PERCEIVED HEALTH-RELATED QUALITY OF LIFE AND THE ACCESS TO HEALTH CARE AMONG COLLEGIATE DANCE TEAM MEMBERS

by

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DEDICATION

Mom, I dedicate this to you, because you have dedicated your entire life to your children. You sacrificed your own dreams and comfort to make sure we had a safe environment to thrive and succeed. When life became tough and many would have given up, you pushed harder and made a way. I pray every day that you genuinely recognize the direct influence your sacrifices had on this accomplishment. I am forever thankful.

ACKNOWLEDGEMENTS

I give all of the glory of this master's thesis to Jesus Christ, my Lord and Savior. It has been a challenging two years; however, I am appreciative of them.

To my co-chair Dr. Rod Harter, I am thankful for your commitment to not only my thesis project, but also both Texas State athletic training programs. You have taken on many roles during this time of transition, and work tirelessly to accomplish every task in front of you. Thank you for the late nights of editing and replies to my many questions. None of your hard work goes unnoticed, and I am truly grateful for all that you do. To my co-chair Dr. Luzita Vela, your willingness to help my classmates and me through our projects after moving was such a kind gesture. You are such a beautiful soul and left your mark on my class during the one year we had together. I would like to express my sincere appreciation for your expertise and guidance with this survey study, because without you this would have been a bit more challenging. Dr. Darcy Downey, my mentor and saving grace, you have been a blessing in so many ways. Thank you for keeping me on track, always having an available ear for me talk to, and being my voice of reason.

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LIST OF ABBREVIATIONS

Description	Abbreviation
Affordable Care Act	ACA
Athletic Trainer(s)	AT(s)
Evidence Based Practice	EBP
Health related quality of life	HRQOL
Disability in the Physically Active scale	DPA
Modified Patient Satisfaction Questionnaire	M-PSQ
National Collegiate Athletic Association Injury Surveillance System	NCAA ISS
Patient Satisfaction Questionnaire-18	PSQ-18
The Medical Outcomes Study Short Form Health Survey, version 2	SF-36v2

ABSTRACT

Context: Health-related quality of life (HRQOL) and a patient's perception of health care satisfaction are two common outcome measures associated with the sports injury treatment process. Dancers and more specifically, female collegiate dance team members are a historically understudied group in which the interrelationship of these two concepts has not been documented. **Objective**: To investigate the HRQOL of members of collegiate dance teams as assessed by the SF-36 and the Disability in the Physically Active (DPA) questionnaires. Secondary purposes of this study were to survey collegiate dance team members' perceptions of the health care satisfaction, and to identify their levels of satisfaction with the health care services available to them, as assessed by the Modified Patient Satisfaction Questionnaire (M-PSQ) instrument. **Design**: Cross-sectional descriptive study. **Setting**: Field-based survey. **Patients or Other Participants**: A convenience sample of 179 dancers from 5 college-level dance teams in Texas participated in this study. To qualify for inclusion in this study, the dancers had to be official members of their school's dance team, and currently performing or on the current roster before incurring a season-ending injury. **Interventions**: Four pencil-and-paper questionnaires were administered to all of the members of the collegiate dance teams surveyed. A brief questionnaire was also given to each school's dance team instructor/coordinator. **Main Outcome Measures**: The Short Form Health Study-36v2 (SF-36-v2), the Disability in the Physically Active scale (DPA), and the Modified Patient Satisfaction Questionnaire (M-PSQ) were key outcome measures. Secondary measures

included the prevalence of health insurance coverage, and the availability of an athletic trainer and/or team physician. **Results**: Of the 179 collegiate dance team members surveyed, 95.6% (n = 171) currently had health insurance coverage and 81.6% (n = 146) indicated that they had access to medical services provided by athletic trainers. However, 74% (n = 133) responded that their preferred health care providers in the event of an injury would be their family physicians. Significant between-group differences were noted in three SF-36 v2 subscales (physical role limitations, bodily pain, general health), and the physical component scores of the injured dancers compared to their healthy counterparts ($p < 0.05$). Healthy collegiate dancer team members showed higher trends of satisfaction with health care providers compared to their injured counterparts; however, there were no statistically significant differences on any of the other outcome measures ($p > 0.05$). **Conclusions:** To our knowledge, this study is the first of its kind to investigate the incidence of injuries, perceptions of HRQOL, and health care satisfaction among female intercollegiate dance team members. Collegiate dancers remain an understudied population that could benefit from inclusion in existing national sports injury epidemiology programs such as the NCAA Injury Surveillance System.

Key Words: patient satisfaction, SF-36, evidence based medicine, drill team

I. INTRODUCTION

Multiple reports over the last 40 years indicate that the lifetime injury incidence among all dancers is as high as 90%.[1-4] This high incidence of injury supports the premise that this population unceasingly suffers from dance-related injuries while performing and perfecting their craft.[5] Physical and psychological concerns are hypothesized to be highly related to injury in many sports.[6] Physical factors could be muscular imbalance, improper posture, nutrition, or poor training surfaces, and psychological factors could be poor self-image or life events that deter focus from dance.[6] Injury of collegiate dancers is historically understudied, only 3 published peer-reviewed studies of this population were found including anterior cruciate ligament injury, lumbar lordosis, and shoulder injuries.[7-9] Other previous studies of dancers have examined psychological concerns such as burnout, trait anxiety, state anxiety, performance anxiety, and negative affect.[1,5,7,8,10-14]

Collegiate dancers often lack recognition as a sanctioned athletic sport with Intercollegiate Athletics so may not receive the same access to healthcare services afforded to other collegiate athletes. At present we have an incomplete understanding of the type, severity, and overall incidence of musculoskeletal injuries in the collegiate dance team population. [1,4,13,15-18]

Dancers are athletes who are capable of pushing both anaerobic and aerobic limits. [13,15,18-21] Studies have reported that individuals with varying dance styles have VO_{2max} scores ranging between 37.3-51.0 $ml \cdot kg^{-1} \cdot min^{-1}$ and heart rate max was between 190-200bpm.[22-24] Collegiate cheerleaders averaged 40.7±5.8 $ml \cdot kg^{-1} \cdot min^{-1} VO_2$ Max.[25] Artistic interpretation opposed to consistent head-to-head competition is the main difference between traditional athletes and dancers. However, collegiate dance teams

compete annually in a variety of regional and national dance competitions.[26] The dance team members are often pushed to their anatomical limits at an excessive and rapid pace, with practices lasting 5 or more hours a day, therefore, greatly increasing the risk of injury.[13]

The National Collegiate Athletic Association Injury Surveillance System (NCAA ISS) was developed in 1982 to provide current data on sports injury trends in intercollegiate athletics, and currently collects and reports injury statistics on 25 different sports across all divisions with 375,000 student athlete participants.[27,28] Unfortunately, intercollegiate dance teams are not included in this database. Injury, as defined by the NCAA ISS, is one that occurred during an organized, university related activity that resulted in an absence from participation for at least one day after the date of the injury.[27,29] Female gymnasts are included in the NCAA ISS database, but were the only group without an "equivalent" or pair during analysis, but could easily be grouped with dancers and cheerleaders if they were tracked. [30,31]

The injuries commonly seen among modern dance team members are overuse in nature and could be mitigated or prevented with the availability of the proper health care providers.[4,26] For example, Bronner et al., studied 42 dancers over a 5 year period, and found that 34% of lower extremity injuries were ankle and foot, and 17% were lumbo-pelvic.[4] Bronner et al. also studied 7 Broadway dancers over a 7 week period, totaling 1,680 individual performances, and noted that 50% of injuries were combined ankle and foot, followed by 34% lumbo-pelvic, 8% knee, and 8% calf region.[32] Health care providers need a thorough understanding of dance techniques to properly instruct and teach the dancers injury preventative exercises, as well as implement functionally sound

rehabilitation programs.[1,33] As a health care provider it is understood that no two patients present themselves identically in clinic, and this is an important point to remember when caring for dancers. Dancers are unique in the fact that their bodies move and function differently than the common collegiate athletes. For example, a grade 2 metatarsal-phalangeal joint sprain to a football lineman may not be reported to his team's medical staff, however upsetting to a soccer player, and devastating to a dancer due to the immense amount of time spent on their toes.[13]

Health care satisfaction, as defined by Hostutler et al., occurs when the patient feels that their expectations, needs, and perceptions of health care were met.[34] However, a lack of appreciation and understanding of dancers and their art as a sport are cited as reasons why many of these dancers are hesitant to seek medical attention.[15,18,19] Among dancers, ballerinas have been most often studied in injury research, and are often characterized as "difficult" and "mistrusting".[18] This misconception has evolved from a common misunderstanding and lack of knowledge about their specific healthcare concerns and needs.[18] Trust is ultimately gained between dancer and clinician when there is an open line of communication and understanding of their bodies, dance technique, culture, and mentality.[18] Patient's satisfaction with available health care is related to the perception of quality of care provided. Positive patient health care satisfaction will often lead to proper health care selection and recommendations to others in the future.[35] Therefore, understanding a dancer's expectations, needs, and perceptions is critical for identifying the weaknesses or gaps in health care currently provided to them individually. Once health care weaknesses are identified when caring for dancers, improvements can be implemented.[36]

Air et al. recently found that 47.5% of 177 injured dancers who visited a medical clinic for dancers and musicians considered their dance director to be their first option for seeking medical treatment, followed by physical therapists (30%), a physician (12.5%), and lastly, fellow dance colleagues (10%). Interestingly enough these dancers were seeking a majority of treatment advice from individuals with little to no medical training at all. These authors noted that the dancers' prior knowledge about medical help available and/or medical insurance could have affected the outcome of their study, but supports the need of access to proper health care.[13,33]

Evidence based practice (EBP) is a multifaceted approach utilizing current evidence in conjunction with patient values and clinical expertise.[37] This practice is common in the medical profession; however, the sports medicine community is currently transitioning more heavily into integrating EBP into clinical practice. The key to a better understanding in the medical profession is not only utilizing objective disease-oriented evidence, but utilizing EBP to assess both patient-reported outcomes and disease-oriented evidence during patient care.[38] The application of EBP principles is vital to gaining patient trust in, and satisfaction with their available health care, and also creates a checks-and-balance system that helps practitioners successfully navigate through the treatment of injuries.[39] Underutilization of EBP is often credited to lack of time, resources, and practitioner understanding of the topic. The sports medicine community is currently shifting the culture of understanding and utilization of this practice by stressing EBP in school and professional conferences. The research is growing tremendously, however, there will be trouble implementing EBP if there is a lack of knowledge about specific athletic groups such as dance.[40]

More specifically, health-related quality of life (HRQOL) is an important subjective patient-based component to EBP that investigates personal experience, beliefs, and perceptions.[39] A practitioner can take into consideration the subjective data to better understand their overall view of life and well-being during injury.[39,41,42] Dancers often view their individual sports as their identity, and long periods of absence could lead to an "identity crisis" if not handled properly. The dancers become more involved with their treatment plan when the HRQOL is implemented by allowing them to set goals and visualize the treatment progress on paper.[41,43] Recent surveys have examined the physical, psychological, and social aspects of health during normal daily activities, and have been used in adults, adolescents, and various athletic populations.[44-46] Sorensen et al. created the Trojan Lifetime Champions Health Survey that proved valid and reliable in athletic and non-athletic populations; however, more research is needed to make the data generalizable.[44] Simon et al. noted that while using the Patient-Reported Outcomes Measurement Information System (PROMIS) there was a significant lower quality of life in athletes compared to non-athletes.[46]

Despite the existing evidence on injuries in a majority of ballet dancers, it is unclear how disability and HRQOL after injury affect the dancers of all backgrounds, but more specifically collegiate dancers.[13] The primary purpose of this study will be to investigate the HRQOL of collegiate dance team members as assessed by the Short Form-36v2 and Disability in the Physically Active (DPA) instruments. Healthy and injured collegiate dancers' SF-36v2 and DPA scores were compared to those of other intercollegiate athletes. The secondary purposes of this study were to survey collegiate dance team members' perceptions of the health care available to them, and to identify

their levels of satisfaction with the health care services provided as assessed by the Modified Patient Satisfaction Questionnaire (M-PSQ) instrument.

Following the successful defense of this master's thesis, the manuscript from this research study will be submitted for review and publication to the *Journal of Athletic Training*. The abstract will also be submitted to the National Athletic Trainers' Association by the November 2016 deadline for review for presentation at the 68th Annual Meeting to be held in Houston, Texas from June 26-29, 2017. An abstract of this research study will also submitted by the May 2017 deadline for presentation at Southwest Athletic Trainers' Association annual meeting to be held in San Marcos, Texas from July 20-22, 2017.

II. MANUSCRIPT

PERCEIVED HEALTH-RELATED QUALITY OF LIFE AND THE ACCESS TO HEALTH CARE AMONG COLLEGIATE DANCE TEAM MEMBERS

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Abstract

Context: Health-related quality of life (HRQOL) and a patient's perception of health care satisfaction are two common outcome measures associated with the sports injury treatment process. Dancers and more specifically, female collegiate dance team members are a historically understudied group in which the interrelationship of these two concepts has not been documented. **Objective**: To investigate the HRQOL of members of collegiate dance teams as assessed by the SF-36 and the Disability in the Physically Active (DPA) questionnaires. Secondary purposes of this study were to survey collegiate dance team members' perceptions of the health care satisfaction, and to identify their levels of satisfaction with the health care services available to them, as assessed by the Modified Patient Satisfaction Questionnaire (M-PSQ) instrument. **Design**: Cross-sectional descriptive study. **Setting**: Field-based survey. **Patients or Other Participants**: A convenience sample of 179 dancers from 5 college-level dance teams in Texas participated in this study. To qualify for inclusion in this study, the dancers had to be official members of their school's dance team, and currently performing or on the current roster before incurring a season-ending injury. **Interventions**: Four pencil-and-paper questionnaires were administered to all of the members of the collegiate dance teams surveyed. A brief questionnaire was also given to each school's dance team instructor/coordinator. **Main Outcome Measures**: The Short Form Health Study-36v2 (SF-36-v2), the Disability in the Physically Active scale (DPA), and the Modified Patient Satisfaction Questionnaire (M-PSQ) were key outcome measures. Secondary measures included the prevalence of health insurance coverage, and the availability of an athletic trainer and/or team physician. **Results**: Of the 179 collegiate dance team members

surveyed, 95.6% (n = 171) currently had health insurance coverage and 81.6% (n = 146) indicated that they had access to medical services provided by athletic trainers. However, 74% (n = 133) responded that their preferred health care providers in the event of an injury would be their family physicians. Significant between-group differences were noted in three SF-36 v2 subscales (physical role limitations, bodily pain, general health), and the physical component scores of the injured dancers compared to their healthy counterparts ($p < 0.05$). Healthy collegiate dancer team members showed higher trends of satisfaction with health care providers compared to their injured counterparts; however, there were no statistically significant differences on any of the other outcome measures ($p > 0.05$). **Conclusions:** To our knowledge, this study is the first of its kind to investigate the incidence of injuries, perceptions of HRQOL, and health care satisfaction among female intercollegiate dance team members. Collegiate dancers remain an understudied population that could benefit from inclusion in existing national sports injury epidemiology programs such as the NCAA Injury Surveillance System.

Word Count: 440

Key Words: patient satisfaction, SF-36, evidence based medicine, drill team

Introduction

Dancers, specifically intercollegiate dance team members, are a historically understudied and underserved population. The few epidemiological studies that have been published over the last 40 years indicate that injury rates among dancers are high, ranging from 50% to 90%. Collegiate dancers often lack recognition as athletes at their respective universities and may not have access to the healthcare providers, like athletic trainers, that are afforded to other intercollegiate athletes. Dancers are athletes whose performances are not only aesthetically pleasing, but they themselves are capable of pushing both anaerobic and aerobic limits similar to athletes in organized sports. [13,15,18-21] At present there is an incomplete understanding of the type, severity, and overall incidence of musculoskeletal injuries among the collegiate dance team members. [1,4,13,15-18]

The National Collegiate Athletic Association Injury Surveillance System (NCAA ISS), developed in 1982, provides data on sports injury trends in intercollegiate athletics and currently collects injury statistics on 25 different sports across all divisions.[27,28] Unfortunately, intercollegiate dance teams are not included in this database. Injury, as defined by the NCAA ISS, is one that occurred during an organized, university related activity that resulted in an absence from participation for at least one day after the date of the injury.[27,28,47]

The injuries commonly seen among modern dance team members are overuse in nature and many could be mitigated with the availability of the proper health care providers.[4,26] Bronner et al. studied 42 dancers over a 5 year period, and found that 34% of lower extremity injuries were ankle and foot, and 17% were lumbo-pelvic.[4] Bronner et

al. also studied 7 Broadway dancers over a 7 week period, totaling 1,680 individual performances, and noted that 50% of injuries were combined ankle and foot, followed by 34% lumbopelvic, 8% knee, and 8% calf region.[32] However, health care providers need a thorough understanding of dance techniques to properly instruct and teach the dancers injury preventative exercises, as well as implement functionally sound rehabilitation programs.[1,33] Dancers are unique in the fact that their bodies move and function differently than the common collegiate athletes. For example, a grade 2 metatarsal-phalangeal joint sprain to a football lineman may not be reported to his team's medical staff, could however be upsetting to a soccer player, and devastating to a dancer due to the immense amount of time spent on their toes.[13]

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quality of care provided. Positive patient health care satisfaction will often lead to proper health care selection and recommendations to others in the future.[35] Therefore, understanding a dancer's expectations, needs, and perceptions is critical for identifying the weaknesses or gaps in health care currently provided to them individually. Once health care weaknesses are identified when caring for dancers, improvements can be implemented.[36]

Health-related quality of life (HRQOL) measures are important patient-rated outcomes critical in evidence-based practice (EBP) which investigates a patient's personal experience, beliefs, and perceptions.

Despite the available evidence on injuries in a majority of ballet dancers, it is unclear how disability and HRQOL after injuries occur affect the dancers of all backgrounds, but more specifically collegiate dancers.[13] Many collegiate dance team members use their physical and artistic skills to earn a college degree in dance, and go on to become professional performers and/or dance directors. The primary purpose of this study is to investigate the HRQOL of collegiate dance team members as assessed by the Short Form-36, the Disability in the Physically Active (DPA) questionnaire, and the Modified Patient Satisfaction Questionnaire (M-PSQ). The secondary purposes of this study is to survey collegiate dance team members' perceptions of the health care available to them, and to identify their levels of satisfaction with the health care services provided.

Methods

Design

We administered a series of four pencil-and-paper questionnaires to collegiate dance team members in this cross-sectional descriptive study. We also sent a screening questionnaire to the dance teams' directors to gain information regarding available health care providers to their teams, weekly practice schedules, and performance trends. Our intent was to determine the health related quality of life among college dance team members, and also measure the dancers' levels of satisfaction of current health care directly available to them.

Participants

As convenience sample of approximately 300 female dancers from 9 college-level dance teams in central Texas was recruited to participate in this study. Each intercollegiate dance team director received an e-mail from the principal investigator (JJL) requesting their team's participation in the study. The e-mail included statements about the project's approval in the exempt category from the Texas State University Institutional Review Board (IRB), the purpose of the study, the participant inclusion criteria, and a brief description about how this survey research study would be administered.

To qualify for inclusion in this study, the collegiate dance teams had to be geographically located within a 6-hour driving distance from the primary investigator's institution. This constraint was imposed in order to make it financially feasible for the principal investigator to be physically present during administration of the questionnaires. The dancers themselves must be official members of their school's dance team, and

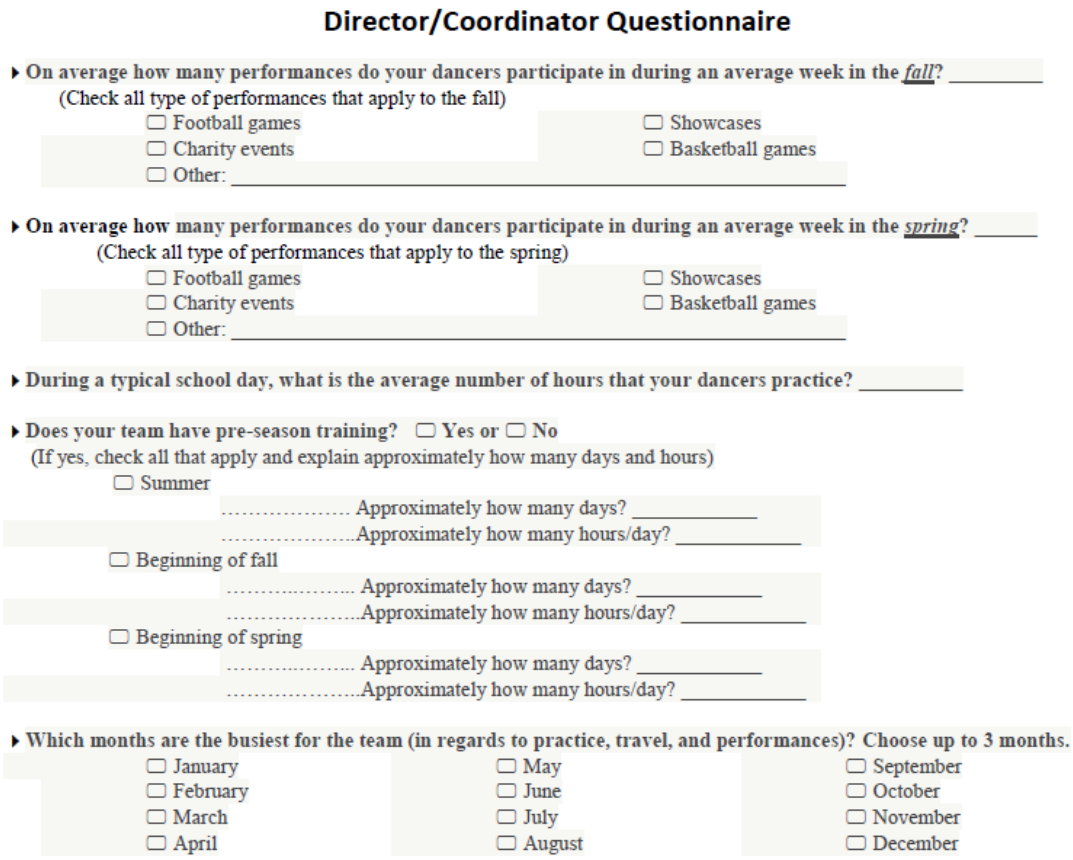
currently be performing at competitions and/or sporting events, or on the current drill team roster before incurring a season-ending injury.

Survey Instruments

The Dance Team Director/Coordinator Questionnaire was a 6-item short form that obtained the training and performance schedule for each respective team, and the director's preferred choice of referral for injured dancers (Figure 1).

A Dancer Demographic Questionnaire (Figure 2) was created expressly for this study and given to all participants in order to obtain personal information about the dancer's age and college class, e.g., freshman, sophomore. Other pertinent questions included the number of years of dance team experience, the types of dance styles studied, and injury history during the past 4 weeks. The 4-week time limit was adopted after review of the reliability of the Medical Outcomes Survey (SF-36v2) to reduce memory bias in perception due to day-by-day variations.[13,48]

The RAND SF-36v2 is a widely used, valid and reliable standard measure of HRQOL.[31,49-51] The SF-36v2 evolved from its predecessor, the SF-36 and maintains the same basic properties from it, but is more efficient (Figure 3). The mean scores from the domain T scores of the SF-36v2 vary from those of the SF-36, but the Physical Component Summary (PCS) and Mental Component Summary (MCS) scores are highly comparable.[52] The physical and mental status of those dancers who completed the SF-36v2 was assessed through 8 core concepts: (a) physical functioning, (b) role limitation for emotional issues, (c) role limitation for physical issues, (d) social functioning, (e) bodily pain, (f) general mental health, (f) vitality, and (h) overall health.[52]



Director/Coordinator Questionnaire

▸ **On average how many performances do your dancers participate in during an average week in the *fall*?** _____

(Check all type of performances that apply to the fall)

- ☐ Football games
- ☐ Charity events
- ☐ Showcases
- ☐ Basketball games
- ☐ Other: _____

▸ **On average how many performances do your dancers participate in during an average week in the *spring*?** _____

(Check all type of performances that apply to the spring)

- ☐ Football games
- ☐ Charity events
- ☐ Showcases
- ☐ Basketball games
- ☐ Other: _____

▸ **During a typical school day, what is the average number of hours that your dancers practice?** _____

▸ **Does your team have pre-season training?** ☐ **Yes or** ☐ **No**

(If yes, check all that apply and explain approximately how many days and hours)

- ☐ Summer
  - ..... Approximately how many days? _____
  - .....Approximately how many hours/day? _____
- ☐ Beginning of fall
  - ..... Approximately how many days? _____
  - .....Approximately how many hours/day? _____
- ☐ Beginning of spring
  - ..... Approximately how many days? _____
  - .....Approximately how many hours/day? _____

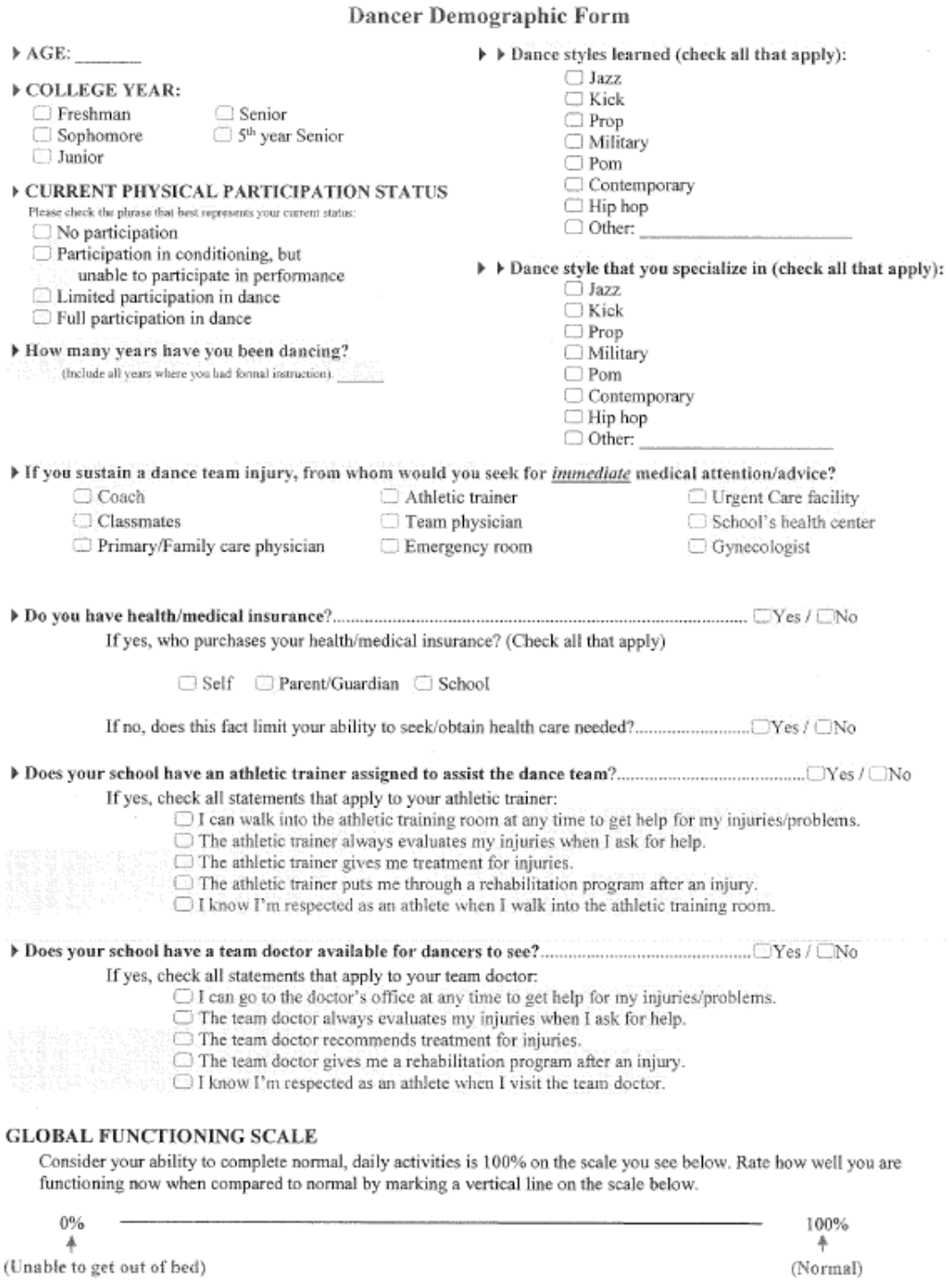
▸ **Which months are the busiest for the team (in regards to practice, travel, and performances)? Choose up to 3 months.**

☐ January	☐ May	☐ September
☐ February	☐ June	☐ October
☐ March	☐ July	☐ November
☐ April	☐ August	☐ December

When one of your dancers has an injury, who do you refer them to for treatment/help?

- ☐ Primary/Family care physician
- ☐ Athletic trainer
- ☐ Team physician
- ☐ Emergency room
- ☐ Urgent Care facility
- ☐ School's health center
- ☐ Other: _____

Figure 1. Dance Team Director/Coordinator Questionnaire



Dancer Demographic Form

- AGE: _____

- COLLEGE YEAR:
  - ☐ Freshman
  - ☐ Sophomore
  - ☐ Junior
  - ☐ Senior
  - ☐ 5th year Senior

- CURRENT PHYSICAL PARTICIPATION STATUS

  Please check the phrase that best represents your current status:
  - ☐ No participation
  - ☐ Participation in conditioning, but unable to participate in performance
  - ☐ Limited participation in dance
  - ☐ Full participation in dance

- How many years have you been dancing?

  (Include all years where you had formal instruction) _____

- Dance styles learned (check all that apply):
  - ☐ Jazz
  - ☐ Kick
  - ☐ Prop
  - ☐ Military
  - ☐ Pom
  - ☐ Contemporary
  - ☐ Hip hop
  - ☐ Other: _____

- Dance style that you specialize in (check all that apply):
  - ☐ Jazz
  - ☐ Kick
  - ☐ Prop
  - ☐ Military
  - ☐ Pom
  - ☐ Contemporary
  - ☐ Hip hop
  - ☐ Other: _____

- If you sustain a dance team injury, from whom would you seek for *immediate* medical attention/advice?
  - ☐ Coach
  - ☐ Classmates
  - ☐ Primary/Family care physician
  - ☐ Athletic trainer
  - ☐ Team physician
  - ☐ Emergency room
  - ☐ Urgent Care facility
  - ☐ School's health center
  - ☐ Gynecologist

- Do you have health/medical insurance?..... ☐Yes / ☐No

  If yes, who purchases your health/medical insurance? (Check all that apply)

  ☐ Self ☐ Parent/Guardian ☐ School

  If no, does this fact limit your ability to seek/obtain health care needed?.....☐Yes / ☐No

- Does your school have an athletic trainer assigned to assist the dance team?.....☐Yes / ☐No

  If yes, check all statements that apply to your athletic trainer:
  - ☐ I can walk into the athletic training room at any time to get help for my injuries/problems.
  - ☐ The athletic trainer always evaluates my injuries when I ask for help.
  - ☐ The athletic trainer gives me treatment for injuries.
  - ☐ The athletic trainer puts me through a rehabilitation program after an injury.
  - ☐ I know I'm respected as an athlete when I walk into the athletic training room.

- Does your school have a team doctor available for dancers to see?.....☐Yes / ☐No

  If yes, check all statements that apply to your team doctor:
  - ☐ I can go to the doctor's office at any time to get help for my injuries/problems.
  - ☐ The team doctor always evaluates my injuries when I ask for help.
  - ☐ The team doctor recommends treatment for injuries.
  - ☐ The team doctor gives me a rehabilitation program after an injury.
  - ☐ I know I'm respected as an athlete when I visit the team doctor.

GLOBAL FUNCTIONING SCALE

Consider your ability to complete normal, daily activities is 100% on the scale you see below. Rate how well you are functioning now when compared to normal by marking a vertical line on the scale below.

0% ——————————————————————— 100%

(Unable to get out of bed) (Normal)

Figure 2. Dancer Demographic Questionnaire

Dancer Demographic Form

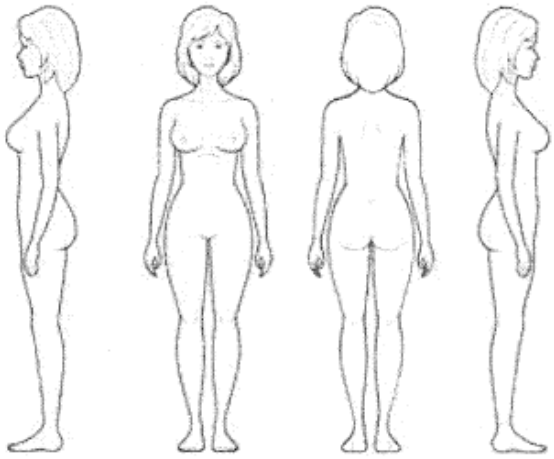
Injury, as defined by the NCAA injury surveillance system, is an issue that **occurred during** an organized university related activity that **resulted in an absence** from participation for **at least one day** after the date of the injury.

▸ Are you *currently* injured?..... ☐Yes / ☐No

If yes, is it ..... ☐ Mild / ☐ Severe

Numbness	Pins & Needles	Burning	Aching	Stabbing
------	ooooo	^^^^	xxxx	⊗⊗⊗⊗
------	ooooo	^^^^	xxxx	⊗⊗⊗⊗
------	ooooo	^^^^	xxxx	⊗⊗⊗⊗

If yes mark the injury with the type of pain you are experiencing:



▸ **Have you had a dance injury in the *last week*?**
☐Yes / ☐No
If yes how many times? _____
Type of Injury: _____

▸ **Have you had a dance injury in the *4 weeks*?**
☐Yes / ☐No.....*If yes how many times?* _____
Type of Injury: _____

▸ **Have you been injured during your collegiate career of dancing that resulted in one or more days of absence from practice or competition?**
☐Yes / ☐No.....If so, to the best of your ability explain what happened:

_____

_____

_____

▸ **Have you ever had any major injuries during your collegiate dancing career that needed surgery or long term rehabilitation?**
☐Yes / ☐No..... If so, to the best of your ability explain what happened for each major injury:

_____

_____

_____

Figure 2. Dancer Demographic Questionnaire-continued.

Each of the 8 categories of questions ("subscales") on the SF-36v2 earns a score of between 0 and 100, with lower scores reflecting increasing levels of dysfunction, and the inverse for the higher scores.[31,52,53] These domain scores are then converted into T scores with standardization formulas. For example, the 0 to 100 score will represent a dancer's physical functioning (PF) and input into the formula, PFz = (PF - 83.29094) / 23.75883. PFz will then be used to calculate the PF T score = 50 + (PFz * 10). The scores can be analyzed by individual domain, by Physical Component Summary (PCS) or by Mental Component Summary (MCS) scores. The PCS and MCS scores can help separate if the dysfunction is mental or physical. The PCS and MCS scores can be transformed into T scores with the formula PCS T score=50 + (aggregate physical x 10) and MCS T score= 50 + (aggregate mental component score x 10). [52]

The SF-36v2 questionnaire requires approximately 10 minutes to complete, and has been shown to be both comprehensive and psychometrically sound.[51] Given the wide range of studies that have employed the SF-36v2 in the past, there are normative values for comparisons with many age groups and populations including collegiate athletes.[30,31,54,55]

The Disablement in the Physically Active scale (DPA) is a generic, subjective, and multidimensional scale that addresses both disablement and HRQOL of the individual (Figure 4).[56] The DPA has previously been demonstrated to be both a reliable (Cronbach's $\alpha = 0.908$ in acute, and $\alpha = 0.890$ in chronic groups) and valid instrument ($r = -0.751$, $P < 0.001$ for acute, $r = -0.714$, $P < 0.001$ for chronic injuries).[57] The DPA has 16 questions that can be separated into 4 distinct domains that utilize the disablement model: (a) impairments, (b) functional limitations, (c) disability, and (d) quality of life.

The impairment domain asks questions that inquire about pain, motion, muscular functioning, and stability. The functional limitation domain questions overall fitness, changing directions, common daily actions, maintaining positions, and different levels of skill performances. Disability questions target participation in leisure activities and hobbies, and also participation in preferred sport. Lastly, the quality of life domain targets relationships, uncertainty, stress, overall energy, and mood. The DPA generates a single raw score that can range from 0 (indicating no physical problems) to 64 (indicating severe physical disability).[56]

The PSQ-18 is an 18-item short form version of the 50-item Patient Satisfaction Questionnaire III (PSQ-III), and both evaluate the same 7 subscale categories general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with health care provider, and accessibility and convenience. All of the 7 subscale categories have been shown to have acceptable construct validity ($F(4,1312) = 57.10$; $P < 0.0001$) and internal consistency reliability (Cronbach's $\alpha = 0.74$ to 0.95).[58,59]

The –M-Patient Satisfaction Questionnaire (M-PSQ) used in this study was a modification of the Patient Satisfaction Questionnaire–18 (PSQ-18) (Figure 5).[58] The only alterations made to the PSQ-18 were semantic in nature, as we changed the term "doctor" in the PSQ-18 to the more global term, "health care provider" in the M-PSQ. This change was done to remove "medical doctor" as being defined as the sole health care provider, and to permit the sports injury health care provided by ATs, physical therapists, emergency room nurses, physician assistants, and orthopedic surgeons to be recognized as valid. The M-PSQ was obtained free of charge from RAND Health, as their documents are available to the public.[60]

Your Health and Well-Being

This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities.
Thank you for completing this survey!

For each of the following questions, please mark an ☒ in the one box that best describes your answer.

1. In general, would you say your health is:

Excellent	Very good	Good	Fair	Poor
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

2. <u>Compared to one year ago</u>, how would you rate your health in general <u>now</u>?

Much better now than one year ago	Somewhat better now than one year ago	About the same as one year ago	Somewhat worse now than one year ago	Much worse now than one year ago
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Figure 3. Medical Outcomes Study Short Form Health Survey (SF-36v2).

3. **The following questions are about activities you might do during a typical day. Does <u>your health now limit you</u> in these activities? If so, how much?**

	Yes, limited a lot	Yes, limited a little	No, not limited at all
a Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	☐ 1	☐ 2	☐ 3
b Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	☐ 1	☐ 2	☐ 3
c Lifting or carrying groceries	☐ 1	☐ 2	☐ 3
d Climbing several flights of stairs	☐ 1	☐ 2	☐ 3
e Climbing one flight of stairs	☐ 1	☐ 2	☐ 3
f Bending, kneeling, or stooping	☐ 1	☐ 2	☐ 3
g Walking more than a mile	☐ 1	☐ 2	☐ 3
h Walking several hundred yards	☐ 1	☐ 2	☐ 3
i Walking one hundred yards	☐ 1	☐ 2	☐ 3
j Bathing or dressing yourself	☐ 1	☐ 2	☐ 3

Figure 3. Medical Outcomes Study Short Form Health Survey (SF-36v2)-continued

4. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a Cut down on the amount of time you spent on work or other activities	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b Accomplished less than you would like	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c Were limited in the kind of work or other activities	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d Had difficulty performing the work or other activities (for example, it took extra effort)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

5. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a Cut down on the amount of time you spent on work or other activities	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b Accomplished less than you would like	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c Did work or other activities less carefully than usual	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Figure 3. Medical Outcomes Study Short Form Health Survey (SF-36v2)-continued

6. **During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?**

Not at all	Slightly	Moderately	Quite a bit	Extremely
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

7. **How much bodily pain have you had during the past 4 weeks?**

None	Very mild	Mild	Moderate	Severe	Very severe
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6

8. **During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?**

Not at all	A little bit	Moderately	Quite a bit	Extremely
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Figure 3. Medical Outcomes Study Short Form Health Survey (SF-36v2) -continued

9. **These questions are about how you feel and how things have been with you <u>during the past 4 weeks</u>. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the <u>past 4 weeks</u>…**

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a. Did you feel full of life?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b. Have you been very nervous?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c. Have you felt so down in the dumps that nothing could cheer you up?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d. Have you felt calm and peaceful?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
e. Did you have a lot of energy?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
f. Have you felt downhearted and depressed?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
g. Did you feel worn out?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
h. Have you been happy?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
i. Did you feel tired?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

10. **During the <u>past 4 weeks</u>, how much of the time has your <u>physical health or emotional problems</u> interfered with your social activities (like visiting with friends, relatives, etc.)?**

All of the time	Most of the time	Some of the time	A little of the time	None of the time
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Figure 3. Medical Outcomes Study Short Form Health Survey (SF-36v2)-continued

11. How TRUE or FALSE is <u>each</u> of the following statements for you?

	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
a. I seem to get sick a little easier than other people	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b. I am as healthy as anybody I know	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c. I expect my health to get worse	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d. My health is excellent	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Thank you for completing these questions!

Figure 3. Medical Outcomes Study Short Form Health Survey (SF-36v2)-continued

Disablement in the Physically Active Scale©

Instructions: Please answer **each statement** with one response by shading the circle that most closely describes your problem(s) within the past **24 hours.** Each problem has possible descriptors under each. Not all descriptors may apply to you but are given as common examples.

KEY
1 - no problem
2 - I have the problem(s), but it does not affect me
3 - The problem(s) slightly affects me
4 - The problem(s) moderately affects me
5 - The problem(s) severely affects me

	No problem **1**	Does not affect **2**	Slight **3**	Moderate **4**	Severe **5**
Pain – *"Do I have **pain**?"*	O	O	O	O	O
Motion – **"***Do I have impaired **motion**?"* **Ex.** decreased range/ease of motion, flexibility, and/or increased stiffness	O	O	O	O	O
Muscular Functioning – *"Do I have impaired **muscle function**?"* **Ex.** decreased strength, power, endurance, and/or increased fatigue	O	O	O	O	O
Stability – *"Do I have impaired **stability**?"* **Ex**. the injured area feels loose, gives out, or gives way	O	O	O	O	O
Changing Directions – *"Do I have difficulty with **changing directions** in activity?"* **Ex.** twisting, turning, starting/stopping, cutting, pivoting	O	O	O	O	O
Daily Actions – **"***Do I have difficulty with **daily actions** that I would normally do?"* **Ex**. walking, squatting, getting up, lifting, carrying, bending over, reaching, and going up/down stairs	O	O	O	O	O
Maintaining Positions – *"Do I have difficulty **maintaining the same position** for a long period of time?"* **Ex.** standing, sitting, keeping the arm overhead, or sleeping	O	O	O	O	O
Skill Performance – *"Do I have difficulties with **performing skills** that are required for physical activity?"*					
1.) **Ex**. running, jumping, kicking, throwing, & catching	O	O	O	O	O
2.) **Ex.** coordination, agility, precision & balance	O	O	O	O	O
Overall Fitness – *"Do I have difficulty maintaining my **fitness** level?"* **Ex**. conditioning, weight lifting & cardiovascular endurance	O	O	O	O	O
Participation in Activities – *"Do I have difficulty with **participating in activities**?"*					
1.) **Ex**. participating in leisure activities, hobbies, and games	O	O	O	O	O
2.) **Ex.** participating in my sport(s) of preference	O	O	O	O	O
Well Being – *"Do I have difficulties with the following…?"*					
1.) Increased uncertainty, stress, pressure, and/or anxiety	O	O	O	O	O
2.) Altered relationships with team, friends, and/or colleagues	O	O	O	O	O
3.) Decreased overall energy	O	O	O	O	O
4.) Changes in my mood and/or increased frustration	O	O	O	O	O

Figure 4. Disability in the Physically Active (DPA) scale

To reduce statistical error, one-half of the 18 questions on the M-PSQ are intended to be answered positively, and the other half are worded so as to be answered negatively. All M-PSQ answers will be converted and scored positively to reflect true satisfaction. Scoring is averaged within each subscale, and then presented individually.[58] Scoring a "5" represents completely satisfied, while scoring a "1" is completely

unsatisfied. On average the PSQ-18 takes only 3 to 4 minutes to complete, and we expected that a similar amount of time would be required for the collegiate dance team members to complete the M-PSQ.[58]

Experimental Procedures

A pilot study was conducted to establish the validity and alternate-form reliability of the M-PSQ, when compared to the PSQ-18, and occurred after receipt of IRB approval for this project. To establish the validity of the M-PSQ, 25 undergraduate female cheerleaders were recruited to complete the original PSQ-18 and the modified M-PSQ. Using a test-retest paradigm to establish reliability, these same students were asked to complete the M-PSQ on two separate occasions, approximately 72 hours apart from one another.

Directors from 9 intercollegiate dance teams received an invitation to participate in this study. The schools were selected based on their geographical locations. Upon agreement from the dance team director a time and date were arranged for the principal investigator to travel to that institution and administer the surveys. Two schools agreed to participate via mail due to practice and performance time constraints.

We administered a series of four pencil-and-paper questionnaires to collegiate dance team members in this cross-sectional descriptive study. Each data collection started with brief instructions about the 4 questionnaires to be administered and acknowledgement of participation. The anonymity of the participants was preserved as no personal identifying information was collected on any of the 4 questionnaires. The participants could decline completing the questionnaires if they wished to, but were asked

to sit with the team until everyone is finished and return their blank surveys into the same pile as the other completed surveys.

We anticipated that approximately 30 minutes would be required to complete the entire battery of 4 questionnaires; however, a majority of data collection sessions were only 20 minutes in length. Once everyone in the group finished, the principal investigator asked the participants to turn in their questionnaires at the front of the room. At that juncture, all participants had the option to write their names on a separate small slip of paper. A drawing was then held with the names of 3 participants selected to win 1 of 3 participant incentive gifts reserved for that dance team. The participant incentives in our study consisted of $25, $15 and $10 gift cards.

Statistical Analyses

All statistical tests were performed using SPSS (version 26.0; IBM SPSS Inc, Chicago, IL). Scoring for the SF-36v2 was performed using Health Outcomes Scoring Software (version 4.5; QualityMetric Inc, Lincoln, RI).

Due to the lack of current evidence frequencies, means and standard deviations were calculated to describe and establish the data from SF-36v2, M-PSQ, and DPA relating to all dancers, both currently injured and currently healthy, location and severity of injury, access to health care, and insurance.

Independent-samples t-tests were run on 8 subscales and 2 component scores of the SF-36v2, the total score for the DPA, and each of the 7 subscales in the DSQ to compare the scores of participants that identified themselves as currently injured to healthy dancers. To protect against Type I error, Bonferroni corrections were used to adjust the level of significance *a priori* to $\alpha = 0.005$.

Modified-Patient Satisfaction Questionnaire

Derived from the Short-Form Patient Satisfaction Questionnaire (PSQ-18)

These questions are about how you feel about the medical care you receive. Please read carefully, and answer truthfully and to the best of your ability. This survey is confidential and your answers can not be tied back to you.

Who is your preferred health care professional?

- ☐ Orthopedic surgeon
- ☐ Emergency room physician
- ☐ Physical Therapist
- ☐ Athletic Trainer
- ☐ Other: _____

Read the following statements and circle the number that best correlates with how you feel.

		Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
1.	Health care professionals are good about explaining the reason for medical tests	1	2	3	4	5
2.	I think my health care professional's office has everything needed to provide complete medical care	1	2	3	4	5
3.	The medical care I have been receiving is just about perfect	1	2	3	4	5
4.	Sometimes my health care provider makes me wonder if their diagnosis is correct	1	2	3	4	5
5.	I feel confident that I can get the medical care I need without being set back financially	1	2	3	4	5
6.	When I go for medical care, they are careful to check everything when treating and examining me	1	2	3	4	5
7.	I have to pay for more of my medical care than I can afford	1	2	3	4	5
8.	I have easy access to the medical specialists I need	1	2	3	4	5
9.	Where I get medical care, people have to wait too long for emergency treatment	1	2	3	4	5
10.	Health care professionals act too businesslike and impersonal toward me	1	2	3	4	5
11.	My health care professional treats me in a very friendly and courteous manner	1	2	3	4	5
12.	Those who provide my medical care sometimes hurry too much when they treat me	1	2	3	4	5
13.	Health care professionals sometimes ignore what I tell them	1	2	3	4	5
14.	I have some doubts about the ability of the health care professionals who treat me	1	2	3	4	5
15.	Health care professionals usually spend plenty of time with me	1	2	3	4	5
16.	I find it hard to get an appointment for medical care right away	1	2	3	4	5
17.	I am dissatisfied with some things about the medical care I receive	1	2	3	4	5
18.	I am able to get medical care whenever I need it	1	2	3	4	5

Figure 5. Modified Patient Satisfaction Questionnaire (M-PSQ**)**

Two-tailed bivariate Pearson product moment correlations were run on the DPA total score, the 8 subscales, PCS, and MCS scores of the SF-36v2 to determine the relationship among these various measures of HRQOL.

One sample t-tests were performed to compare SF-36 normative values of female collegiate athletes from previously established means and standard deviation norms for collegiate athletes found in two recent publications.

Results

Pilot Testing of the Modified Patient Satisfaction Questionnaire (M-PSQ)

A pilot study was conducted using a convenience sample of intercollegiate cheerleaders (N = 25) to determine the validity and test-retest reliability of the Modified Patient Satisfaction Questionnaire (M-PSQ), the adaptation of the Patient Satisfaction Questionnaire (PSQ) for the purposes of this study. Cheerleaders were selected as a pilot group based on the similarities in their dance performances and choreography. The validity of the M-PSQ was tested using a Pearson r correlation on each of the 7 PSQ subscales. Each of the M-PSQ-PSQ correlations was found to be statistically significant ($p < 0.001$), with values ranging from a high of $r = 0.88$ (Interpersonal Manner and Time Spent with Health Care Provider subscales), to a low of $r = 0.72$ (General Satisfaction).

Intraclass correlation coefficient values greater than 0.75 represent "excellent" test-retest reliability, ICC values between 0.40 and 0.75 represent "fair to good" reliability, while ICC values less than 0.40 indicate "poor" reliability.[32] The results of our pilot study indicated that the M-PSQ had a "good" to "excellent" test-retest reliability, established by calculating the $ICC_{(2,1)}$ values shown in Table 1.

Table 1. Test-Retest Reliability of the Modified Patient Satisfaction Questionnaire	
M-PSQ Subscales:	$ICC_{2,1}$ Value (n=25)
General Satisfaction	0.757
Technical Quality	0.843
Interpersonal Manner	0.570
Communication	0.735
Financial Aspects	0.734
Time Spent with Health Care Provider	0.788
Accessibility and Convenience	0.829

Director/Coordinator and Dance Team Member Demographic Questionnaires

Five of the 9 colleges and universities in Texas that were recruited agreed to participate in this study (Table 2). A total of 179 female dancers (mean age 19.5 ± 1.6 yrs) completed the 4 surveys. The participants reported an average of 11.3 ± 4.9 years of previous dance experience. Common dance styles learned during their experiences included jazz (n = 171), pom (n = 167), contemporary (n = 161), kick (n = 160), prop (n = 131), and military (n = 93).

Table 2. Dance Team School Demographics		
School	**Enrollment size**	**Athletic Association**
1	32,177	-
2	58,577	179 (100%)
3	19,317	40 (22.3%)
4	3,926	179 (100%)
5	7,743	-

The collegiate dance team members sampled participated in an average of 1.9 ± 2.7 performances a week in the fall semester 2015, and 2.0 ± 0.7 performances a week in the spring semester 2016 (Table 3). The average duration of daily practice for collegiate dancers participating in this study was 2.2 ± 1.4 hours in length.

Table 3. Summary of Dance Team Performances by Semester		
Performances	**Fall 2015**	**Spring 2016**
Football	179 (100%)	-
Charity	85 (47.5%)	179 (100%)
Showcases	126 (70%)	40 (22.3%)
Basketball Games	85 (47.5%)	179 (100%)
Parades	126 (70 %)	-
Professional Sports	179 (100%)	94 (52.5%)
Volleyball	53 (29.6%)	-

With regard to health insurance coverage, 95.6% of the respondents (171 of 179) indicated that they currently had health insurance. More than 91.6% of the dancers (164 of 179) obtained the insurance coverage through their parents, while 3% (5 of 179) indicated that they purchased their own private health insurance, and 1% (2 of 179) purchased a school-sponsored health insurance plan. Eight individuals reported that they did not have health insurance, and 6 of the 8 (75%) indicated that the absence of health insurance did not have an impact on them seeking health care.

One of the demographic questions asked whether the dancer team members had access to an athletic trainer or team physician for immediate health care, 81.6% (n = 146) answered "yes" to an athletic trainer. Fifty of the 179 respondents (27.9%) indicated that they had regular access to care from a team physician.

The dance instructors surveyed that they would refer an injured dancer to the athletic trainer 83% of the time (n = 149), team physician 12% of the time (n = 22), and school's health care facility 4 % of the time (n = 8). When the participants were asked, 74% (n = 133) preferred to seek health care with their family physician, followed by 6% (n = 11) answering AT, 4% (n = 8) urgent care facility, and 4% (n = 7) PT. Contrary to their preferences, of the 133 who answered, 47% immediately seek help from the athletic trainer (n = 63), followed by 24% from their family physician (n = 32), 13% from their

coach (n = 17), 8% from an urgent care facility (n = 10), 3% from the team physician (n = 4), 3% from the schools health care facility (n = 4), and 2% from classmates (n = 3).

The classification of injury type was described by the dancers in Table 4. The severity of the current injuries was noted as 93% mild (n = 29) with an aching description (n = 11).

Table 4. Types of Injuries Sustained by Collegiate Dancers

Types of injury	*Currently injured (n = 31)*	*Absence from dance (n = 41)*
Ankle/Foot	3	16
Did not specify	2	5
Elbow	-	1
Hip	4	5
Knee	7	3
Low back/ sacroiliac	5	3
Multiple issues	9	2
Shin	-	-
Shoulder	-	-
Systemic	-	2
Thigh	-	3
Wrist	1	-

Medical Outcomes Study Short Form Health Survey (SF-36v2)

Trends can be seen in the means of the SF-36v2 scores of collegiate dancers (Table 5), healthy dancers scored higher on all subscales when compared to those dancers currently injured or injured within the past 4 weeks. Bonferroni adjustments were made *a priori* from $\alpha = 0.05$ to $\alpha = 0.005$ due to the 10 comparisons and the increased chances of committing a Type I error. Significant differences were noted in physical role limitations ($t(3.35) = 35.27$; $p = 0.002$), bodily pain ($t(5.59) = 177$, $p < 0.001$), general health ($t(3.87) = 177$, $p < 0.001$), and the physical component scores ($t(4.88) = 35.98$, $p < 0.001$) in the injured dancers compared to their healthy counterparts.

Disability in the Physically Active Questionnaire (DPA)

Collectively, the participants (N = 179) had a mean score of 10.17 ± 9.6 on the DPA. The 148 healthy dancers scored an average of 7.98 ± 7.76 on the DPA compared to an average of 20.6 ± 10.86 for the 31 dance team members who were currently injured. Significant differences were found on an independent-sample t-test run on the DPA comparing injured and healthy dancers ($t(-6.16) = 36.68$, $p < 0.001$).

Modified Patient Satisfaction Questionnaire (M-PSQ**)**

When comparing the results of the M-PSQ from healthy dancers to the injured dancers, the healthy individuals were more satisfied with their health care providers than the injured dancers who completed our surveys on each of the 7 subscales. (Table 6). Bonferroni adjustments to the alpha level were made *a priori* from $\alpha = 0.05$ to $\alpha = 0.007$ based on the 7 comparisons and the increased risk of committing a Type I error. There were no significant differences between the healthy and currently injured dancers.

Table 5. Means ± SDs of the SF-36v2 Scores in Collegiate Dancers

SF-36 Subscales	Total (n=179)	Healthy (n=148)	Currently Injured (n=31)
Physical Functioning	94.53 ± 13.53	96.32 ± 11.12	85.97 ± 19.72
Role: Physical	87.43 ± 19.69	90.29 ± 16.76*	73.79 ± 26.29*
Bodily Pain	73.46 ± 19.83	76.97 ± 17.81*	56.74 ± 20.69*
General Health	74.86 ± 15.86	76.89 ± 14.29*	65.23 ± 19.39*
Vitality	54.16 ± 16.68	55.45 ± 16.21	47.98 ± 17.78
Social Functioning	82.33 ± 21.35	84.29 ± 19.68	72.98 ± 26.44
Role: Emotional	79.70 ± 25.18	81.02 ± 23.95	73.39 ± 30.08
Mental Health	71.42 ± 16.72	72.19 ± 16.49	67.74 ± 17.55
Physical Component Summary	55.41 ± 5.95	56.56 ± 4.93*	49.89 ± 7.27*
Mental Component Summary	46.48 ± 9.89	46.83 ± 9.55	44.79 ± 11.39

Table 6. Results of Modified Patient Satisfaction Questionnaire in Collegiate Dancers			
M-PSQ Subscales	**Total (n=178)**	**Healthy (n=148)**	**Currently Injured (n=31)**
General Satisfaction	3.76 ± 2.52	3.88 ± 2.72	3.16 ± 1.10
Technical Quality	3.74 ± 0.67	3.79 ± 0.64	3.54 ± 0.76
Interpersonal Manner	3.98 ± 0.72	4.00 ± 0.73	3.87 ± 0.69
Communication	3.76 ± 0.71	3.78 ± 0.71	3.63 ± 0.66
Financial Aspects	3.41 ± 0.88	3.46 ± 0.89	3.16 ± 0.77
Time Spent with HCP	3.47 ± 0.87	3.53 ± 0.84	3.15 ± 0.97
Accessibility and Convenience	3.52 ± 0.71	3.57 ± 0.70	3.31 ± 0.76

Discussion

Health insurance did not seem to play a large factor in the ability to obtain health care since a majority of the dancers had it. This finding could be attributed to the Affordable Care Act (ACA) allowing parents to keep their children as dependents on their health insurance policies until they turned age 26. Previously, once an adult child turned 22, they could no longer be covered on their parents. More in-depth questions about ACA should be addressed in future studies.

A large majority of the dancers reported that they while had access to an athletic trainer for health care, they would prefer to visit their family physician when seeking medical treatment. This finding could be attributed to familiarity with their family physician after many years or knowledge of the AT's availability. If the AT isn't readily available to the dancers or they do not feel comfortable, then they may prefer to call their family physician. This could be supported by the fact that only 35% of the respondents indicated that they would seek immediate help from the AT.

While currently-injured dance team members reported multiple issues and knee as the most frequent injury bothering them, the dancers who were absent from dance at least once in their career who stated that foot was the top issue. This suggests that the dancers likely interpreted the current injuries as ones they could continue to participate

with in contrast to the more deliberate question asking about current injury causing an absence from sport. Suggesting that ankle injuries were likely more debilitating to dance routines than the knee or low back. Future studies need to use AT or physician notes to get a better look at injuries, or use an interview method to get a better understanding of the injuries suffered by the dancers.

Healthy dancers scored higher on all SF-36v2 scores compared to those dancers currently injured. The MCS scores were lower in individuals injured in 4 weeks compared to those currently injured; however, the PCS scores were reported contrariwise. This could be attributed to the mental toll when dealing with a long term injury, and inversely the longer they deal with an injury the physical quality of life gets better due to adaptations or progress in healing. When comparing those currently injured to healthy dancers, the physical component scale scores and 3 of the 4 subscales that comprise the PCS were significantly lower. This finding suggests that the participants were physically affected, but that their current injuries were not affecting them mentally or socially. Comparisons were not made to those injured in the past 4 weeks due to continuity possibility of redundancy of those belonging to both groups.

Due to the lack of NCAA injury, epidemiology, and quality of life data available for dancers, the SF-36v2 scores from the present study were compared SF-36 scores from female Division I and II NCAA athletes in studies by McAllister et al[26] and Huffman et al[27] When comparing SF-36 results from both healthy and injured NCAA female athletes in the McAllister et al. study to the SF-36v2 data obtained from the collegiate dancers, the dance team members had significantly lower mental subscales except for “Vitality”, and both of the mental and physical component summaries ($p <$

0.001) (Table 6). This finding could be attributed to a lower perceived quality of life among the collegiate dancers.

Next, we compared the SF-35 v2 scores from healthy dance team members to the McAllister et al. study data and significant differences ($p < 0.05$) were found on all subscales and component summary scores except "Social function role" ($p = 0.16$) and "Physical Functioning" ($p = 0.146$) (Table 7).

The Huffman et al comparisons resulted in significant differences ($p < 0.05$) on all SF-36 subscales except "Physical functioning limitations" ($p = 0.28$), and "Role limitations due to physical" ($p = 0.012$). When comparing collegiate dance team members' scores on the SF-36v2 to normative SF-36 data, no similarities were found between the two groups; collegiate dancers scored higher on all subscores and summaries (Table 10).

Ideally comparisons would have been made between the injured dancers and the other athletes; however, the grouping sizes were vastly different. Raw data between other NCAA athletes and dancers should be compared to find more meaningful findings.

Table 7. Comparison of Dancer SF-36v2 Scores to Female NCAA athletes (Healthy and injured) SF-36 Scores [McAllister et al [26]]

SF-36 Subscales	Dancers (n=179)	Female NCAA (n=229)	P Value
Physical Functioning	94.53 ± 13.53	95.0 ± 0.40	.639
Role: Physical	87.43 ± 19.69	87.0 ± 0.40	.770
Bodily Pain	73.46 ± 19.83	75.0 ± 0.90	.303
General Health	74.86 ± 15.86	77.0 ± 1.90	.074
Vitality	54.16 ± 16.68	67.0 ± 1.60	<.001*
Social Functioning	82.33 ± 21.35	85.0 ± 1.50	.096
Role: Emotional	79.70 ± 25.18	91.0 ± 0.90	<.001*
Mental Health	71.42 ± 16.72	78.0 ± 0.90	<.001*
Physical Component Summary	55.41 ± 05.95	52.0 ± 1.40	<.001*
Mental Component Summary	46.48 ± 09.89	52.0 ± 1.10	<.001*

Bonferroni adjustments were made a priori due to the 10 comparisons and the chance of committing a Type I error (α =0.005).

Table 8. Comparison of Healthy Dancer SF-36v2 Scores to Female NCAA Athlete SF-36 data [McAllister et al [26]]

SF-36 Subscales	Healthy Dancers (n=148)	Female NCAA (n=152)	P Value
Physical Functioning	96.32 ± 11.12	96.0 ± 0.50	.146
Role: Physical	90.29 ± 16.76	91.0 ± 0.50	.016
Bodily Pain	76.97 ± 17.81	82.0 ± 1.20	<.001*
General Health	76.89 ± 14.29	79.0 ± 2.00	.001*
Vitality	55.45 ± 16.21	68.0 ± 1.80	<.001*
Social Functioning	84.29 ± 19.68	87.0 ± 1.40	.004*
Role: Emotional	81.02 ± 23.95	93.0 ± 1.00	<.001*
Mental Health	72.19 ± 16.49	79.0 ± 1.10	<.001*
Physical Component Summary	56.56 ± 4.93	54.0 ± 1.60	.002*
Mental Component Summary	46.83 ± 9.55	52.0 ± 1.30	<.001*

Bonferroni adjustments were made a priori due to the 10 comparisons and the chance of committing a Type I error (α =0.005).

Table 9. Comparison of Healthy Dancer SF-36v2 Scores to Female NCAA Athlete SF-36 Data [Huffman et al [27]]

SF-36 Subscales	Healthy (n=148)	Female NCAA (n=287)	P Value
Physical Functioning	96.32 ± 11.12	97.3 ± 07.5	.284
Role: Physical	90.29 ± 16.76	93.8 ± 18.1	.012
Bodily Pain	76.97 ± 17.81	82.5 ± 18.7	<.001*
General Health	76.89 ± 14.29	82.4 ± 14.5	<.001*
Vitality	55.45 ± 16.21	68.7 ± 12.9	<.001*
Social Functioning	84.29 ± 19.68	93.5 ± 12.6	<.001*
Role: Emotional	81.02 ± 23.95	96.4 ± 15.0	<.001*
Mental Health	72.19 ± 16.49	81.7 ± 10.3	<.001*

Bonferroni adjustments were made a priori due to the 8 comparisons and the chance of committing a Type I error (α =0.006).

Table 10. Means of the SF-36v2 Scores in Collegiate Dancers Compared to Normative SF-36 Data			
SF-36 Subscales	**Total dancers (n=179)**	**Normative: Females 18-24 (n=157)**	**p value**
Physical Functioning	94.53 ± 13.53	53.04 ± 6.56	<.001
Role: Physical	87.43 ± 19.69	51.66 ± 7.98	<.001
Bodily Pain	73.46 ± 19.83	51.89 ± 8.43	<.001
General Health	74.86 ± 15.86	48.14 ± 9.55	<.001
Vitality	54.16 ± 16.68	45.65 ± 8.82	<.001
Social Functioning	82.33 ± 21.35	48.26 ±10.72	<.001
Role: Emotional	79.70 ± 25.18	48.26 ± 10.92	<.001
Mental Health	71.42 ± 16.72	45.34 ± 10.74	<.001
Bonferroni adjustments were made a priori due to the 8 comparisons and the chance of committing a Type I error (α =0.006).			

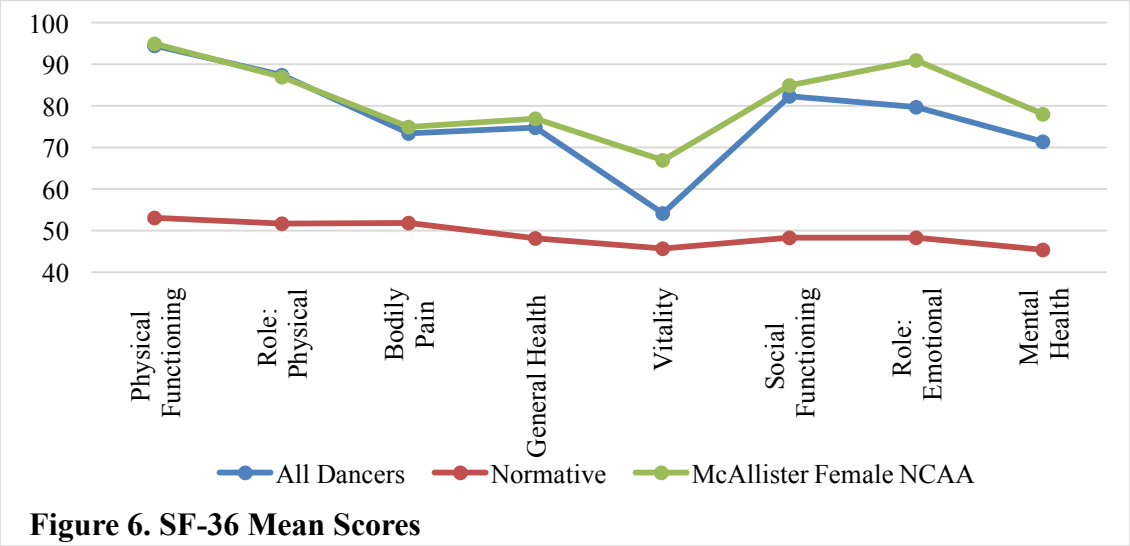


Figure 6. SF-36 Mean Scores

Collectively, the 179 college dance team members surveyed had a mean score of 10.17 ± 9.6 on the DPA. Those healthy (n = 148) scored lower (7.98 ± 7.76) on the DPA compared to the dancers currently injured (n = 31) with a 20.6 ± 10.86.

Healthy dancers had higher satisfaction in health care provider than those injured, and this could be attributed to two factors: (a) the dancers have never been injured and perceive health care to be good, or (b) they have received good healthcare that lead to their current healthy state. Overall, the dancers were between uncertain and slightly satisfied with health care, but future studies need to look further into

There were limitations to this study. Research on collegiate dancers is limited and there were few studies with which to compare our results. The demographic and dance director/coordinator questionnaires were missing some key questions that could have provided critical information. For example, adding a question on the dance team directors/coordinators' questionnaire about the availability of athletic trainers and team physicians would provide very helpful information. Additionally, dancers' self-reports of injuries were not consistent due to the absence of standardized, layperson injury terminology on our questionnaire. One solution to this problem in future studies could be the addition of standardized definitions of injury region, tissue type and severity.

Conclusions

To our knowledge, this study is the first of its kind to investigate the incidence of injuries, perceptions of HRQOL, and health care satisfaction among female intercollegiate dance team members. Collegiate dancers remain an understudied population that could benefit from inclusion in existing national sports injury surveillance programs like the NCAA Injury Surveillance System. We recommend that future studies involving this population be longitudinal and prospective by design to quantify injury risk, prevalence and severity, as well as examine the qualitative aspects of the medical care provided to this group of athletes.

III – SUMMARY AND RECOMMENDATIONS

Summary

The primary purpose of this study was to investigate the health related quality of life (HRQOL) of collegiate dance team members as assessed by the Short Form-36v2, and Disability in the Physically Active (DPA) instruments. Secondary purposes were to survey collegiate dance team members' perceptions of the health care available to them, and to identify their levels of satisfaction with the health care services provided as assessed by the Modified Patient Satisfaction Questionnaire (M-PSQ) instrument.

Four pencil-and-paper questionnaires were administered to all of the members of each collegiate dance teams. The questionnaires included: a demographic questionnaire, the Short Form Health Study-36v2 (SF36-v2), the Disability in the Physically Active scale (DPA), and the Modified Patient Satisfaction Questionnaire (M-PSQ). A one-page questionnaire was given to the dance instructor/coordinator to obtain practice and performance times and their medical referral preference.

With regard to health insurance coverage, 95.6% of the respondents (171 of 179) indicated that they currently had health insurance. More than 91.6% of the dancers (164 of 179) obtained the insurance coverage through their parents, while 3% (5 of 179) indicated that they purchased their own private health insurance, and 1% (2 of 179) purchased a school-sponsored health insurance plan. Eight individuals reported that they did not have health insurance, and 6 of the 8 indicated that the absence of health insurance did not have an impact on them seeking health care.

One of the demographic questions asked whether the dancer team members had access to an athletic trainer or team physician for immediate health care, and 81.6% (n =

146) answered “yes” to an athletic trainer. While only 27.9% (50 of the 179 respondents) said “yes” to a team physician.

Our SF-36v2 scores were compared to those of other female NCAA athletes in the studies by McAllister and Huffman et al. due to the lack of NCAA injury, epidemiology, and quality of life data available for dancers. When comparing both healthy and injured female athletes from the McAllister et al study to collegiate dancers, all SF-36 subscales and component summary scores except for “role limitation for emotional issues” were significantly different ($p < 0.05$). When comparing a subset of only healthy dancer SF-36v2 data to the McAllister et al. study, significantly better (higher) SF-36 scores were found for collegiate dancers on 6 of 8 subscales ($p < 0.05$). Only the SF-36 subscales “social function role” and “role limitation for emotional issues” were not significantly different between healthy (uninjured) participants in McAllister et al and present study ($p > 0.05$).

Comparisons between our SF-36 v2 data and the Huffman et al SF-36 results revealed significant differences on 7 of 8 subscales ($p < 0.001$). When comparing dancers to normative SF-36 data, no similarities were found between the two. Ideally comparisons could be made between the injured dancers and the other collegiate athletes; however, the sample sizes were very different between our study and the Huffman et al study. Additional SF-36 data from NCAA athletes and collegiate dancers are needed before meaningful comparisons can be made between these groups.

In conclusion, collegiate dancer team members remain an understudied population that could benefit from prospective, longitudinal epidemiological studies. These data

could be readily obtained with the addition of collegiate dance teams to the NCAA Injury Surveillance System database.

Recommendations for Future Research

- Create a more specific questionnaire on dance injuries and cross reference with an injury.
- Conduct prospective, longitudinal epidemiological research on collegiate dancers.
- Replicate the *Epidemiology of National Collegiate Athletic Association's Women's Gymnastics Injuries, 2009-2010 through 2013-2014* study using collegiate dancers with an emphasis on early specialization and its relationship to injury.
- Ask more in-depth questions about dance team members' professional interactions with athletic trainers.
- Expand this study to collegiate dance drill teams throughout the United States.
- Cross reference the dancers, dance directors, and sports medicine teams to truly understand the type of health care available. There were dancers on the same team with differing answers on the availability of ATs and team physicians.
- Categorize injuries into boxed answers on the demographic questionnaire so the dancers can select their injuries instead of trying to complete short answer.
- Study "burnout" and its prevalence among collegiate dancers.
- Include more open ended questions to do a qualitative analysis of emergent themes in dancers.

IV. REFERENCES

1. Toledo SD, Akuthota V, Drake DF, Nadler SF, Chou LH. Sports and performing arts medicine. 6. Issues relating to dancers. *Arch Phys Med Rehabil.* 2004;85(3 Suppl 1):S75-78.
2. Miller C. Dance medicine: current concepts. *Phys Med Rehabil Clin N Am.* 2006;17(4):803-811, vii.
3. Koutedakis Y, Jamurtas A. The dancer as a performing athlete: physiological considerations. *Sports Med.* 2004;34(10):651-661.
4. Bronner S, Ojofeitimi S, Rose D. Injuries in a modern dance company: effect of comprehensive management on injury incidence and time loss. *Am J Sports Med.* 2003;31(3):365-373.
5. Russell JA. Preventing dance injuries: current perspectives. *Open Access J Sports Med.* 2013;4:199-210.
6. Mainwaring L, Kerr G, Krasnow D. Psychological correlates of dance injuries. *Med Probl Perform Art.* 1993;8:3-3.
7. Hincapié CA, Morton EJ, Cassidy JD. Musculoskeletal injuries and pain in dancers: a systematic review. *Arch Phys Med Rehabil.* 2008;89(9):1819-1829.
8. Air ME. Psychological distress among dancers seeking outpatient treatment for musculoskeletal injury. *J Dance Med Sci.* 2013;17(3):115-125.
9. Krasnow D, Kerr G, Mainwaring L. Psychology of dealing with the injured dancer. *Med Probl Perform Art.* 1994;9(1):7-9.
10. Draugelis S, Martin J, Garn A. Psychosocial Predictors of Well-Being in Collegiate Dancers. *Sport Psychologist.* 2014;28(1):1-9.
11. Russell JA. Preventing dance injuries: current perspectives. *Open Access J Sports Med.* 2013;4:199-210.
12. Ojofeitimi S, Bronner S. Injuries in a modern dance company effect of comprehensive management on injury incidence and cost. *J Dance Med Sci.* 2011;15(3):116-122.
13. Allen N, Nevill AM, Brooks JH, Koutedakis Y, Wyon MA. The effect of a comprehensive injury audit program on injury incidence in ballet: a 3-year prospective study. *Clin J Sport Med.* 2013;23(5):373-378.
14. Shah S. Caring for the dancer: special considerations for the performer and troupe. *Curr Sports Med Rep.* 2008;7(3):128-132.
15. Shah S, Weiss DS, Burchette RJ. Injuries in professional modern dancers: incidence, risk factors, and management. *J Dance Med Sci.* 2012;16(1):17-25.
16. Steinberg N, Siev-Ner I, Peleg S, et al. Injury patterns in young, non-professional dancers. *J Sports Sci.* 2011;29(1):47-54.
17. Moser BR. 30,000 kicks: gaining perspective in dance training volume. *Curr Sports Med Rep.* 2014;13(5):293-294.
18. Schantz PG, Astrand PO. Physiological characteristics of classical ballet. *Med Sci Sports Exerc.* 1984;16(5):472-476.
19. Rodrigues-Krause J, Krause M, Cunha Gdos S, et al. Ballet dancers cardiorespiratory, oxidative and muscle damage responses to classes and rehearsals. *Eur J Sport Sci.* 2014;14(3):199-208.
20. Blanksby BA, Reidy PW. Heart rate and estimated energy expenditure during ballroom dancing. *Br J Sports Med.* 1988;22(2):57-60.

21. Thomas DQ, Seegmiller JG, Cook TL, Young BA. Physiologic profile of the fitness status of collegiate cheerleaders.*J Strength Cond Res.* 2004;18(2):252-254.
22. Leanderson C, Leanderson J, Wykman A, Strender LE, Johansson SE, Sundquist K. Musculoskeletal injuries in young ballet dancers. *Knee Surg Sports Traumatol Arthrosc.* 2011;19(9):1531-1535.
23. Dick R, Agel J, Marshall SW. National Collegiate Athletic Association Injury Surveillance System Commentaries: Introduction and Methods. *J Athl Train.* 2007;42(2):173-182.
24. Klossner D, Corlette J, Agel J, Marshall SW. Data-driven decision making in practice: The NCAA injury surveillance system. *New Directions for Institutional Research.* 2009;2009(144):53-63.
25. Dick RW. NCAA injury surveillance system: A tool for health and safety risk management. *Athl Ther Today.* 2006;11(1):42-44.
26. McAllister DR, Motamedi AR, Hame SL, Shapiro MS, Dorey FJ. Quality of life assessment in elite collegiate athletes. *Am J Sports Med.* 2001;29(6):806-810.
27. Huffman GR, Park J, Roser-Jones C, Sennett BJ, Yagnik G, Webner D. Normative SF-36 values in competing NCAA intercollegiate athletes differ from values in the general population.*J Bone Joint Surg Am.* 2008;90(3):471-476.
28. Bronner S, Brownstein B. Profile of dance injuries in a Broadway show: a discussion of issues in dance medicine epidemiology. *J Orthop Sports Phys Ther.* 1997;26(2):87-94.
29. Fuhrmann TL, Brayer A, Andrus N, McIntosh S. Injury prevention for modern dancers: a pilot study of an educational intervention. *J Community Health.* 2010;35(5):527-533.
30. Hostutler JJ, Taft SH, Snyder C. Patient needs in the emergency department: nurses' and patients' perceptions. *J Nurs Adm.* 1999;29(1):43-50.
31. Trout A, Magnusson AR, Hedges JR. Patient satisfaction investigations and the emergency department: what does the literature say? *Acad Emerg Med Title.* 2000;7(6):695-709.
32. Thayaparan AJ, Mahdi EJ. The Patient Satisfaction Questionnaire Short Form (PSQ-18) as an adaptable, reliable, and validated tool for use in various settings. *Medical education online.* 2013;18.
33. Snyder AR, Parsons JT, Valovich McLeod TC, Curtis Bay R, Michener LA, Sauers EL. Using disablement models and clinical outcomes assessment to enable evidence-based athletic training practice, part I: disablement models. *J Athl Train.* 2008;43(4):428-436.
34. Steves R, Hootman JM. Evidence-Based Medicine: What Is It and How Does It Apply to Athletic Training? *J Athl Train.* 2004;39(1):83-87.
35. McLeod TCV, Bay RC, Parsons JT, Sauers EL, Snyder AR. Recent Injury and Health-Related Quality of Life in Adolescent Athletes. *J Athl Train.* 2009;44(6):603-610.
36. Welch CE, Hankemeier DA, Wyant AL, Hays DG, Pitney WA, Van Lunen BL. Future directions of evidence-based practice in athletic training: perceived strategies to enhance the use of evidence-based practice. *J Athl Train.* 2014;49(2):234-244.

37. Testa MA. Interpretation of Quality-of-Life Outcomes: Issues That Affect Magnitude and Meaning. J. B. Lippincott Williams and Wilkins Inc.; 2000:II166.
38. Lam KC, Valier ARS, Bay RC, McLeod TCV. A Unique Patient Population? Health-Related Quality of Life in Adolescent Athletes Versus General, Healthy Adolescent Individuals. *J Athl Train.* 2013;48(2):233-241.
39. Snyder AR, Martinez JC, Bay RC, Parsons JT, Sauers EL, Valovich McLeod TC. Health-related quality of life differs between adolescent athletes and adolescent nonathletes. *J Sport Rehabil.* 2010;19(3):237-248.
40. Sorenson SC, Romano R, Scholefield RM, Schroeder ET, Azen SP, Salem GJ. The Trojan Lifetime Champions Health Survey: Development, Validity, and Reliability. *J Athl Train.* 2015;50(4):407-418.
41. Dehkordi AG. The comparison between athlete females and non-athlete females regarding to general health, mental health, and quality of life. *Procedia Soc Behav Sci.* 2011;15:1737-1741.
42. Simon JE, Docherty CL. Current health-related quality of life is lower in former Division I collegiate athletes than in non-collegiate athletes. *Am J Sports Med.* 2014;42(2):423-429.
43. Roos KG, Marshall SW, Kerr ZY, et al. Epidemiology of Overuse Injuries in Collegiate and High School Athletics in the United States. *Am J Sports Med.* 2015;43(7):1790-1797.
44. Keller SD, Bayliss MS, Ware JE, Jr., Hsu MA, Damiano AM, Goss TF. Comparison of responses to SF-36 Health Survey questions with one-week and four-week recall periods. *Health Serv Res.* 1997;32(3):367-384.
45. Ware JE, Kosinski M. SF-36 physical & mental health summary scales: a manual for users of version 1. *Quality Metric*; 2001.
46. Ware JE, Kosinski M, Dewey JE, Gandek B. SF-36 health survey: manual and interpretation guide. *Quality Metric* Inc.; 2000.
47. McHorney CA, War Jr JE, Lu JR, Sherbourne CD. The MOS 36-item Short-Form Health Survey (SF-36): III. Tests of data quality, scaling assumptions, and reliability across diverse patient groups. *Med Care.* 1994:40-66.
48. Maruish ME. User's manual for the SF-36v2 Health Survey. *Quality Metric* Incorporated; 2011.
49. Ware JE, Kosinski M, Dewey JE. How to score version 2 of the SF-36 health survey (standard & acute forms). *QualityMetric Incorporated*; 2000.
50. Snyder AR, Martinez JC, Bay RC, Parsons JT, Sauers EL, Valovich McLeod TC. Health-related quality of life differs between adolescent athletes and adolescent nonathletes. *J Sport Rehabil.* 2010;19(3):237-248.
51. Jenkinson C, Coulter A, Wright L. Short form 36 (SF36) health survey questionnaire: normative data for adults of working age. *Bmj.* 1993;306(6890):1437-1440.
52. Vela LI, Denegar CR. The Disablement in the Physically Active Scale, Part II: The Psychometric Properties of an Outcomes Scale for Musculoskeletal Injuries. *J Athl Train.* 2010;45(6):630-641.
53. Vela LI. *The Disability in the Physically Active Scale: The Psychometrics of an Outcome Scale for Musculoskeletal Injuries*, The Pennsylvania State University; 2005.

54. Marshall GN, Hays RD. The patient satisfaction questionnaire short-form (PSQ-18). Rand Santa Monica, CA; 1994.
55. Hays RD. The Medical Outcomes Study (MOS) measures of patient adherence. *Retrieved April.* 1994;19:2004.
56. Grogan S, Conner M, Norman P, Willits D, Porter I. Validation of a questionnaire measuring patient satisfaction with general practitioner services. *Quality in Health Care : QHC.* 2000;9(4):210-215.

APPENDIX SECTION

EXEMPT IRB APPLICATION

Institutional Review Process

Jessica Lair

APPLICATION FOR IRB EXEMPTION

This is your IRB Exemption Application Number: EXP2015W141218Q

Section I

Classroom exemption instructions:

• For undergraduate classroom projects only, a single application for each separate class, submitted by the faculty member, is required to establish exemption for multiple student projects, if the following conditions apply:

• The faculty member has a current completion certificate for the CITI Course in Human Subjects Protection.

• The faculty member takes responsibility for ensuring all student interactions with human subjects meet the standards for exemption, and if individual projects do not meet the standards for exemption, the students should submit a regular IRB application.

• The faculty member acknowledges that exemption status has no bearing on the need for informed consent and that if informed consent procedures are necessary, ensures they will be carried out in accordance with the Texas State IRB consent form checklist.

• The faculty member submits one exemption request per class and only for their own classes.

NOTE: If this application is for an undergraduate classroom exemption "Academic/Classroom Project" must be selected from the drop-down list for question 1.

1. This project is **thesis**/dissertation

2. If you are a student, please provide your supervising faculty member's full name:

Faculty Name: **Rod Harter, PhD, ATC, FNATA**

Section II

1. If this is an academic or classroom project, does the scope extend beyond Texas State University?

Yes No

2. Would you describe this project as "a systematic investigation, designed to develop or contribute to generalizable knowledge?

Yes No

3. Will the results of your project be put on the internet, shared at a conference, published, or otherwise disseminated?

Yes No

4. Will identifiable private information from individuals be collected from contact with research participants?

Yes **No**

5. Will identifiable private information from individuals be collected from other sources (e.g. medical records)?

Yes **No**

6. Does the project involve fetuses, pregnant women or human in vitro fertilization?

Yes **No**

7. Does the project involve prisoners?

Yes **No**

8. Does the project involve any persons who are mentally impaired or homeless or who have limited autonomy?

Yes **No**

9. Does the project involve the review of medical records if the information is recorded in such a way that subjects can be identified, directly or through identifiers linked to the subjects?

Yes **No**

10. Does the project involve survey or interview techniques which include minors as subjects in which the researcher(s) participate in the activities being observed?

Yes **No**

11. Will a drug, biological product, medical device, or other product regulated by the FDA be used in this project?

Yes **No**

12. Will the participants be asked to ingest substances of any kind?

Yes **No**

13. Will the participants be asked to perform any physical tasks?

Yes **No**

14. Does the research attempt to influence or change participants' behavior, perception, or cognition?

Yes **No**

15. Does the project involve questions or discussions of sensitive or deeply personal aspects of the subject's behavior, life experiences or attitudes? Examples include substance abuse, sexual activity, sexual orientation, sexual abuse, criminal behavior, sensitive demographic data, detailed health history, etc.

Yes **No**

16. Does the project involve techniques which expose the subject to discomfort, harassment, embarrassment, stigma, alarm or fear beyond levels encountered in the daily life of a healthy individual?

Yes **No**

17. Does the project involve the deception of subjects?

Yes **No**

18. Does the project involve videotaping or audiotaping of subjects?

Yes **No**

Section III

1. If you are choosing one of the six federal categories of exemption, which one are you choosing?

**If your project falls under more than one exemption, choose the one that is most applicable. You may cite the others in #3 below. Category 2

Please note for questions 2, 3, and 4: The text areas are limited to 2000 characters/approximately 300 words. Even though you are allowed to type more than the specified limit, those additional words/characters will be cropped/cut off when you move to the next question.

2. What is the purpose of the project? (300 words or less)

The primary purpose of this study will be to investigate the health related quality of life of collegiate dance teams. The secondary purposes of this study will be to investigate the collegiate dancer's perception of health care available, and identify if there is a need for readily available health care for this population.

3. Explain how this exemption category pertains to your project: (300 words or less)

The participants of this study will not be personally identified in the surveys administered and they will have absolutely no risk of criminal investigation, civil liability, or personal damage. The surveys that will be administered do not contain sensitive information and are not linked to causing stress in participants.

4. If you believe your project poses no risk to human participants or should be exempt from IRB review for other reasons, please explain: (300 words or less)

The total survey time should not take more than 30 minutes. The participants will be informed that if they decide to quit at any time I will not be aware. They need to simply close their packet and wait until the group is finished to turn it in. I want to make sure they are comfortable and confident in the research process.

Acknowledgment of Consent

This survey is an approved research that has been declared exempt by the Texas State Institutional Review Board (IRB).

The primary purpose of this study will be to investigate the health related quality of life of large collegiate dance teams. The secondary purposes of this study will be to investigate the collegiate dancer's perception of health care available, and identify if there is a greater need for readily available health care in the dance population.

You have been selected due to your dance teams size and geographical location. If the you agree to participate in this study, there will be no identifiers that link you to this study.

If you agree to participate please continue to the next page and complete the survey. The actual survey should only take approximately 30 minutes to complete. The entire process should only take 45 minutes.

This project EXP2015W141218Q was approved by the Texas State IRB on December 17, 2015. Pertinent questions or concerns about the research, research participants' rights, and/or research-related injuries to participants should be directed to the IRB chair, Dr. Jon Lasser (512-245-3413 - lasser@txstate.edu) and to Becky Northcut, Director, Research Integrity & Compliance (512-245-2314 - bnorthcut@txstate.edu).

Questions about this research should be addressed to:

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TEXAS STATE UNIVERSITY
SAN MARCOS
The rising STAR *of Texas*

Institutional Review Board

Request For Exemption

Certificate of Approval

Applicant: Jessica Lair

Request Number : EXP2015W141218Q

Date of Approval: 12/17/15

Assistant Vice President for Research and Federal Relations

Chair, Institutional Review Board

REVIEW OF LITERATURE

Multiple reports over the last 40 years indicate that the lifetime injury incidence among all dancers is as high as 90%.[1-4] This high incidence of injury supports the premise that this population unceasingly suffers from dance-related injuries while performing and perfecting their craft.[5] Physical and psychological concerns are hypothesized to be highly related to injury in many sports. [6] Physical factors could include musculoskeletal injuries, muscular imbalance, improper posture, metabolic disorders, or poor training surfaces, and psychological factors could include burnout, trait anxiety, state anxiety, performance anxiety, negative affect, life stressors, peer pressure, and poor self-image that deter focus from dance.[6,10-12,61-66] Injury of collegiate dancers is historically understudied, only 3 published peer-reviewed studies of this population were found including anterior cruciate ligament injury, lumbar lordosis, and shoulder injuries.[7-9] Other studies included psychological concerns in dancers including burnout, trait anxiety, state anxiety, performance anxiety, and negative affect.[1,5,7,8,10-14] Collegiate dancers often lack recognition as a recognized sanctioned sport with Intercollegiate Athletics so may not receive the same access to healthcare services afforded to other collegiate athletes. At present we have an incomplete understanding of the type, severity, and overall incidence of musculoskeletal injuries in the collegiate dance team population. [1,4,13,15-18]

The level of physical activity required in dancers is similar to those required of athletes with their fitness energy levels requiring both aerobic and anaerobic expenditures as well as specialization in speed, agility, fine motor control, and mental awareness of their surroundings.[1,3,15] Studies have reported that individuals with varying dance styles have VO_{2max} scores ranging between 37.3-51.0ml·kg^{-1}·min^{-1} and heart rate max was

between 190-200bpm.[22-24] In comparison, collegiate cheerleaders averaged 40.7±5.8 $ml \cdot kg^{-1} \cdot min^{-1} VO_2$ Max.[25] Artistic interpretation opposed to consistent head-to-head competition is the main difference between traditional athletes and dancers. However, collegiate dancers compete in a variety of dance competitions regionally and nationally.[26]

The National Collegiate Athletic Association Injury Surveillance System (NCAA ISS), developed in 1982, provides data on sports injury trends in intercollegiate athletics and currently collects injury statistics on 25 different sports across all divisions.[27,28] Unfortunately, intercollegiate dance teams are not included in this database, however, gymnasts were included. Gymnasts were the only athletes to not have an "equivalent" or pair during analysis, but could easily be grouped with dancers and cheerleaders if they were tracked.[30,31] The surveillance system has played a role in the risk-management, policy development, and rules-making process in most collegiate sports since it began. A recently published study by Kerr et al. studied gymnasts specifically for 3 seasons and showed an increase in injury rates more than contributed to data collection methods.[67] Despite the aforesaid high report of injury in the dance population they have not been included into this study. Athletic trainers are the group of health-care providers most directly associated with the system and can play an integral role in the growth of dance medicine in the collegiate setting. This program could provide injury tracking to get a better understanding of epidemiology, incidence, rate of injury, treatment options, prevention programs, and so much more.[29]

Injury, as defined by the NCAA ISS, is one that occurred during an organized, university related activity that resulted in an absence from participation for at least one day after the date of the injury.[27,28,47] The injuries commonly seen among modern dance

team members are overuse in nature and could be mitigated with the availability of the proper health care providers.[4,26] For example, Bronner et al. studied 42 dancers over a 5 year period, and found that 34% of lower extremity injuries were ankle and foot, and 17% were lumbo-pelvic.[4] Bronner et al. also studied 7 Broadway dancers over a 7 week period, totaling 1,680 individual performances, and noted that 50% of injuries were combined ankle and foot, followed by 34% lumbopelvic, 8% knee, and 8% calf region.[32] However, health care providers need a thorough understanding of dance techniques to properly instruct and teach the dancers injury preventative exercises, as well as to implement functionally sound rehabilitation programs.[1,33] As a health care provider it is understood that no two patients present themselves identically, and this is an important point to remember when caring for dancers. Dancers are unique in the fact that their bodies move and function differently than the common collegiate athletes. For example, a grade 2 metatarsal-phalangeal joint sprain to a football lineman may not be reported to his team's medical staff, could however be upsetting to a soccer player, and devastating to a dancer due to the immense amount of time spent on their toes..[13] It should be noted that these individuals are constantly pushed to their anatomical limits at an excessive and rapid pace, therefore, greatly increasing the risk of injury.[13] The injuries commonly seen are overuse in nature and could be prevented with the availability of the proper health care providers.[4,26] Knowing the style, ability, and individuality of the dancers will help clinicians instruct and teach the dancers preventative exercises, as well as implement a functionally sound rehabilitation program.[1,11,32,33]

The health care providers' understanding of a dancer's biomechanics and techniques are imperative for growth in dance medicine. A ballet dancer's body requires

increased flexibility with increases of 30% hip external rotation, 8% hip flexion, and 15% abduction when compared to non-dancers. The increased flexibility seen in dancers should not be confused with being hypermobile, because when compared to non-dancers there is little difference noted. Knowing the difference could save a lot of time and money during rehabilitation because the clinical goals would certainly change.[3,18,19,68] A wide variety of dancers must perform with turn-out and en pointe techniques trying to achieve an aesthetic look, however, lack or flexibility or strength could lead to serious joint injuries.[69] Once again, knowing these key factors would certainly lead to proper preventative and strengthening programs.[18,70]

Other aspects of dance medicine that needs attention are the mental stresses that dancers are placed under. Some of those include fear of being told not to dance, being judged by peers, eating disorders, and/or loss of position. These stressors often affect their performance negatively, which can lead to injury.[6,11,71] However, Estanol et al. supports the idea that psychosocial interventions lead to a decrease in risk of eating disorders specifically. They utilized the Weight Pressures in Dance Scale to measure the dancer's environmental pressure, the Beck depression inventory II for depression, and the state and trait anxiety inventory. Eating disorder risk was measured with the eating disorder inventory-third edition, and mental skills were measured using the athletic coping skills inventory. Findings of the study supported the hypothesis that external pressures and negative affect have a large influence on eating disorder, and that protective factors can be given to dancers by educating them on coping strategies. These coping strategies were specifically dealing with adversity, lack of worry, confidence, and achievement motivation.[65] Another study by Torres-McGehee et al. supports those

findings by using the Eating disorder inventory-third edition to measure eating disorder risk, The Center for Epidemiology Studies Depression scale to measure depression, the eating disorder knowledge questionnaire and the nutritional knowledge survey specific to athletes and dancers assessed knowledge before and after intervention. The findings supported an increase in nutrition and eating disorder knowledge, and a decrease in depression, poor self-esteem, and maturity fears in the intervention group.[72] While both of these were education on eating disorders they did look at multiple psychosocial factors and future research should follow these methods to gain a better understanding of this aspect in dancers.

HEALTH CARE SATISFACTION

Health care satisfaction, as defined by Hostutler et al., occurs when the patient feels that their expectations, needs, and perceptions of health care were met.[34] When observing a health care provider and how they can effect a patient's satisfaction the quality of the interaction can be measured in several ways. Work by Ware et al. has established that health care satisfaction is affected by both positive and negative influences in the art of caring, technical quality of care, accessibility and convenience, financial costs, physical environment, availability, continuity of care, and efficacy and outcomes of the care given. The art of caring is measured by the provider's conduct (concern, consideration abruptness, disrespect). Technical quality of care looks at high standards of diagnosis and treatment (being thorough, experienced, accurate, and clear explanations/instructions). Accessibility or convenience takes into consideration all aspects of organizing the appointment (effort in getting an appointment, distance of travel to get care, convenient hours of operation, and waiting time at office). Finance questions

take into consideration the ability to pay for care (delayed payments, recognition of different credit-cards, and wide range insurance coverage). Physical environment looks at overall satisfaction of the health care facilities (good atmosphere, lighting, quiet, clean, and easy to navigate through the facilities). Availability is the overall readiness of staff members at the facility (physician, nurse, or other staffers). Continuity of care simply looks at the long term use of one health care provider or facility. Efficacy and outcome of care looks at useful or helpful advice that lead to improved health status (relieved pain or prevented disease).[73] While most NCAA teams have an athletic trainer readily available to work with for any given purpose it is unclear how many dance teams have one to report to. Athletic trainers often understand the importance of a good relationship and understanding of the student athlete, and this could play a part of dancer satisfaction with health care. However, one study concluded that athletes in a high profile sport is often more satisfied with their health care than those in a lower profile sport, and this could be the cause of many things. Staffing issues, and lack of knowledge of the low profile sports could be credited with the reasoning behind lower satisfaction.[74]

Dancers are often cited with saying there is a lack of caring, appreciation, and understanding of and their art as a sport, and this is the deterrent of them seeking medical attention.[15,18,19] Ballerinas are most often cited in research and are often characterized as "difficult" and "mistrusting", and this has evolved from a common misunderstanding and lack of knowledge about them as athletes from the healthcare community. Trust is ultimately gained when there is an open line of communication and understanding of their bodies, dance technique, culture, and mentality.[18] Patient's satisfaction with available health care is related to the perception of quality of care provided. The

perception of health care will lead to future health care selection and recommendation.[35] Therefore, understanding a dancer's expectations, needs, and perceptions is critical for identifying the weaknesses in health care currently provided to them. Once health care weaknesses are identified, changes towards improved health care methodology can begin and a more positive relationship estabilished.[36]

Air et al. recently found that 47.5% of 177 injured dancers considered their instructors to be their first option for seeking medical treatment, followed by physical therapists (30%), a physician (12.5%), and lastly, fellow dance colleagues (10%). Interestingly enough these dancers were seeking a majority of treatment advice from individuals with little to no medical training at all. These authors noted that the dancer's prior knowledge about medical help available and/or medical insurance could have affected the outcome of their study, and supports the need of access to proper health care.[13,33]

EVIDENCE BASED PRACTICE

Evidence based practice (EBP) is a multifaceted approach utilizing current evidence in conjunction with patient values and clinical expertise.[37] This practice is common in the medical profession; however, the sports medicine community is currently transitioning more heavily into this practice. The key to growth in the medical profession is not only utilizing objective disease-oriented evidence, but utilizing EBP while tracking both patient reported outcomes and disease-oriented evidence simultaneously.[38] The importance of this practice is vital to gaining patient trust and satisfaction of their

available health care, and also creates a checks-and-balance system to help the practitioner successfully navigate through the treatment of an injury.[39]

Underutilization of EBP is often credited to lack of time, resources, and practitioner understanding of the topic. The sport medicine community is currently shifting the culture of understanding and utilization of this practice by stressing it in school and professional conferences. The research is growing tremendously, however, there will be trouble implementing EBP if there is a lack of knowledge about specific athletic groups such as dance.[40] This should drive future research in all areas of dance and is critical to the improvement of understanding of and care delivered to dancers with issues.[38]

More specifically, health-related quality of life (HRQOL) is an important subjective patient-based component to EBP that investigates personal experience, beliefs, and perceptions. A practitioner can take into consideration the subjective data to better understand their overall view of life and well-being during injury.[39,41,42] Athletes often view their individual sports as their identity, and long periods of absence could lead to an "identity crisis" if not handled properly. The athlete becomes more involved with their treatment plan when the HRQOL is implemented by allowing them to set goals and visualize the treatment progress on paper.[41,43] Current cross sectional studies examining the physical, psychological, and social aspects of health during normal daily activities, and have been used in adults, adolescents, and various athletic populations.[44,45] The Medical Outcomes Study Short Form Health Survey, version 2 (SF-36v2) is a widely used, valid and reliable standard measure of one's quality of life.[31,49-51] The SF-36v2 evolved from its predecessor the SF-36 and maintains the same basic properties from it,

but is more efficient. The mean scores from the domain T scores of the SF-36v2 vary from those of the SF-36, but the PCS and MCS scores are highly comparable.[52] The physical and mental status of those who complete the SF-36v2 will be assessed through 8 core concepts: (a) physical functioning, (b) role limitation for emotional issues, (c) role limitation for physical issues, (d) social functioning, (e) bodily pain, (f) general mental health, (f) vitality, and (h) overall health.[52] The SF-36 was used by McAllister et al. to establish norms (Table 1) on Division I collegiate athletes, however collegiate dancers were not included in the study.[30]

TABLE 1
Mean (Standard Error) Values for the Summary Scores and Individual Domains by Group

SF-36 component	Men					Women				
	Noninjured	Injured		All	Norm[a,e]	Noninjured	Injured		All	Norm[a,e]
		Mild	Serious				Mild	Serious		
Physical component summary scale	54 (0.4)	50 (0.8)	44 (2.2)	53 (0.4)	54 (0.7)	54 (0.5)	50 (1.1)	47 (1.3)	52 (0.4)	54 (0.9)
Mental component summary scale	52 (0.5)	53 (0.8)	48 (2.1)	52 (0.4)	51 (1.0)	52[a] (0.5)	53 (0.8)	50 (1.9)	52 (0.5)	47 (1.1)
Physical function	94 (1.2)	95 (1.5)	85 (4.5)	94 (1.0)	94 (1.9)	96[a] (1.2)	95 (0.9)	88 (3.5)	95 (0.9)	90 (2.0)
Role physical	96 (1.0)	82 (3.7)	47 (9.6)	90 (1.4)	94 (2.5)	91 (2.0)	83 (4.6)	73 (7.7)	87 (1.9)	85 (3.1)
Role emotional	94[a] (1.2)	92 (2.9)	73 (9.2)	92 (1.3)	88 (3.3)	93[a] (1.8)	94 (2.1)	75 (8.0)	91 (1.6)	79 (3.4)
Bodily pain	84 (1.1)	69 (2.5)	52 (5.0)	79 (1.1)	80 (2.5)	82 (1.4)	68 (3.5)	50 (4.0)	75 (1.5)	82 (2.1)
Mental health	80 (1.0)	82 (1.2)	71 (2.7)	79 (0.8)	78 (1.9)	79[a] (1.0)	79 (1.7)	76 (2.8)	78 (0.9)	72 (1.9)
Vitality	69 (1.1)	67 (1.9)	59 (4.3)	68 (0.9)	65 (2.2)	68[a] (1.1)	69 (1.7)	64 (2.8)	67 (0.9)	60 (2.0)
Social function	88 (1.2)	82 (3.2)	70 (5.6)	86 (1.2)	86 (2.4)	87 (1.6)	82 (3.0)	74 (5.0)	85 (1.4)	82 (2.1)
General health	81 (1.1)	72 (2.6)	72 (4.2)	79 (1.0)	77 (2.1)	79 (1.3)	74 (2.5)	74 (3.7)	77 (1.1)	77 (1.9)

[a] Statistical significance when compared with norm.

Despite the available evidence on injuries in a majority of ballet dancers, it is unclear how disability and health related quality of life after injuries occur affect the dancers of all backgrounds.[13] As stated before, a majority of professional dancers perform to support themselves financially and an absence from this would be detrimental to their psychological and social well-being.[4,15] Many collegiate dance team members use their physical and artistic skills to earn a college degree in dance, and go on to become professional performers and/or teachers.

REFERENCES

1. Toledo SD, Akuthota V, Drake DF, Nadler SF, Chou LH. Sports and performing arts medicine. 6. Issues relating to dancers. *Archives of physical medicine and rehabilitation.* 2004;85(3 Suppl 1):S75-78.
2. Miller C. Dance medicine: current concepts. *Phys Med Rehabil Clin N Am.* 2006;17(4):803-811, vii.
3. Koutedakis Y, Jamurtas A. The dancer as a performing athlete: physiological considerations. *Sports Med.* 2004;34(10):651-661.
4. Bronner S, Ojofeitimi S, Rose D. Injuries in a modern dance company: effect of comprehensive management on injury incidence and time loss. *Am J Sports Med.* 2003;31(3):365-373.
5. Russell JA. Preventing dance injuries: current perspectives. *Open Access J Sports Med.* 2013;4:199-210.
6. Mainwaring L, Kerr G, Krasnow D. Psychological correlates of dance injuries. *Medical Problems of Performing Artists.* 1993;8:3-3.
7. Ambegaonkar J, Caswell A, Kenworthy J, Cortes N, Caswell S. Lumbar Lordosis in Female Collegiate Dancers and Gymnasts. *Medical problems of performing artists.* 2014;29(4):189-192.
8. Ambegaonkar JP, Shultz SJ, Perrin DH, Schulz MR. Anterior cruciate ligament injury in collegiate female dancers. *Athletic Therapy Today.* 2009;14(4):13-16.
9. Sides SN, Ambegaonkar JP, Caswell SV. High Incidence of Shoulder Injuries in Collegiate Modern Dance Students. *Athletic Therapy Today.* 2009;14(4):43-46.
10. Air ME. Psychological distress among dancers seeking outpatient treatment for musculoskeletal injury. *Journal of dance medicine & science : official publication of the International Association for Dance Medicine & Science.* 2013;17(3):115-125.
11. Krasnow D, Kerr G, Mainwaring L. Psychology of dealing with the injured dancer. *Med Probl Perform Art.* 1994;9(1):7-9.
12. Draugelis S, Martin J, Garn A. Psychosocial Predictors of Well-Being in Collegiate Dancers. *Sport Psychologist.* 2014;28(1):1-9.
13. Hincapié CA, Morton EJ, Cassidy JD. Musculoskeletal injuries and pain in dancers: a systematic review. *Archives of physical medicine and rehabilitation.* 2008;89(9):1819-1829.
14. Dale RB. High incidence of shoulder injuries in collegiate modern dance students. *Athletic Therapy Today.* 2009:43.
15. Russell JA. Preventing dance injuries: current perspectives. *Open Access Journal of Sports Medicine.* 2013;4:199-210.
16. Ojofeitimi S, Bronner S. Injuries in a modern dance company effect of comprehensive management on injury incidence and cost. *Journal of dance medicine & science : official publication of the International Association for Dance Medicine & Science.* 2011;15(3):116-122.
17. Allen N, Nevill AM, Brooks JH, Koutedakis Y, Wyon MA. The effect of a comprehensive injury audit program on injury incidence in ballet: a 3-year prospective study. *Clinical journal of sport medicine : official journal of the Canadian Academy of Sport Medicine.* 2013;23(5):373-378.
18. Shah S. Caring for the dancer: special considerations for the performer and troupe. *Current sports medicine reports.* 2008;7(3):128-132.

19. Shah S, Weiss DS, Burchette RJ. Injuries in professional modern dancers: incidence, risk factors, and management. *Journal of dance medicine & science : official publication of the International Association for Dance Medicine & Science.* 2012;16(1):17-25.
20. Steinberg N, Siev-Ner I, Peleg S, et al. Injury patterns in young, non-professional dancers. *J Sports Sci.* 2011;29(1):47-54.
21. Moser BR. 30,000 kicks: gaining perspective in dance training volume. *Current sports medicine reports.* 2014;13(5):293-294.
22. Schantz PG, Astrand PO. Physiological characteristics of classical ballet. *Medicine and science in sports and exercise.* 1984;16(5):472-476.
23. Rodrigues-Krause J, Krause M, Cunha Gdos S, et al. Ballet dancers cardiorespiratory, oxidative and muscle damage responses to classes and rehearsals. *European journal of sport science.* 2014;14(3):199-208.
24. Blanksby BA, Reidy PW. Heart rate and estimated energy expenditure during ballroom dancing. *Br J Sports Med.* 1988;22(2):57-60.
25. Thomas DQ, Seegmiller JG, Cook TL, Young BA. PHYSIOLOGIC PROFILE OF THE FITNESS STATUS OF COLLEGIATE CHEERLEADERS. *Journal of Strength & Conditioning Research (Allen Press Publishing Services Inc.).* 2004;18(2):252-254.
26. Leanderson C, Leanderson J, Wykman A, Strender LE, Johansson SE, Sundquist K. Musculoskeletal injuries in young ballet dancers. *Knee Surg Sports Traumatol Arthrosc.* 2011;19(9):1531-1535.
27. Dick R, Agel J, Marshall SW. National Collegiate Athletic Association Injury Surveillance System Commentaries: Introduction and Methods. *Journal of Athletic Training.* 2007;42(2):173-182.
28. Klossner D, Corlette J, Agel J, Marshall SW. Data-driven decision making in practice: The NCAA injury surveillance system. *New Directions for Institutional Research.* 2009;2009(144):53-63.
29. Dick RW. NCAA injury surveillance system: A tool for health and safety risk management. *Athletic Therapy Today.* 2006;11(1):42-44.
30. McAllister DR, Motamedi AR, Hame SL, Shapiro MS, Dorey FJ. Quality of life assessment in elite collegiate athletes. *The American Journal of Sports Medicine.* 2001;29(6):806-810.
31. Huffman GR, Park J, Roser-Jones C, Sennett BJ, Yagnik G, Webner D. Normative SF-36 values in competing NCAA intercollegiate athletes differ from values in the general population. *The Journal of bone and joint surgery. American volume.* 2008;90(3):471-476.
32. Bronner S, Brownstein B. Profile of dance injuries in a Broadway show: a discussion of issues in dance medicine epidemiology. *The Journal of orthopaedic and sports physical therapy.* 1997;26(2):87-94.
33. Fuhrmann TL, Brayer A, Andrus N, McIntosh S. Injury prevention for modern dancers: a pilot study of an educational intervention. *J Community Health.* 2010;35(5):527-533.
34. Hostutler JJ, Taft SH, Snyder C. Patient needs in the emergency department: nurses' and patients' perceptions. *J Nurs Adm.* 1999;29(1):43-50.
35. Trout A, Magnusson AR, Hedges JR. Patient satisfaction investigations and the emergency department: what does the literature say? *Academic emergency medicine : official journal of the Society for Academic Emergency Medicine.* 2000;7(6):695-709.
36. Thayaparan AJ, Mahdi EJ. The Patient Satisfaction Questionnaire Short Form (PSQ-18) as an adaptable, reliable, and validated tool for use in various settings. *Medical education online.* 2013;18.

37. Snyder AR, Parsons JT, Valovich McLeod TC, Curtis Bay R, Michener LA, Sauers EL. Using disablement models and clinical outcomes assessment to enable evidence-based athletic training practice, part I: disablement models. *J Athl Train.* 2008;43(4):428-436.
38. Steves R, Hootman JM. Evidence-Based Medicine: What Is It and How Does It Apply to Athletic Training? *J Athl Train.* 2004;39(1):83-87.
39. McLeod TCV, Bay RC, Parsons JT, Sauers EL, Snyder AR. Recent Injury and Health-Related Quality of Life in Adolescent Athletes. *Journal of Athletic Training (National Athletic Trainers' Association).* 2009;44(6):603-610.
40. Welch CE, Hankemeier DA, Wyant AL, Hays DG, Pitney WA, Van Lunen BL. Future directions of evidence-based practice in athletic training: perceived strategies to enhance the use of evidence-based practice. *J Athl Train.* 2014;49(2):234-244.
41. Testa MA. Interpretation of Quality-of-Life Outcomes: Issues That Affect Magnitude and Meaning. J. B. Lippincott Williams and Wilkins Inc.; 2000:II166.
42. Lam KC, Valier ARS, Bay RC, McLeod TCV. A Unique Patient Population? Health-Related Quality of Life in Adolescent Athletes Versus General, Healthy Adolescent Individuals. *Journal of Athletic Training (Allen Press).* 2013;48(2):233-241.
43. Snyder AR, Martinez JC, Bay RC, Parsons JT, Sauers EL, Valovich McLeod TC. Health-related quality of life differs between adolescent athletes and adolescent nonathletes. *J Sport Rehabil.* 2010;19(3):237-248.
44. Sorenson SC, Romano R, Scholefield RM, Schroeder ET, Azen SP, Salem GJ. The Trojan Lifetime Champions Health Survey: Development, Validity, and Reliability. *Journal of Athletic Training.* 2015;50(4):407-418.
45. Dehkordi AG. The comparison between athlete females and non-athlete females regarding to general health, mental health, and quality of life. *Procedia - Social and Behavioral Sciences.* 2011;15:1737-1741.
46. Simon JE, Docherty CL. Current health-related quality of life is lower in former Division I collegiate athletes than in non-collegiate athletes. *Am J Sports Med.* 2014;42(2):423-429.
47. Roos KG, Marshall SW, Kerr ZY, et al. Epidemiology of Overuse Injuries in Collegiate and High School Athletics in the United States. *Am J Sports Med.* 2015;43(7):1790-1797.
48. Keller SD, Bayliss MS, Ware JE, Jr., Hsu MA, Damiano AM, Goss TF. Comparison of responses to SF-36 Health Survey questions with one-week and four-week recall periods. *Health services research.* 1997;32(3):367-384.
49. Ware JE, Kosinski M. *SF-36 physical & mental health summary scales: a manual for users of version 1.* Quality Metric; 2001.
50. Ware JE, Kosinski M, Dewey JE, Gandek B. *SF-36 health survey: manual and interpretation guide.* Quality Metric Inc.; 2000.
51. McHorney CA, War Jr JE, Lu JR, Sherbourne CD. The MOS 36-item Short-Form Health Survey (SF-36): III. Tests of data quality, scaling assumptions, and reliability across diverse patient groups. *Medical care.* 1994:40-66.
52. Maruish ME. *User's manual for the SF-36v2 Health Survey.* Quality Metric Incorporated; 2011.
53. Ware JE, Kosinski M, Dewey JE. *How to score version 2 of the SF-36 health survey (standard & acute forms).* QualityMetric Incorporated; 2000.
54. Snyder AR, Martinez JC, Bay RC, Parsons JT, Sauers EL, Valovich McLeod TC. Health-related quality of life differs between adolescent athletes and adolescent nonathletes. *J Sport Rehabil.* 2010;19(3):237-248.

55. Jenkinson C, Coulter A, Wright L. Short form 36 (SF36) health survey questionnaire: normative data for adults of working age. *Bmj.* 1993;306(6890):1437-1440.
56. Vela LI, Denegar CR. The Disablement in the Physically Active Scale, Part II: The Psychometric Properties of an Outcomes Scale for Musculoskeletal Injuries. *Journal of Athletic Training.* 2010;45(6):630-641.
57. Vela LI. *The Disability in the Physically Active Scale: The Psychometrics of an Outcome Scale for Musculoskeletal Injuries*, The Pennsylvania State University; 2005.
58. Marshall GN, Hays RD. The patient satisfaction questionnaire short-form (PSQ-18). Rand Santa Monica, CA; 1994.
59. Grogan S, Conner M, Norman P, Willits D, Porter I. Validation of a questionnaire measuring patient satisfaction with general practitioner services. *Quality in Health Care : QHC.* 2000;9(4):210-215.
60. Hays RD. The Medical Outcomes Study (MOS) measures of patient adherence. *Retrieved April.* 1994;19:2004.
61. Warren MP, Brooks-Gunn J, Fox RP, et al. Persistent osteopenia in ballet dancers with amenorrhea and delayed menarche despite hormone therapy: a longitudinal study. *Fertility and sterility.* 2003;80(2):398-404.
62. Warren MP, Brooks-Gunn J, Hamilton LH, Warren LF, Hamilton WG. Scoliosis and fractures in young ballet dancers. Relation to delayed menarche and secondary amenorrhea. *The New England journal of medicine.* 1986;314(21):1348-1353.
63. Lench HC, Levine LJ, Roe E. Trait anxiety and achievement goals as predictors of self-reported health in dancers. *Journal of dance medicine & science : official publication of the International Association for Dance Medicine & Science.* 2010;14(4):163-170.
64. Singer K. The effect of neurofeedback on performance anxiety in dancers. *Journal of Dance Medicine & Science.* 2004;8(3):78-81.
65. Estanol E, Shepherd C, MacDonald T. Mental skills as protective attributes against eating disorder risk in dancers. *Journal of Applied Sport Psychology.* 2013;25(2):209-222.
66. Reel JJ, SooHoo S, Jamieson KM, Gill DL. Femininity to the extreme: Body image concerns among college female dancers. *Women in Sport & Physical Activity Journal.* 2005;14(1):39.
67. Kerr ZY, Hayden R, Barr M, Klossner DA, Dompier TP. Epidemiology of National Collegiate Athletic Association women's gymnastics injuries, 2009-2010 through 2013-2014. *Journal of athletic training.* 2015;50(8):870-878.
68. Weiss DS, Shah S, Burchette RJ. A profile of the demographics and training characteristics of professional modern dancers. *Journal of dance medicine & science : official publication of the International Association for Dance Medicine & Science.* 2008;12(2):41-46.
69. Hamilton WG, Hamilton LH, Marshall P, Molnar M. A profile of the musculoskeletal characteristics of elite professional ballet dancers. *The American journal of sports medicine.* 1992;20(3):267-273.
70. Garrick JG, Lewis SL. Career hazards for the dancer. *Occup. Med.-State Art Rev.* 2001;16(4):609-618.
71. Noh Y-E, Morris T. Designing research-based interventions for the prevention of injury in dance. *MEDICAL PROBLEMS OF PERFORMING ARTISTS.* 2004;19(2):82-89.
72. Torres-McGehee TM, Green JM, Leaver-Dunn D, Leeper JD, Bishop PA, Richardson MT. ATTITUDE AND KNOWLEDGE CHANGES IN COLLEGIATE DANCERS FOLLOWING A SHORT-TERM, TEAM-CENTERED PREVENTION PROGRAM ON EATING DISORDERS 1. *Perceptual and Motor skills.* 2011;112(3):711-725.

73. Ware JE, Jr., Davies-Avery A, Stewart AL. The measurement and meaning of patient satisfaction. *Health & medical care services review.* 1978;1(1):1, 3-15.
74. Unruh S, Unruh N, Moorman M, Seshadri S. Collegiate Student-Athletes' Satisfaction With Athletic Trainers. *J Athl Train.* 2005;40(1):52-55.

SURVEY ADMINISTRATION SCRIPT

You are being asked to be part of a research project that is trying to learn more about dancer's health related quality of life, perception of health care available, and their need for readily available health care. If you agree to be part of this research, you will take a five-part survey. It should take about 30 minutes to finish the survey. The research is being conducted by myself, Jessica Lair of Texas State University.

There are no serious risks to you while completing this one time. However, you may choose not to answer any question(s) for any reason.

There are no direct benefits to you for participating in this research. However, society may benefit from the results. Your name will be put into a raffle directly after completing the surveys and three members from your team will win Walmart gift cards ($25, $15, and $10).

The surveys are anonymous; we are not recording your name. We will keep the surveys in a locked file cabinet at Texas State University for three years and then we will destroy the surveys. Only the researcher, Jessica Lair, will have access to the surveys.

Your participation is voluntary, and refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled.

A summary of the findings will be provided to participants upon completion of the study, if requested. To access results of the study, contact myself, Jessica Lair.

OVERVIEW OF THE STUDY

Purpose of Study: The primary purpose of this study will be to investigate the HRQOL of collegiate dance team members as assessed by the Short Form-36v2, and Disability in the Physically Active (DPA) instruments. Secondary purposes of this study will be to survey collegiate dance team members' perceptions of the health care available to them, and to identify their levels of satisfaction with the health care services provided as assessed by the Modified Patient Satisfaction Questionnaire (M-PSQ) instrument.

Delimitations:

- Must be official member of their school's dance team, or was on current roster before incurring a season-ending injury
- Must be currently performing at competitions and/or sporting events

Operational Definitions:

- *Injury*- as defined by the NCAA ISS, is one that occurred during an organized, university related activity that resulted in an absence from participation for at least one day after the date of the injury.
- *Health care satisfaction*- as defined by Hostutler et al, occurs when the patient feels that their expectations, needs, and perceptions of health care were met.

Significance of the study:

The outcomes of this study will provide significant insight to the field of dance medicine by:

- Introducing basic epidemiological statistics about collegiate dancers
- Shining light on the comparisons of dancers and other NCAA athletes
- Acknowledge the need to include collegiate dancers in the NCAA ISS