Clinical Research

Türk Fen ve Sağlık Dergisi
Turkish Journal of Science and Health

Volume 4
Number 1
Year 2023
Pages 55-63

e-ISSN: 2717-7173 https://dergipark.org.tr/tr/pub/tfsd

Received: 08.11.2022 Accepted: 03.01.2023 https://doi.org/10.51972/tfsd.1200944

The Relationship Between Sport Injury Anxiety and Musculoskeletal Discomfort in Folk Dancers: An Analysis of Body Parts

Murat Tomruk [1], Melda Soysal Tomruk [1*], Gönül Kılavuz Ören [1], Selver Bulut [1], Hasan Özbek [1]

[1]Burdur Mehmet Akif Ersoy University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Burdur, Türkiye

ABSTRACT:
Purpose: Since anxiety and musculoskeletal discomfort can affect dancers separately both physically and psychologically throughout their dance life, revealing the relationship between level of anxiety and musculoskeletal discomfort could be beneficial for the development of approaches to prevent injuries occurring in different body parts. This study aimed to determine the relationship between sport injury anxiety and musculoskeletal discomfort in folk dancers and to analyze body parts with this point of view.
Material and Methods: Fifty-four folk dancers whose mean (SD) age and BMI were 23.04 (4.29) years and 22.61 (3.36) kg/m^2, respectively, participated in the study (37 males, 17 females). Sport injury anxiety was assessed using the Sports Injury Anxiety Scale while the frequency and severity of musculoskeletal discomfort were assessed with the Cornell Musculoskeletal Discomfort Questionnaire. The correlation coefficients were calculated using Spearman test.
Results: Overall musculoskeletal discomfort positively and moderately correlated with total sport injury anxiety in folk dancers ($p=0.001$, $r=0.442$). On the other hand, sport injury anxiety was significantly related to musculoskeletal discomfort in neck, both legs and left foot alone when body part analyzed ($p<0.05$). In addition, some dance-related features were also found to be associated with anxiety and discomfort, separately ($p<0.05$).
Conclusion: Keeping anxiety level to a minimum could help to reduce musculoskeletal discomfort in dancers. We believe that musculoskeletal discomfort could be minimized and dance performance could be increased by applying approaches that combat anxiety in dancers. Besides, dancers with musculoskeletal discomfort in the lower extremities should be evaluated for injury anxiety.
Keywords: *Folk dancers, Injury, Musculoskeletal discomfort, Injury anxiety*

**Corresponding author: Melda Soysal Tomruk, email: meldasoysaltomruk@gmail.com*

INTRODUCTION

Dance is defined as a series of steps and movements that composed with the speed and rhythm of a music. Dance is an art that involves body movement and performed with the purpose of appearing an idea or an emotion (Ambrosio, 2010). Dancers use many limbs and move their bodies in harmony while performing their dance. From this point of view, it is obvious that dancers are a group that is prone to musculoskeletal injury like athletes (Guarino, 2015; Koutedakis and Jamurtas, 2004). Dance-related injuries result from both intrinsic (age, body mass index, anxiety, previous injury etc.) and extrinsic factors (dance type, warm up and cool down time etc.) (Huang et al., 2022). Musculoskeletal injury affects dancers both physically and psychologically. These factors have been shown as an associated factor of a number of painful sites (Jacobs et al., 2012). Besides all of these, dance-related features can affect both anxiety and musculoskeletal discomfort, separately (Noh et al., 2005; Ramel and Moritz, 1994). Examining dance-related features along with anxiety and discomfort may contribute to increasing body awareness and changing the perception of injury in dancers (Kelman, 2020). Injuries in dancers can result in permanent disability and the end of their dance careers (Kelman, 2020). Therefore, the fear of injury creates anxiety and anxiety negatively affects dance performance (Huang et al., 2022; Noh et al., 2003). For this reason, it is very important to determine the level of anxiety in order not to affect the dance performance of the dancers and to reduce this level for the continuation of the psychological well-being (Noh et al., 2003). On the other hand, some movements performed during the dance and the injury itself can trigger a sense of musculoskeletal discomfort in dancers (Jacobs et al., 2012). It has been stated that moving some body parts especially to the last limit of the joint range of motion during dance may create discomfort (Jacobs et al., 2012; Malkogeorgos et al., 2011). It has been showed that the most frequently discomforted areas are the lower back and lower extremities in dancers (Ramel and Moritz, 1994; Smith et al., 2015). Detecting region-specific factors that affect dancers is important to maintain physical performance. Although studies examining injury anxiety and musculoskeletal discomfort separately (Koutedakis and Jamurtas, 2004; Ramel and Moritz, 1994), which negatively affect dance performance, are available in the literature, to our knowledge, there is no study examining whether there is a relationship between them. Knowing the level of anxiety and musculoskeletal discomfort in Turkish dancers and their relation will shed light on the literature on the prevention of injuries in dancers and the development of approaches to combat injury anxiety and/or musculoskeletal discomfort in dancers. With the findings to be obtained by the evaluation of region-by-region musculoskeletal discomfort and anxiety, it will be possible to predict the presence of risk in dancers according to their body region, and to conclude on which body parts should be focused in terms of evaluation and treatment. With this interference, the aim of this study was to determine the relationship between sport injury anxiety and musculoskeletal discomfort in folk dancers and to analyze body parts with this point of view. We hypothesized that anxiety would have correlated with musculoskeletal discomfort in dancers and lower body could be the most injured area.

MATERIAL and METHODS

Purpose and Type of the Study

The primary the purpose of this study was to determine the relationship between sport injury anxiety and musculoskeletal discomfort in folk dancers. The study was a cross-sectional and descriptive survey.

Sampling and Participant

The target population of the study was determined as university students studying in folk dances. The research was conducted between May and August 2022. Inclusion criteria were (i) age ≥ 17 years, (ii) having official registration in folk dances undergraduate program of Burdur Mehmet Akif Ersoy University Turkish Music State Conservatory for the 2021-2022 academic year (iii) volunteering to participate in the research. Exclusion criteria were (i) unwilling to participate in the study (ii) having cognitive and communication problems that will prevent answering the survey questions. The sample size was calculated as 50 individuals using the GPower 3.1 Package Program, with the type-1 error level α=0.05, the power 1-β=0.80. University students were reached with the convenience sampling method. At the beginning of the study, the researcher physiotherapist informed the participants about the purpose of the study, data collection tools, the duration of filling out the questionnaires and the confidentiality of personal information. All assessments were carried out in the research laboratory of the Department of Physiotherapy and Rehabilitation by face-to-face interview method (Figure 1).

Data Collection Tools

Data collection forms were filled by each participant. This form was consisted of questions asking demographic (age, gender, BMI, etc.) and dance-related (age to start dancing, time spent on dancing per day in hours, time spent on dancing per week in days, time spent on warm-up and cool-down exercises per session in minutes, dominant upper and lower extremity etc.) characteristics of the individuals.

Sports Injury Anxiety Scale (SIAS): Sport injury anxiety was assessed using the SIAS. The SIAS consists of a total of 19 items in a 5-point Likert type (1: strongly disagree, 2: disagree, 3: neutral, 4: agree, 5: strongly agree). It includes 6 sub-dimensions: loss of athleticism, being perceived as weak, experiencing pain, letting down important others, re-injury, loss of social support. The SIAS, adapted into Turkish by Caz et al. (2019), measures sports injury anxiety between 19 and 95 points. As the total or average score obtained from the 6 sub-dimension increases, the sport injury anxiety increases. The frequency and severity of musculoskeletal discomfort and whether they interfere with work ability were assessed with the Cornell Musculoskeletal Discomfort Questionnaire (CMDQ), which was adapted into Turkish by Erdinç et al (2011). The CMDQ measures the musculoskeletal discomfort felt in various body parts (neck, shoulder, back, upper arm, waist, forearm, wrist, hip, upper leg, knee, lower leg, foot) during the last week. Participants mark the parts of ache, pain, discomfort separately for each region on the body diagram in the questionnaire. In addition, participants mark frequency, level of discomfort and interference with the ability to work options in three different columns for each region. A risk score between 0-90 is calculated for each region. A higher score represents more severe musculoskeletal discomfort (Erdinç et al., 2011).

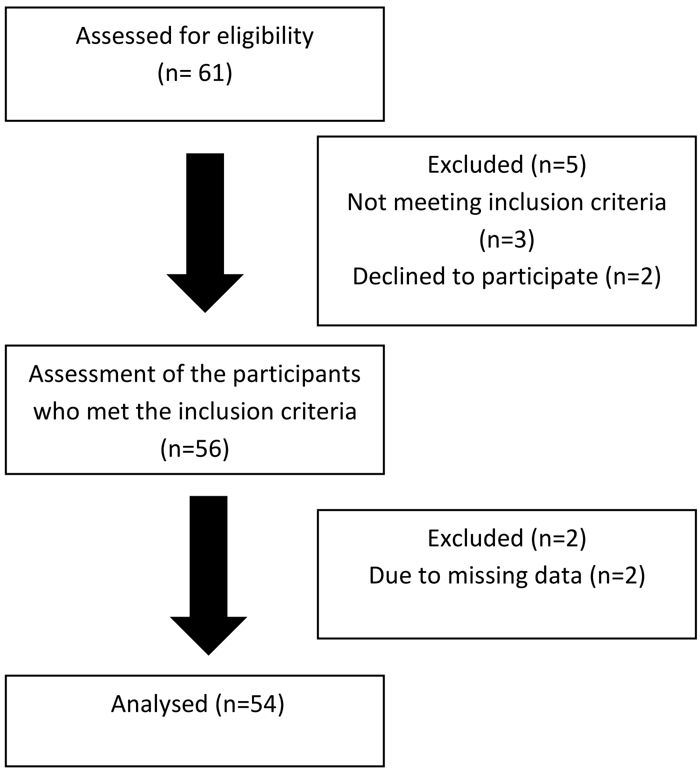

Figure 1. Flow chart of the study

Statistical Analysis

The software package SPSS version 25.0 for Windows was used for statistical analysis (IBM SPSS Inc., Chicago, IL, USA). The variables were investigated using visual (histograms, probability plots) and analytical methods (Kolmogorov-Smirnov/Shapiro-Wilk Test) to determine whether they showed normal distribution. Descriptive statistics were expressed as frequencies and percentages for categorical variables. Continuous variables were presented as median (minimum-maximum) and interquartile range (25%-75%) as they were not normally distributed. The correlation coefficients and their significance were calculated using Spearman test. Strength of correlation was defined as very weak for r values between 0.00–0.19, weak for r values between 0.20–0.39, moderate for r values between 0.40–0.69, strong for r values between 0.70–0.89, and very strong for r values over 0.90 (Streiner et al., 2014). An overall 5% type-I error level was used to infer statistical significance ($p < 0.05$).

Ethical Approval

The study was performed in accordance with the ethical guidelines of Declaration of Helsinki. Ethics committee of local university approved the study (Protocol number: GO-2022/716).

RESULTS

A total of 61 folk dancers were invited to participate in the study. Two folk dancers refused to participate. Three and two surveys were discarded due to not meeting inclusion criteria and missing item responses, respectively. As a result, data obtained from 54 folk dancers (37 males, 17 female) were used for the analyses. Overall response rate was 87.1%. Demographics and dance-related features of the participants are presented in Table 1.

Table 1. Demographics and dance-related characteristics of the participants

	Median (min-max)[a]	IQR (25%-75%)[b]
Age, years	22 (18 – 44)	4 (21 – 25)
Age to start dancing, years	11 (4 -22)	8 (7 – 15)
BMI[c], kg/m^2	21.8 (18.6 – 37.2)	4.2 (20.7 – 24.9)
Time spent on dancing per day, hours	5.0 (2.0 – 8.0)	2.5 (3.0 – 5.5)
Time spent on dancing per week, days	5.0 (3.0 – 7.0)	1.0 (5.0 – 6.0)
Time spent on warm-up exercises per session, minutes	15.0 (5.0 – 45.0)	20.0 (10.0 – 30.0)
Time spent on cool-down exercises per session, minutes	10.0 (0.0 – 22.0)	10.0 (5.0 – 15.0)

[a] minimum-maximum, [b] Interquartile range, [c] Body Mass Index

Table 2. Sport Injury Anxiety Scale scores of the participants

	Median (min-max)[a]	IQR (25%-75%)[b]
Loss of athleticism	6 (3 – 12)	5 (3 – 8)
Being perceived as weak	6 (3 – 13)	4 (3 – 7)
Experiencing pain	10 (3 -15)	4 (8 – 12)
Letting down important others	6 (3 -15)	6 (3 – 10)
Loss of social support	3 (3 – 15)	3 (3 – 6)
Re-injury	13 (4 -20)	6 (10 – 16)
SIAS TOTAL SCORE[c]	48 (21 – 76)	22 (34 – 56)

[a] minimum-maximum, [b]Interquartile range, [c] SIAS Sport Injury Anxiety Scale

90.7% of the participants had right upper extremity dominance and 72.2% of them had right lower extremity dominance. Median (min-max) SIAS total score of the participants was 48 (21-76) (Table 2).

Median (min-max) CMDQ total score was 51.3 (0.0-459.0) (Table 3).

The results of Spearman Correlation Analysis between demographic and dance-related characteristics, SIAS total score and CMDQ total score are presented in Table 4. SIAS total score was weakly and positively correlated with the time spent on dancing per day (p=0.049, r=0.270) and the time spent on dancing per week (p=0.026, r=0.303).

Furthermore, there was a moderate, positive correlation between SIAS total score and CMDQ total score (p=0.001, r=0.442). CMDQ total score was also weakly and positively correlated with the time spent on warm-up exercises per session (p=0.026, r=0.303). A Spearman Correlation Analysis was also conducted to reveal relationships between SIAS total score and body parts scores of CMDQ. The results showed that SIAS total score was moderately and positively correlated with neck discomfort score (p=0.002, r=0.409), right lower leg discomfort score (p=0.001, r=0.446), left lower leg discomfort score (p<0.001, r=0.489). Moreover, there was a weak and positive correlation between SIAS total score and left foot discomfort score (p=0.021, r=0.313). No other significant correlation between SIAS total score and body parts score of CMDQ was found (p>0.05) (Table 4).

Table 3. Cornell Musculoskeletal Discomfort Questionnaire Scores of the participants

	Median (min-max)[a]	IQR (25%-75%)[b]
Neck discomfort	0.0 (0.0 – 40.0)	1.5 (0.0 – 1.5)
Right shoulder discomfort	0.0 (0.0 – 45.0)	1.5 (0.0 – 1.5)
Left shoulder discomfort	0.0 (0.0 – 40.0)	0.0 (0.0 – 0.0)
Upper back discomfort	0.0 (0.0 – 60.0)	4.0 (0.0 – 4.0)
Right upper arm discomfort	0.0 (0.0 – 40.0)	0.0 (0.0 – 0.0)
Left upper arm discomfort	0.0 (0.0 – 6.0)	0.0 (0.0 – 0.0)
Lower back discomfort	1.5 (0.0 – 90.0)	15.5 (0.0 – 15.5)
Right forearm discomfort	0.0 (0.0 – 60.0)	0.0 (0.0 – 0.0)
Left forearm discomfort	0.0 (0.0 – 20.0)	0.0 (0.0 – 0.0)
Right wrist discomfort	0.0 (0.0 – 60.0)	0.0 (0.0 – 0.0)
Left wrist discomfort	0.0 (0.0 – 20.0)	0.0 (0.0 – 0.0)
Hip/Buttocks discomfort	0.0 (0.0 – 60.0)	0.4 (0.0 – 0.4)
Right thigh discomfort	0.0 (0.0 – 60.0)	8.6 (0.0 – 8.6)
Left thigh discomfort	0.0 (0.0 – 60.0)	7.0 (0.0 – 7.0)
Right knee discomfort	0.0 (0.0 – 90.0)	3.5 (0.0 – 3.5)
Left knee discomfort	0.0 (0.0 – 90.0)	5.3 (0.0 – 5.3)
Right lower leg discomfort	0.8 (0.0 – 60.0)	7.5 (0.0 – 7.5)
Left lower leg discomfort	0.8 (0.0 – 60.0)	7.8 (0.0 – 7.8)
Right foot discomfort	0.0 (0.0 – 40.0)	6.0 (0.0 – 6.0)
Left foot discomfort	0.0 (0.0 – 60.0)	6.3 (0.0 – 6.3)
CMDQ TOTAL SCORE[c]	51.3 (0.0 – 459.0)	114.1 (16.1 – 130.3)

[a] minimum-maximum, [b] Interquartile range, [c] Cornell Musculoskeletal Discomfort Questionnaire

DISCUSSION

The present study revealed that overall musculoskeletal discomfort positively and moderately correlated with total sport injury anxiety in folk dancers. By other words, as musculoskeletal discomfort increases, sport injury anxiety increases. Body parts analyses showed that sport injury anxiety was significantly related to musculoskeletal discomfort in neck, both legs and left foot alone. Our hypothesis that musculoskeletal discomfort of folk dancers is positively correlated with injury anxiety has been validated in this study. It has been mentioned that injury and anxiety may be related to some dance-related characteristics one of which is time spent on dancing (Costa et al., 2016; Jacobs et al., 2012). There are inconsistent results in the literature regarding the average time that dancers spend on dancing. Nieminen examined 308 dancers who spend an average of 6 hours (hr) per week for dancing and found different results in those who performed different dances in her study: competitive ballroom dancers, ballet dancers, modern and folk dancers practiced almost 8 hr., 6.5 hr. and 5 hr. per week on dancing, respectively. The average dance time for dancers performing the other dances ranged from 3 hr. to 8 hr (Nieminen, 1998). Hamilton et al (1989) stated that American soloist and principal dancers spent an average of 8 hr. per week and 6 days of week on dancing. However, in the present study, we found that dancers spend an average of 25 hr. a week for dancing. The other factors related to injury rate in dancers are warming up and cooling down times. Huang et al examined factors associated with lower extremity injury in ballet dancers and assessed warm-up and cool down times spent. The mean time spent for warm-up and cool down per session were 18.2 min and 8.8 min, respectively. Their results showed that warm-up and cool-down duration were not significantly associated with lower extremity injury prevalence (Huang et al., 2022). Malliou et al (2007) found that dancers who did about 15-minute warm-up and cool-down reduced their risk of injury. They indicated that the rate of injuries was correlated with the duration of the warm-up and cool down and declared that warming up and cooling down before, during and after a program, should be taken into consideration. Cahalan and O'Sullivan (2013) investigated the rate of injury and associated factors in Irish dancers and asked if they did warm-up and cool-down. They founded greater compliance with warm-up and cool-down between these professional dancers and others, whereas there was no relationship between injury rate and doing warm up and cool down. In our study, mean time spent for warm up and cool down per session were 15.0 min and 10.0 min, respectively, consistent with the previous research in the literature (Huang et al., 2022; Malliou et al., 2007; McGuinness and Doody, 2006).

Table 4. Correlation matrix among variables

	Age	Age to start dancing	BMI [a]	Time spent on dancing per day	Time spent on dancing per week	Time spent on warm-up exercises per session	Time spent on cool-down exercises per session	SIAS [b] TOTAL SCORE	CMDQ [c]TOTAL SCORE
Age	-	r = -0.180 p = 0.193	**r = 0.358 p =0.008***	r = 0.005 p =0.969	r = 0.238 p = 0.083	r = 0.249 p = 0.069	r = 0.248 p = 0.070	r = -0.053 p = 0.703	r = -0.080 p = 0.566
Age to start dancing	-	-	r = -0.045 p = 0.749	r = -0.241 p = 0.079	r = -0.266 p = 0.052	r = -0.177 p = 0.200	**r = -0.282 p = 0.039***	r = -0.023 p =0.871	r = -0.025 p = 0.860
BMI[a]	-	-	-	r = 0.000 p = 0.999	r = 0.149 p = 0.282	r = 0.047 p = 0.738	r = -0.207 p = 0.133	r = -0.036 p = 0.794	r = 0.216 p = 0.177
Time spent on dancing per day	-	-	-	-	**r = 0.334 p =0.014***	r = -0.061 p = 0.662	r = 0.019 p = 0.893	**r = 0.270 p =0.049***	r = 0.100 p = 0.473
Time spent on dancing per week	-	-	-	-	-	**r = 0.340 p = 0.012***	**r = 0.325 p = 0.017***	**r = 0.303 p =0.026***	r = 0.240 p = 0.080
Time spent on warm-up exercises per session	-	-	-	-	-	-	**r = 0.609 p < 0.001***	r = 0.002 p = 0.989	**r = 0.303 p =0.026***
Time spent on cool-down exercises per session	-	-	-	-	-	-	-	r = 0.105 p = 0.452	r = 0.222 p = 0.107
SIAS[b] TOTAL SCORE	-	-	-	-	-	-	-	-	**r = 0.442 p =0.001***
CMDQ[c] TOTAL SCORE	-	-	-	-	-	-	-	-	-

*p<0.05, [a] Body Mass Index, [b] Sport Injury Anxiety Scale, [c] Cornell Musculoskeletal Discomfort Questionnaire

Although we did not assess injury rate, which could be a limitation, in our study, we assessed sport injury anxiety and musculoskeletal discomfort and gathered descriptive data about dance. We conducted the study by predicting that dance-related features might be related to injury anxiety. Noh et al (2005) investigated whether anxiety and coping could predict injuries among 105 ballet dancers. They used SIAS and Athletic Coping Skills Inventory to evaluate dancers and noted time spent being injured. The results of their study indicated that coping skills were the main predictors of frequency of injuries, but the best predictor for the time spent being injured was negative dance stress. Walker and Nordin-Bates (2010) stated that while the time spent for the opening ceremony period caused more stress and anxiety, this rate decreased in the next performances. On the other hand, van Winden (2022) investigated the incidence and characteristics of health problems in dance students. She pointed out that factors related to an increased injury were lower age and higher BMI. In addition, a relationship was found between stress levels and injuries in her study. Parallel to this study, Malkogeorgos et al (2011) investigated contributing factors to injury anxiety among dancers and showed that younger dancers had a higher tendency injury. Anxiety often began during adolescence, a time when self-consciousness increases according to Buckroyd (2000). Unlike these studies, our study examined the relationship between injury anxiety and dance-related parameters. Our results showed that anxiety was correlated with the time spent on dancing per week. Therefore, keeping the weekly dance time within certain limits may be useful in keeping anxiety under control.

It should be kept in mind that musculoskeletal discomfort also could be related to dance-related features. Gender, age, joint laxity and flexibility, dance style, previous injury, physical fitness, and psychological factors were correlated to musculoskeletal injury in dancers (Bronner et al., 2003). Jacobs et al (2017) stated that number of years dancing professionally and rank were associated with injury in ballet dancers. Malliou et al (2007) found that the rate of injuries was correlated with the duration of the warm up and cool down and declared the longer warming up and cooling down duration, the lower risk of injury. The difference of our study from the studies mentioned so far on this subject is that we used Cornell Musculoskeletal Discomfort Questionnaire. In other words, we did investigate musculoskeletal discomfort, not injury risk, which could be a limitation to our study. Therefore, our findings revealed that as the warm-up time increases, musculoskeletal discomfort also increases. Although the warm-up and cool-down times of our dancers are similar to other studies, the reason why the increase in warm-up and cool-down time also increases the discomfort may be that the time allocated to the dance itself is much higher than the average in our dancers. In addition, there are studies examining the musculoskeletal discomfort in terms of body parts. Ramel et al (1994) stated that musculoskeletal discomfort within last 7 days in ankles/feet and low back had been experienced by 30% and 27% of the Swede ballet dancers, respectively. On the other hand, Aweto et al (2014) stated that the most commonly affected body parts were the knee, the lower back and the ankle. Tsekoura et al (2017) examined prevalence of pain and musculoskeletal discomfort in Greek ballet dancers during last 12 months and found that highest prevalence of discomfort according to body site was the low back followed by the neck, shoulders and ankle/ foot. Jacobs et al also reported that the lower extremities, hips and low back were most commonly injured in dancers (Jacobs et al., 2012). Consistent with these studies, our findings showed that musculoskeletal discomfort was common in low back and legs. Since dance is an art form that constantly puts the body under load, it causes injuries to the musculoskeletal system. Therefore, lower extremity and low back injuries are common. In many studies, the relationship between anxiety and injury has been examined and the terminology such as mood, tension, pain and discomfort has been used (Chalan and O'Sullivan, 2013; Jacobs et al., 2012, Hincapié et al., 2008). In all these studies, authors revealed that anxiety, fatigue, tension, and stress were related to musculoskeletal injury and pain. The results of our study revealed that as the anxiety increases in dancers, musculoskeletal discomfort increases as well. Considering the results of the relationship between musculoskeletal discomfort and anxiety, which is the primary goal of our study, it is concluded that approaches to reduce the anxiety of dancers should be considered for dancers.

When the region-by-region musculoskeletal discomfort was examined, it was seen that anxiety was mostly related to the discomfort in the neck, right and left legs. We predict that the reason for this is related to the frequency of whiplash movement in the neck and the intensity of movement that occurs on the lower extremities that provide the interaction between the trunk and the ground during the dance, depending on the difference in the performed dance type. Besides, the reason why anxiety was associated with left foot discomfort but not with right foot should be related to lower extremity dominance. Majority of dancers in our study were right dominant, implementing that non-dominant (left foot) is used more during closed kinetic chain movements such as pivoting while dancing.

Limitations

Our study has strengths. Although there are studies in the literature examining the prevalence of anxiety and discomfort independently of each other, to the best of our knowledge, our study is the first to investigate the relationship between musculoskeletal discomfort and injury anxiety. This is also the first study to examine the relationship between injury characteristics and anxiety in dancers according to body regions. In the study in which the Sports Injury Anxiety Scale was adapted into Turkish, it was shown that the average anxiety score of the athletes was 14.69 (Caz et al., 2019). In studies conducted with dancers, injury concerns were calculated over the percentages of the participants (Jacobs et al., 2012). In this respect, our study is valuable as it is the first study to present the average anxiety level of dancers.

There were some limitations to this study. First, the relatively low number of traumatic patients can be considered as a limitation. Second, this study is a descriptive study, therefore, prospective studies are needed. Another and the last limitation could be that we evaluated the injuries with a questionnaire. Regional relations should be evaluated with more objective measurements.

CONCLUSION

Keeping the anxiety level to a minimum can be helpful in preventing injuries. We predict that injuries can be minimized by applying the necessary approaches to reduce anxiety in dancers. In addition, dancers with musculoskeletal discomfort in lower extremity should be evaluated in terms of injury anxiety.

Acknowledgment

None. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of Interest

All authors declare that they have no conflict of interest.

REFERENCES

Ambrosio, N. (2010). Learning about dance: Dance as an art form and entertainment. 6th ed. Dubuque, IA: Kendall Hunt.

Aweto, H., A., Awolesi, O., M., Alao, R., O. (2014). Musculoskeletal pain and injury in professional dancers: prevalence, predisposing factors and treatment. Indian Journal of Physical Therapy, 2(1), 7-13.

Bronner, S., Ojofeitimi, S., Spriggs, J. (2003). Occupational musculoskeletal disorders in dancers. Physical Therapy Reviews, 8(2), 57-68.

Buckroyd J. (2000). The student dancer: Emotional aspects of the teaching and learning of dance. London: Dance Books.

Caz, Ç., Kayhan, R.,F., Bardakci, S. (2019). Adaptation of the sport injury anxiety scale to Turkish: Validity and reliability study. Turkish Journal of Sports Medicine, 54(1), 52-63. https://dx.doi.org/10.5152/tjsm.2019.116

Cahalan, R., O'Sullivan, K. (2013). Injury in professional Irish dancers. Journal of Dance Medicine & Science: Official Publication of The International Association for Dance Medicine & Science, 17(4), 150–158. https://dx.doi.org/10.12678/1089-313x.17.4.150

Costa, M. S. S., Ferreira, A. S., Orsini, M., Silva, E. B., Felicio, L. R. (2016). Characteristics and prevalence of musculoskeletal ınjury in professional and non-professional ballet dancers. Brazilian Journal of Physical Therapy, 20, 166-175. https://dx.doi.org/10.1590/bjpt-rbf.2014.0142

Erdinç, O., Hot, K., Özkaya, M. (2011). Turkish version of the Cornell Musculoskeletal Discomfort Questionnaire: Cross-cultural adaptation and validation. Work, 39(3), 251-260. https://dx.doi.org/10.3233/WOR-2011-1173

Hamilton, L. H., Hamilton, W. G., Meltzer, J. D., Marshall, P., Molnar, M. (1989). Personality, stress, and injuries in professional ballet dancers. The American Journal of Sports Medicine, 17(2), 263-267. https://dx.doi.org/10.1177/036354658901700219

Hincapié, C. A., Morton, E. J., Cassidy, J. D. (2008). Musculoskeletal injuries and pain in dancers: A systematic review. Archives of Physical Medicine and Rehabilitation, 89(9), 1819-1829.

https://dx.doi.org/10.1016/j.apmr.2008.02.020

Huang, P. Y., Lin, C. W., Jankaew, A., Lin, C. F. (2022). Relationship of extrinsic risk factors to lower extremity injury in collegiate ballet dancers. Frontiers in Bioengineering and Biotechnology, 10, 878448. https://dx.doi.org/10.3389/fbioe.2022.878448

Jacobs, C. L., Cassidy, J. D., Côté, P., Boyle, E., Ramel, E., Ammendolia, C., Hartvigsen, J., Schwartz, I. (2017). Musculoskeletal injury in professional dancers: Prevalence and associated factors: An international cross-sectional study. Clinical Journal of Sport Medicine: Official Journal of the Canadian Academy of Sport Medicine, 27(2), 153–160. https://dx.doi.org/10.1097/JSM.0000000000000314

Jacobs, C. L., Hincapié, C. A., Cassidy, J. D. (2012). Musculoskeletal injuries and pain in dancers: a systematic review update. Journal of Dance Medicine & Science: Official Publication of The International Association for Dance Medicine & Science, 16(2), 74-84.

Kelman B. B. (2000). Occupational hazards in female ballet dancers. Advocate for a forgotten population. AAOHN Journal: Official Journal of the American Association of Occupational Health Nurses, 48(9), 430-434. https://dx.doi.org/10.1177/216507990004800904

Koutedakis Y., Jamurtas A. (2004). The dancer as a performing athlete: Physiological considerations. Sports Medicine, 34(10), 651-661. https://dx.doi.org/10.2165/00007256-200434100-00003

Lindsay, G. (2015). Is dance a sport?: A twenty-first-century debate. Journal of Dance Education, 15(2), 77-80. https://dx.doi.org/10.1080/15290824.2015.978334

Malkogeorgos, A., Mavrovouniotis, F.I., Zaggelidis, G., Ciucurel, C. (2011). Common dance related musculoskeletal injuries. Journal of Physical Education and Sport, 11, 259-266.

Malliou, P., Rokka, S., Beneka, A., Mavridis, G., Godolias, G. (2007). Reducing risk of injury due to warm up and cool down in dance aerobic instructors. Journal of Back and Musculoskeletal Rehabilitation, 20(1), 29-35. https://dx.doi.org/10.3233/BMR-2007-20105

McGuinness, D; Doody, C. (2006). The injuries of competitive Irish dancers. Journal of Dance Medicine & Science, 10, 35-39.

Nieminen, P. (1998). Motives for dancing among Finnish folk dancers, competitive ballroom dancers, ballet dancers and modern dancers. European Journal of Physical Education, 3(1), 22-34. https://dx.doi.org/10.1080/1740898980030103

Noh, Y. E., Morris T., Andersen, M. B. (2005). Psychosocial factors and ballet injuries. International Journal of Sport and Exercise Psychology, 3(1), 79-90. https://dx.doi.org/10.1080/1612197X.2005.9671759

Noh, Y. E., Morris, T., & Andersen, M. B. (2003). Psychosocial stress and injury in dance. Journal of Physical Education, Recreation & Dance, 74(4), 36-40. https://dx.doi.org/10.1080/07303084.2003.10609200

Ramel, E., Moritz, U. (1994). Self-reported musculoskeletal pain and discomfort in professional ballet dancers in Sweden. Scandinavian Journal of Rehabilitation Medicine, 26(1), 11–16.

Smith, P. J., Gerrie, B. J., Varner, K. E., McCulloch, P. C., Lintner, D. M., Harris, J. D. (2015). Incidence and prevalence of musculoskeletal injury in ballet: A systematic review. Orthopaedic Journal of Sports Medicine, 3(7), 2325967115592621. https://dx.doi.org/10.1177/2325967115592621

Streiner DL, Norman GR, Cairney J. (2014). Health measurement scales: a practical guide to their development and use. Oxford: Oxford University Press.

Tsekoura, M., Billis, E., Panopoulou, K., & Tsepis, E. (2017). Musculoskeletal disorders among Greek professional ballet dancers. Journal of Advances in Medicine and Medical Research, 19(11), 1-8. https://dx.doi.org/10.9734/BJMMR/2017/31876

van Winden, P., A., M. (2022). Injuries in pre-professional dancers: A performance psychological approach. Research and graduation internal. PhD Thesis: Vrije Universiteit Amsterdam, Amsterdam-Netherlands.

Walker, I., J., Nordin-Bates, S. (2010). Performance anxiety experiences of professional ballet dancers: the importance of control. Journal of Dance Medicine & Science: Official Publication of The International Association for Dance Medicine & Science 14(4), 133-145.