block pain increased to 48.9% ( $n=23$ ). After a game 42.6% ( $n=20$ ) take NSAIDs to block pain.

Of the 47 athletes who take NSAIDS, 40.4% ( $n=19$ ) said they took NSAIDs before practice to treat injuries. That number increased to (46.8%;  $n=22$ ) for athletes that take NSAIDs after practice to treat injuries. Thirty four percent ( $n=16$ ) of athletes took NSAIDs before a game to treat injuries. While

after a game, that percentage increased to 46.8% (n=22).

About 36.2% (n=17) of the athletes said they took NSAIDs before practice to decrease muscle soreness. That number increased to 53.2% (n=25) for athletes who took NSAIDs after practice to decrease muscle soreness. Thirty four percent (n=16) of athletes took NSAIDs before a game to decrease muscle soreness. While after a game, that percentage increased to 46.8% (n=22).

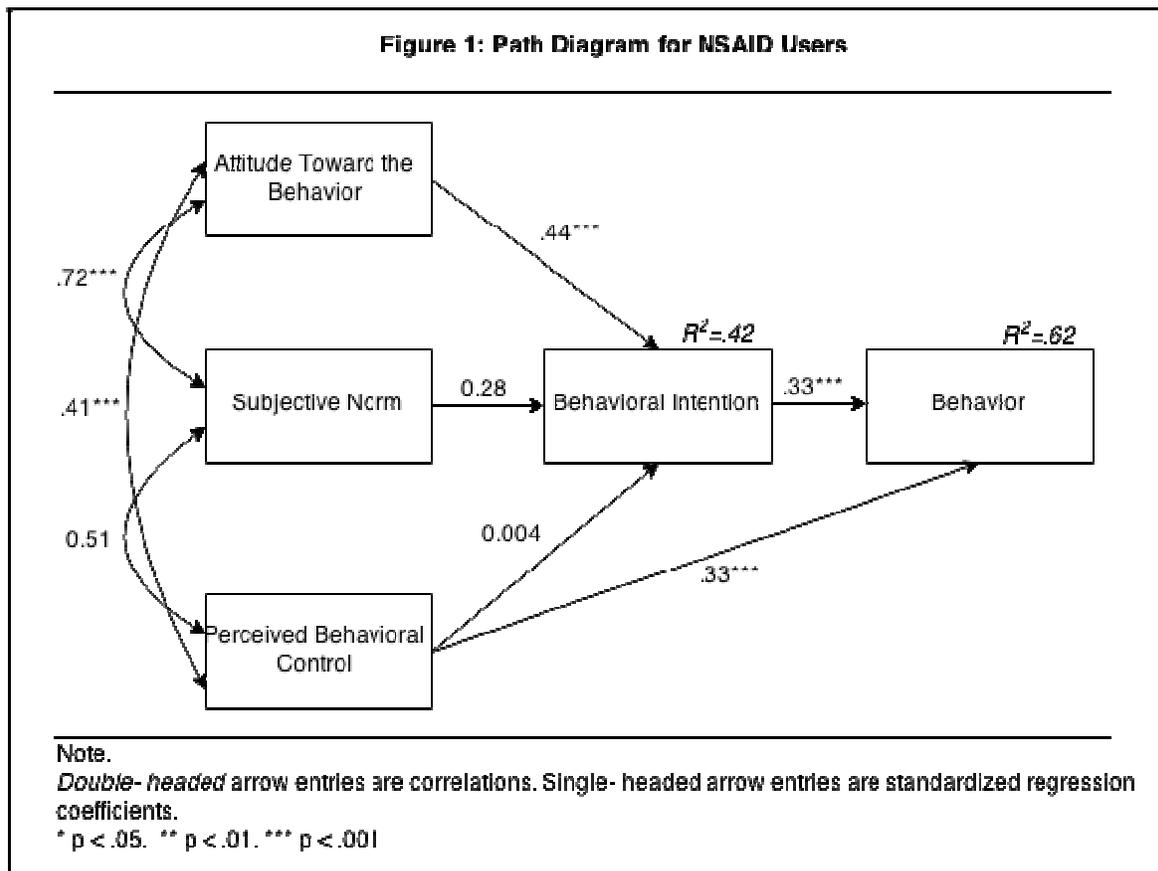
Only 10.6% (n=5) of the 47 athletes said they took NSAIDs before practice to improve performance. That number decreases to 4.3% (n=2) for athletes that take NSAIDs after practice to improve performance. Ten percent (n=5) of athletes took NSAIDs before a game to improve performance. While after a game, that percentage decreased to 6.4% (n=3).

Table 5: Student Athletes' Behaviors and Uses of NSAIDs

Behavior Variable	Before Practice (Percent)	Before Game Day (Percent)	Pearson's R	Pearson's Chi-square	p value
Muscle Cramps	6.38	4.26	.807	30.637	< .001
Muscle Soreness	36.17	34.04	.861	34.835	< .001
Treat Injuries	40.42	34.04	.781	28.641	< .001
Control Swelling	36.17	23.40	.630	18.638	< .001
Block Pain	51.06	48.94	.618	17.936	< .001
Improve Performance	10.64	10.64	.776	28.316	< .001

Figure 1 is a path diagram with exogenous variable correlations, standard path coefficients, and  $R^2$  estimates. Double-headed arrows represent exogenous variables and single-headed arrows present standardized regression coefficients (Mertler & Vannatta, 2002). A statistically significant correlation existed between Attitude Toward the Behavior and Subjective Norm ( $r=0.72$ ,  $p< .001$ ) and Attitude Toward the Behavior and Perceived Behavioral Control ( $r=.41$ ,  $p<.001$ ). Also there were moderate statistically significant direct effects of Attitude Toward the Behavior on Behavioral Intention ( $b_s= 0.44$ ,

$p < .001$ ). Both Perceived Behavioral Control ( $b_s = .33$ ,  $p < .001$ ) and Behavioral Intentions ( $b_s = 0.33$ ,  $p < .001$ ) were statistically significant and had direct effects on Behavior. Additionally, the proportion of the variance in the Behavioral Intention associated with Attitude Toward the Behavior, Subjective Norm, and Perceived Behavioral Control was  $R^2 = 0.42$ ; the proportion of the variance in the behavior of taking NSAIDs associated with Behavioral intention and Perceived Behavioral Control was  $R^2 = 0.62$ .



## Discussion

The purpose of this research was to identify athletes' perceptions and knowledge of NSAIDs use, through the Theory of Planned Behavior's ability to statistically predict NSAID use among various DIII athletic teams. It was predicted that athletes would use NSAIDs to play through an injury in order to

play on game day. According to Tricker's (2000) study, 29% (n= 165) of the athletes surveyed said they felt nothing wrong with using painkilling drugs on the day of competition to cope with pain (Tricker, 2000). In this study the athlete's behavior was analyzed before practice and before a game. The top reasons an athlete takes NSAIDs before practice/game include: block pain (51.06%/48.94%), muscle soreness (36.17%/34.04%), treat injuries (40.42%/34.04%), and control swelling (36.17%/23.40%). Tricker et Al. predicted that more athletes would consume NSAIDs before a game than practice. However, as seen in the results more athletes reported taking NSAIDs before practice, rather than on the day of competition for all examples. A Chi-square analysis revealed that statistical significance occurred, and more athletes took NSAIDs before practice than a game for all behaviors surveyed. This could suggest that athletes put a focus on playing hard in practice so they can make it to game day and thus earn a chance to compete during the actual game. A study from Diacin, Parks, and Allison (2003) assessed how athletes from Division I and Division III viewed drug use and drug testing during intercollegiate athletics. Results from this study showed that participants said they felt the need to take performance enhancing drugs in order to satisfy the coach and solidify playing time (Diacin et. Al, 2003). These results could indicate one conceivable reason for this incidence.

Another finding from this research pertained to the concept of social norms. When athletes were asked how many of their teammates they thought used NSAIDs, 35.1% (n=27) indicated between 1-25% of their fellow teammates took NSAIDs. According to Glanz et. Al. (2008), social norms are defined as "expectations about how different people will evaluate our behavior and their willingness to be guided by their evaluation" (Glanz et. Al., p. 172). Further explaining the results based on that definition, if an athlete believes other athletes are taking NSAIDs they would be more inclined to also take NSAIDs. However, the results indicate that the perception of those who used NSAIDs is minimal. This could explain why fewer athletes take NSAIDs on game day since they do not think their peers are taking them

on game day as well. Another plausible reason for this finding is the athletes were answering the questions the way researchers would want them to answer (social desirability).

When the Theory of Planned Behavior was assessed to elicit the statistically significant constructs, the Attitude Towards the Behavior construct was the only statistically significant predictor of behavioral intentions. In the sample population, this illustrates that these athlete's own personal values significantly impacts one's intention. The Subjective Norms construct, while approaching significance, did not qualify as statistically significant. Although this is numerically true, to an extent, the approval or disapproval of the intention to perform the behavior is of some consequence to our participants. In other words, it seems in this study the participants do in fact listen to their referent's thoughts and opinions, however ultimately it is up to the individual. Lastly, the athletes' Perceived Behavioral Control played no role in the intention to take the drug. Other research assessing NSAID use or other Performance Enhancing Drugs also found Attitudes as the strongest predictor of intentions (Barkoukis, Lazauras, Tsorbatzoudis & Rodafinos, 2013). As seen in Diacin, Parks, and Allison's study (2003), athletes may be influenced and pressured by their coaches, parents, and teammates however they may refrain from taking performance enhancing substances because their perceptions and attitudes towards the drug. However, due to the sparse research available on this topic, it is hard to compare the results with other research available. One possible reason for Subjective norm and Perceived Behavioral Control not being statistically significant could be due to the lack of participants in the study. Interestingly, when the Perceived Behavioral Control construct was eliminated from an additional analysis accessing the Attitude Toward Behavior and Subjective Norms constructs on intentions, both those two constructs then became statistically significant.

The Perceived Behavioral Control accounts for external and internal factors associated either the behavior or the intention to perform the behavior. To review, according to the Theory of Planned

Behavior, intention is the primary predictor of behavior and our research confirms Fishbein's (2007) theory. Results suggested both behavioral intention and perceived behavioral control were both statistically significant predictors of behavior. Although the Perceived Behavioral Control construct did not significantly predict the intention, it was a statistically significant predictor of the actual behavior. This indicates that while the participant does not take into account their internal or external beliefs about NSAID use when deciding whether or not to take the drug, these results demonstrate that these forces do act directly on an individual who will take the medicine. To sum it up differently, according to the results and the Perceived Behavioral Control construct, taking NSAIDs is more of a "game time" decision and based on the environment around the individual more so than it is something that is purposefully thought over.

### **Conclusion**

The use of the Theory of Planned Behavior in this study showed that the main predictor of Behavioral Intention is the Attitude Toward Behavior. Concluding that despite internal or external pressures and their referent's approval (or disapproval), the biggest contributor to an athlete's intention is their personal value of the NSAIDs. Previous literature gives evidence of athletes misusing NSAIDs in order to continue playing through injuries in order to make it to game day (Diacin et. Al, 2003; Tricker, 2000). This study also supports this conclusion with more athletes taking NSAIDs before practice than game day. With NSAIDs being the most commonly used drug amongst athletes, it is essential to ensure athletes are taking them for the correct reasons. To better understand why athletes take NSAIDs it is necessary to understand their intentions and what influences their behaviors.

### **Future Research**

Future research could focus on getting more students involved in the study to gather data. This could possibly help boost response rates and strengthen the results. Also, for further research additional

survey development could be executed to ensure validity and reliability. Additional data could be gathered from more than one Division III institution to compare how various demographics affect an athletes' behaviors and perceptions of NSAIDs. Another line of research could include examining the Perceived Behavioral Control construct further to assess whether specifically it is the internal or external forces that act on a person and their intentions.

### **Limitations**

There are several limitations to this study. One limitation of this research is attributable to low response rate (37%) and participation (n=77). Due to the lower response rate the results from this study may not be a good representation of this DIII athletic department. The monothematic nature of the project only allows the respondent to answer the question within the given responses. Social desirability may be another limitation to this study. This occurs when participants respond in accordance to social norms, over reporting social acceptable behaviors and under reporting socially undesirable behaviors (Colton & Covert, 2007). Also due to the closed-survey format of this questionnaire, the responses were limited and additional input was not recorded. The self-reporting nature of the survey instrument enabled athletes to skip questions resulting in missing data.

Data collection occurred during the current spring semester to reduce or prevent recall bias. When a respondent forgets and cannot remember an event or behavior, this can increase the chances of recall bias and as a result, lessen the strength of the results (Portney & Watkins, 2000). Although the survey was sent to the athletic director for dispersal to the identified athletic head coaches and teams, it was still up to the coaches to send the survey out to their respective athletes. In some instances, the survey was only sent out once instead of three times to specific sport's teams. The coaches also had the choice not to send it to their team if they so choose. This step was out of the researcher's control and they relied on the coach's participation as well.

[Appendix A]

## The Perceptions of NSAID Use Among One Midwestern D3 Athletic

Please answer the questions below as they relate to your behavior, perceptions, and knowledge. Even if you do not take NSAIDS, please answer these questions to the best of your ability. By completing this form you acknowledge participating in this confidential and anonymous survey. Only grouped responses will be reported. Thank you for your participation.

Nonsteroidal Anti-inflammatory Drugs (NSAIDs) are a class of painkillers used to treat a variety of conditions which include: treatment of pain, soft tissue swelling, fever, sprains, and strains. Some common NSAIDs include: Ibuprofen, Advil, Motrin, Motrin IB, Aspirin, Bayer, and Excedrin. Your responses will be kept confidential.

---

**1. Select the NSAID(s) you take?**

I do not take NSAIDs (Skip to question 5)

I take NSAIDs for athletic related issues

I take NSAIDs for additional reasons (please specify)

Other (please specify)

**2. Are you concerned about the frequency in which you use NSAIDs?**

Yes

No

I do not use NSAIDs

**3. Have you previously heard about athletes at Otterbein using more than the recommended dose of NSAIDs?**

Yes

No

**4. Please check the box that best corresponds with your behavior.**

**If you do not use NSAIDs (skip to question 8).**

	Always	Frequently	Sometimes	Never	I do not use NSAIDs
I use NSAIDs before practice:	<input type="checkbox"/>				
I use NSAIDs after practice:	<input type="checkbox"/>				
I use NSAIDs before a game:	<input type="checkbox"/>				
I use NSAIDs after a game:	<input type="checkbox"/>				

## The Perceptions of NSAID Use Among One Midwestern DIII Athletic

**7. Although the therapeutic effects of these drugs may help relieve pain and discomfort for an athlete, there are also side effects associated with the use of these drugs. Based on your knowledge, which of the following are side effects of NSAIDs. (Choose all that apply).**

- Sterility
- Prolonged bleeding
- Allergic Reactions
- Stomach Irritations
- Kidney Dysfunction
- Reye's Syndrome \*Reye's Syndrome is sudden brain damage and liver function problems

**8. In your opinion what percent of your teammates are taking NSAIDs on a regular basis?**

- 0%
- 1-25%
- 26-50%
- 51-75%
- 76-100%
- Not Sure

**9. From what source do you most frequently get your NSAIDs? (check all that apply).**

- From a physician
- From the athletic trainer
- From my parents
- From teammates
- From friends
- I buy them over the counter

Other (please specify)

## The Perceptions of NSAID Use Among One Midwestern DIII Athletic

**10. Please check the box that best corresponds to your level of agreement or disagreement with each of the following statements:**

	Strongly Disagree	Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
My coach approves of me taking NSAIDs before a game:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My athletic trainer approves of me taking NSAIDs before a game:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The people I value in my life approve of me taking NSAIDs before every game:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My teammates approve of me taking NSAIDs before a game:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My girlfriend/ boyfriend approves of me taking NSAIDs before a game:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My best friend approves of me taking NSAIDs before a game:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**11. Please answer each of the following questions by selecting the number that best describes your opinion. Some of the questions may appear to be similar, but they do address somewhat different issues. Please read each question carefully. Please pay attention to the scales as they vary per question.**

**For me to take NSAIDs on game day is:**

	Unfavorable (1)	2	3	4	5	6	Favorable (7)
<input type="radio"/>							

**12. For me to take NSAIDs on game day is:**

	Bad (1)	2	3	4	5	6	Good (7)
<input type="radio"/>							

**13. For me to take NSAIDs on game day is:**

	Harmful (1)	2	3	4	5	6	Beneficial (7)
<input type="radio"/>							

**14. For me to take NSAIDs on game day is:**

	Unimportant (1)	2	3	4	5	6	Important (7)
<input type="radio"/>							

## The Perceptions of NSAID Use Among One Midwestern DIII Athletic

### 15. For me to take NSAIDs on game day is:

	Unhelpful (1)	2	3	4	5	6	Helpful (7)
<input type="radio"/>							

### 16. Access to NSAIDs is:

	Difficult (1)	2	3	4	5	6	Easy (7)
<input type="radio"/>							

### 17. Taking NSAIDs is:

	Difficult (1)	2	3	4	5	6	Easy (7)
<input type="radio"/>							

### 18. The belief in my ability to take NSAIDs is:

	Not Under my Control (1)	2	3	4	5	6	Under my Control (7)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### 19. When I take NSAIDs it is:

	Not Under my Control (1)	2	3	4	5	6	Under my Control (7)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### 20. For me to refuse NSAIDs is:

	Not Under My Control (1)	2	3	4	5	6	Under my Control (7)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### 21. Please select the box that best corresponds to your level of agreement with each statement:

	Strongly Disagree	Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
I intend to take NSAIDs on the next game day.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I plan to abstain from taking NSAIDs on the next game day.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I will take NSAIDs on the next game day.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I intend to take NSAIDs on the next game day regardless if I need it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## The Perceptions of NSAID Use Among One Midwestern DIII Athletic

### 22. What is your gender?

- Male
- Female
- Transgender

### 23. What is your age?

### 24. What year are you in school?

- 1st year
- 2nd year
- 3rd year
- 4th or greater

### 25. Select the primary sport you play.

- Baseball
- Basketball
- Golf
- Lacrosse
- Softball
- Tennis
- Track and Field

### 26. Do you have any comments you would like to share?

Thank you very much for completing this survey!

## [Appendix B]

Date

First Name, Last Name, Degree

Address 1

Address 2

City, State, Zip

Dear \_\_\_\_\_,

I am an undergraduate student at Otterbein University working with Rob Braun, PhD, MPH, CHES and am asking for your help in evaluating a questionnaire to be used in my research project. The primary purpose of this research is to explore the knowledge, perceptions, and attitudes of Division 3 college athletes and Nonsteroidal Anti-Inflammatory drugs based on constructs within the Theory of Planned Behavior (TPB). The questionnaire items are as follows:

**Questions #1 – 4** pertain to the athlete's behavior.

**Question #5-9** pertain to the athlete's knowledge and attitude of NSAIDs.

**Question #10** - based on the Subjective Norm construct within the TPB.

**Question #11**- based on the Attitude toward the Behavior construct within the TPB.

**Question #12-17** based on the Perceived Behavioral construct within the TPB.

**Question #19-22** – pertain to demographic questions.

We used the following definitions to operationalize our constructs:

- Attitude toward the behavior - *The degree to which the performance of the behavior is positively or negatively valued*
- Subjective norm– *Social pressure to perform or not perform the behavior*
- Perceived behavioral- *Individuals perceive ease or difficulty in performing a behavior*
- Behavioral Intention- *readiness to perform a given behavior*

When reviewing the questionnaire, please consider doing the following:

1. Write on the survey
2. Draw a line through any question or statement that is irrelevant
3. Add any additional items or comments

I know you are busy and I greatly appreciate your time and support. Thank you in advance for your consideration of my request. Hopefully you will be able to complete the review in the next week and return it in the postage paid envelope.

Sincerely,

Katherine Cialella  
Allied Health, 2015  
Otterbein University

Rob Braun, PhD, MPH, CHES  
Assistant Professor  
Otterbein Universi

## INSTITUTIONAL REVIEW BOARD OTTERBEIN UNIVERSITY

### Application Forms

Please read the Guidelines for Submission of Protocols carefully prior to completing the attached materials. Per the Guidelines, determine if your submission is for expedited or complete committee review. Requests for both full and expedited review must follow the same procedures, with the exception that a request for expedited review must be indicated on the "Cover Page of Summary Sheets."

The following materials are required to support the review process of the IRB Committee. **Please type.**

1. **SUMMARY SHEETS:**
  - a. Cover Page for Summary Sheets must include original signatures of the principal and co-investigators. (If student, advisor must be listed as principal investigator.)
  - b. The Summary Sheets include 17 questions regarding subject population, consent procedures, risks and benefits. Complete each section. Do not leave any question unanswered.
2. **ABSTRACT OF THE STUDY.**
3. **ORAL AND/OR WRITTEN INSTRUCTIONS TO SUBJECTS.** Please provide an outline or script of the information which will be provided to subjects prior to their volunteering to participate. (Please note: Subjects must be informed about the nature of what is involved as a participant, including a description of anything they might consider to be unpleasant or a risk.) Include a copy of the written solicitation and an outline of the oral solicitation when applicable. If you are recruiting by means of a "sign-up sheet," please attach a copy of that sheet.
4. **Consent form**, if required, should be included. Please note that the person obtaining consent shall sign a copy of the cover sheet for the summary sheets.

Only protocols that are complete as defined below will be scheduled for review. Incomplete protocols will be returned to the principal investigator.

**FOR EXPEDITED REVIEW, SUBMIT ONE COPY OF THE COMPLETE PROTOCOL –**

(Summary Sheets including original signatures, oral/mailed instructions to subjects, questionnaires-instruments, consent form, and abstract) as defined above to:

**FOR FULL COMMITTEE REVIEW SUBMIT SIX (6) COPIES OF THE COMPLETE PROTOCOL –**

(Summary Sheets including original signatures, oral/mailed instructions to subjects, questionnaires-instruments, consent form, and abstract) as defined above to:

Noam Shpancer  
Psychology Department

Otterbein University  
Institutional Review Board

Office Use:  
Protocol No.  
Date Received:

Cover Page for  
SUMMARY SHEETS

Principal Investigator(s): Rob Braun, PhD, MPH, CHES \_\_\_\_\_  
(If student, list advisor's Name Signature  
name first)

Katherine Cialella \_\_\_\_\_  
Name Signature

PI Academic Title: Assistant Professor Phone No. 614.823.3535

Department : Health and Sport Science

Campus Address: Rike Center 226 \_\_\_\_\_  
(Faculty Member's Campus Address)

**PROPOSAL TITLE: The Misperceptions of Nonsteroidal Anti-inflammatory Use Among One  
Midwestern D3 Athletic Department**

Are you applying for expedited review? If so, indicate, by number, the category from the Guidelines  
material entitled "Research Eligible for Expedited Review" which best describes your project.

3

Is there outside funding for the proposed research? If so, please indicate the source:  
No

When do you plan to begin collecting data? **August 2014**

When do you plan to finish collecting data? **December 2014**

Revised September 2010

OTTERBEIN UNIVERSITY INSTITUTIONAL REVIEW BOARD

RESEARCH SUMMARY SHEETS

Be specific about exactly what subjects will experience when they participate in your research, and about the protections that have been included to safeguard them. Careful attention to the following may help facilitate the review process.

1. In a sentence or two, describe the background and purpose of the research.

**To compare the usage of NSAIDs among different athletic teams. To gain insight on Division 3 athletes' views and opinions of NSAIDs. To determine if the doses taken are aiding or impairing an athlete's performance.**

2. Briefly describe each procedure or manipulation to be implemented that will impact subjects included within the study.

**The procedure of this study will include attending athletic team meetings in fall semester. The meeting will begin with an introduction by Dr. Braun and myself and purpose of study will be explained. It will be addressed that this study is optional, confidential, and names are not required. The survey instrument will be dispersed and subjects have the option complete the survey or not participate in the study. From the amount of surveys returned the response rate of the study will be determined. Based on the results descriptive and inferential statistics will be computed to determine themes or statistical significance.**

3. What measures or observations will be taken in the study? If any questionnaires, tests, or other instruments are used, provide a brief description and include a copy for review.

**Measures and observations in this study will be accomplished through the survey instrument. See attached document.**

4. Who will be the subjects in this study? How will they be solicited or contacted?

**The subjects in the study will include all Otterbein athletics. They will be contacted through email and asked if they would like to participate in this study.**

5. What steps will be taken to insure that each subject's participation is voluntary? What, if any inducements will be offered to the subjects for their participation?

**No inducements will be offered for participation. The students have the option to not participate if they choose so.**

6. If there are any risks involved in the study, are there any offsetting benefits that might accrue to either the subject or society?

**There are no risks involved in this study. Information collected will ask about current habits and views of NSAIDs**

<p>7. Approximately how much time will be demanded of the subject?</p> <p><b>The survey should not take longer than take 10-20 minutes to complete.</b></p>	<p><b>Yes</b></p>	<p><b>No</b></p>
<p>8. Will the subjects encounter the possibility of psychological, social, physical or legal risk? If yes, please describe.</p>		<p>✓</p>
<p>9. Will any stress to subjects be involved?</p>		<p>✓</p>
<p>10. Will the subjects be deceived or misled in any way?</p>		<p>✓</p>
<p>11. Will there be a request for information which subjects might consider to be personal or sensitive? If yes, please describe.</p>		<p>✓</p>
<p>12. Will the subjects be presented with materials which they might consider to be offensive, threatening, or degrading? If so, please describe.</p>		<p>✓</p>
<p>13. a. Under federal law 45CFR 46.116.d.1-4 informed consent may be waived if the research involves no more than minimal risk to the subjects. (Please see Guidelines for Submission of Protocols for definition of minimal risk.) Will a written consent form be used? If so, please include the form. If no, please answer b.</p>		<p>✓</p>
<p>13. b. Will you insure that the subjects give their verbal consent prior to participating?</p>	<p>✓</p>	
<p>14. If you are recruiting students who are participating for either fulfillment of a course requirement or for extra credit, will an alternative assignment be provided for those students who do not wish to participate?</p>		<p>✓</p>
<p>15. Other than for class requirement or for extra credit, will the fact that a subject did or did not participate in a specific experiment or study be shared with a supervisor, teacher or employer?</p>		<p>✓</p>
<p>16. Will subjects' contributions to the research (data base) be kept confidential?</p>	<p>✓</p>	
<p>17. Will any data from files or archival data be used?</p>	<p>✓</p>	

## Abstract

Nonsteroidal anti-inflammatory drugs (NSAIDs) are commonly used amongst athletes for a variety of reasons. The purpose of this research is to compare the usage of NSAIDs among different athletic teams, gain insight on Division 3 athletes' views and opinions of NSAID, and to determine if the doses taken are aiding or impairing an athlete's performance. The population participating in this study will include Ottebein's athletic department. The procedure taken to collect data for this study will consist of distributing the survey instrument during athletic meetings, giving survey instructions, reassuring that all data will remain confidential, and collecting the survey after 15 minutes. The survey instrument consists of a 35 questions of which 22 of the questions are related to Theory of Planned Behavior. Based on the results descriptive and inferential statistics will be computed to determine themes or statistical significance. Results and Discussion to be written.

## Oral Instructions

- I. Hello my name is Katherine Cialella and I am a senior Allied Health student working on a research project with Dr. Braun. The questionnaire I will be handing out evaluates athlete's behavior, perceptions, and knowledge of Nonsteroidal Anti-inflammatory drug usage. Your responses will be kept confidential. Only grouped responses will be reported.
- II. I will distribute the survey to everyone. Please review the directions and the informed consent on the top first page. Whether you choose to participate or not in this study, please place the survey in the box in the front of the classroom when finished. Thank you for your help.

[Appendix D]

INSTITUTIONAL REVIEW BOARD  
RESEARCH INVOLVING HUMAN SUBJECTS  
OTTERBEIN UNIVERSITY

- Original Review
- Continuing Review
- Five-Year Review
- Amendment

ACTION OF THE INSTITUTIONAL REVIEW BOARD

With regard to the employment of human subjects in the proposed research:

HS # 14/15-06

**Braun & Cialella: The Misperceptions of Nonsteroidal Anti-Inflammatory Use Among One ...**

THE INSTITUTIONAL REVIEW BOARD HAS TAKEN THE FOLLOWING ACTION:

- Approved
- Disapproved
- Approved with Stipulations\*
- Waiver of Written Consent Granted
- Deferred

\*Stipulations stated by the IRB have been met by the investigator and, therefore, the protocol is APPROVED.

It is the responsibility of the principal investigator to retain a copy of each signed consent form for at least four (4) years beyond the termination of the subject's participation in the proposed activity. Should the principal investigator leave the college, signed consent forms are to be transferred to the Institutional Review Board for the required retention period. This application has been approved for the period of one year. You are reminded that you must promptly report any problems to the IRB, and that no procedural changes may be made without prior review and approval. You are also reminded that the identity of the research participants must be kept confidential.

Date: 5 September 2014

Signed:   
Chairperson

## [Appendix E]

### NSAID Use in DIII Athletics

Hello,

My name is Katherine Cialella, and I am a senior Allied Health student working on a research project with Dr. Rob Braun. We are interested in assessing the behavior, perceptions and knowledge of Division III college athletes and Nonsteroidal Anti-Inflammatory Drugs (NSAIDs). Your participation will include completing an online survey about your beliefs and behavior towards NSAIDs. Completing this survey will take no more than 10 minutes of your time. We believe that the information will be useful in evaluating the perceptions and use of NSAIDs among athletes. Your participation is solicited, although strictly voluntary.

Additionally, we received IRB approval for this research project. By clicking on the link below you agree to participate in this research project. You should be aware that even if you agree to participate, you are free to withdraw at any time without penalty.

We also assure you that your name will not be associated in any way with the research findings. If you would like additional information concerning this study before or after it is complete, please feel free to contact me by phone [330-819-6737](tel:330-819-6737) or email [Katherine.cialella@otterbein.edu](mailto:Katherine.cialella@otterbein.edu)

<https://www.surveymonkey.com/s/GYDP2KF>

Thank you,  
Katherine Cialella

## References

- Armitage, C., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology, 40*(4), 471-499.
- Chen, M., & Dragoo, J. (2013). The effect of nonsteroidal anti-inflammatory drugs on tissue healing. *Knee Surgery, Sports Traumatology, Arthroscopy, 21*(3), 540-549.
- Colton, D., & Covert, R. (2007). *Designing and constructing instruments for social research and evaluation*. San Francisco, CA: Jossey-Bass.
- Correa, C., Cadore, E., Bijoldo, J., Da Silva, E., Pinto, R., de Oliveira, Á., & Martins, L. (2012). The effects of ibuprofen on muscle performance, workload and plasma creatine kinase during a strength training session. *Medicina Sportiva, 16*(1), 17-21.
- Diacin, M. J., Parks, J. B., & Allison, P.C. (2003). Voices of male athletes on drug use, drug testing, and the existing order in intercollegiate athletics. *Journal of Sport Behavior, 26*, 1-16.
- Division III. (n.d.). Retrieved November 26, 2014, from <http://www.ncaa.org/about?division=d2>
- Donnelly, A., Maughan, R., & Whiting, P. (1990). Effects of ibuprofen on exercise-induced muscle soreness and indices of muscle damage. *British Journal Of Sports Medicine, 24*(3), 191-195.
- Fishbein, M. (2007). Theory of reasoned action, theory of planned behavior, and the integrated behavioral model. In K. Glanz, B. Rimer, & F. Lewis (Eds.), *Health behavior and health education: Theory, research, and practice* (pp. 67-92). San Francisco, CA: Jossey-Bass.
- Ho, A. M., Bedair, H., Fu, F. H., & Huard, J. (2004). The role of non-steroidal anti-inflammatory drugs (NSAIDs) after acute exercise-induced muscle injuries. *International Sportmed Journal, 5*(3), 209-227
- Houglum, J. E. (1998). Pharmacologic Considerations in the Treatment of Injured Athletes with Nonsteroidal Anti-Inflammatory Drugs. *Journal of Athletic Training, 33*(3), 259-263.

- Krentz, J. R., Quest, B., Farthing, J. P., Quest, D. W., & Chilibeck, P. D. (2008). The effects of ibuprofen on muscle hypertrophy, strength, and soreness during resistance training. *Applied Physiology, Nutrition & Metabolism*, 33(3), 470-475.
- Lovatt, P. (2010). Ibuprofen for mild to moderate pain, inflammation and fever. *Nurse Prescribing*, 8(11), 544-546.
- Lu, F. J., Hsu, Y., Chan, Y., Cheen, J., & Kao, K. (2012). Assessing College Student-Athletes' Life Stress: Initial Measurement Development and Validation. *Measurement In Physical Education & Exercise Science*, 16(4), 254-267.
- Mehallo CJ, Drezner JA, Bytomski JR. Practical Management: Nonsteroidal Anti-inflammatory Drug (NSAID) use in athletic injuries. *Clin J Sport Med*. 2006; 16:170-174
- Mertler, C., & Vannatta, R. (2002). *Advanced and multivariate statistical methods* (2<sup>nd</sup> ed., p. 201). Los Angeles, CA: Pyrczak Publishing.
- Montano, D. E., & Kasprzyk, D. (2008). Theory of reasoned action, theory of planned behavior, and the integrated behavioral model. In K. Glanz, B. Rimer, & F. Lewis (Eds.), *Health behavior and health education: Theory, research, and practice* (pp. 67-92). San Francisco, CA: Jossey-Bass.
- Portney, L. G., & Watkins, M.P. (2000). *Foundations of clinical research applications to practice* (2nd ed.). Upper Saddle River, NJ: Prentice Hall Health.
- Smith, B., & Collina, S. (2007). Pain medications in the locker room: to dispense or not. *Current Sports Medicine Reports*, 6(6), 367-370.
- PAWLAK, M. (2013). Aspects of pain in sport. *Trends In Sport Sciences*, 20(3), 123-134.
- Stasio, M. J., Curry, K., Sutton-Skinner, K. M., & Glassman, D. M. (2008). Over-the-Counter Medication and Herbal or Dietary Supplement Use in College: Dose Frequency and Relationship to Self-Reported Distress. *Journal Of American College Health*, 56(5), 535-548.

Tricker, R. (2000). Painkilling drugs in collegiate athletics: knowledge, attitudes, and use of student athletes. *Journal Of Drug Education*, 30(3), 313-324.

Warner DC, Schnepf G, Barrett MS, et al, Prevalence, attitudes, and behaviors related to the use of nonsteroidal anti-inflammatory drugs (NSAIDs) in student athletes. *J Adolesc Health*. 2002;30:150-153