PAIN PREVALENCE AMONG FEMALE STREET DANCERS

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Abstract

The aim of this study was to identify the characteristic pain prevalence in street dancers in order to indirectly affect dancers' overall health and prolong their dancing careers. Dancers who trained for more than 15 hours per week have reported significantly higher pain occurrence in the upper and lower back region. High percentage value of pain prevalence progressing among the study groups which are defined by the hours of training per week was recorded in the back, shoulder and knee region. Early detection of low pain intensity can help prevent the injuries as well as improve the professional guidance and appropriate safety requirements for the street dancers.

Key words: *health care, training frequency, injury prevention.*

Introduction

Street dances such as waacking, locking, popping, breaking, hip hop, house, vogue and krumping have become increasingly popular among young people throughout the world over the last few decades. In sociological terms, as an important part of urban subculture, street dance is a modern and global phenomenon that affects habits and behaviors of young people all over the world (Motley, & Henderson, 2007; Quested, & Duda, 2007; Mitchell, 2003). Whether it is a case of improvisation, which is the foundation of every street style, or choreography as the art of creating dance, street dances have become one of the most notable performing arts over the last few decades due to the attractiveness of their performance. They have surpassed the boundaries of streets and hoods a long time ago, thanks to the strong media exposure - movies, TV shows and music videos as well as thanks to the growing popularity of theater performances. Dancing develops motor abilities and stamina (Srhoj, Katic, & Kaliterna, 2006; Srhoj, Mihaljevic, & Jukic; 2008; Uzunovic, 2008; Uzunovic, Kostic, & Miletic, 2009). Therefore, dance directly affects physical readiness (Clarkson, Freedson, & Skrinar, 1989; Yannakoulia, & Matalas, 2000; Miletic, Miletic, & Males, 2008) and indirectly, it affects the level of health in young people. Positive long-term dance outcomes can be fostered among population, as long as health, nutrition, lifestyle and injuries caused by training are being taken care of (Holcer et al., 2012; Rusel, 2013). In order to organize the training process and maintain the desired level of dancer's health, it is necessary to identify and monitor injury types and musculoskeletal pain. Studies containing street dancers samples are extremely rare (Cho et al., 2009; Ojofetimi, Bronner, & Woo, 2012). However, the data on their training process and pain prevalence could help coaches and dancers worldwide to organize and plan their training and to maintain the dancers' health in the process. According to previous studies, typical ballet injuries include lower back, pelvis, knees, foot and ankle injuries (Garrick, 1986; De Mann, 1997; Ramel, Moritz, & Jarnlo, 1999; Dore, & Guerra, 2007). Lower extremities and shoulders injuries are typical in modern dance (Bronner, Ojofeitimi, & Rose, 2003; Sides, Ambegaonkar, & Caswell, 2009). Lower back, ankles/feet, neck and knees pain prevalence is typical for sport dance, (Wanke et al., 2014; Miletic et al., 2015) head and knees injuries are recognized among cheerleaders, (Boden, Tacchetti, & Mueller, 2003; Miletic et al., 2009) and foot and ankle injuries prevail among Irish dancers (Cahalan et al., 2015). The most frequent injuries among brake dancers occur in the wrist, finger, knee, shoulder, lumbar spine and elbow areas (Cho et al., 2009) but breaking is just one of eight various street styles. The purpose of this study was to identify pain experience among female street dancers by defining the proportions of pain status in fourteen body regions and by comparing the pain prevalence frequency with the number of training hours. Accordingly, we have analyzed and compared the results of four female dancer groups defined by hours of training per week. The study also indicates that dancers will try to conceal injuries and suffer a great amount of musculoskeletal pain (Kerr, Krasnow, & Mainwaring, 1992; Miletic, Miletic, & Milavic, 2015; Markula, 2015) not to disappoint their dancing group, partner and not to fall out of the competition. Therefore, it is important to have an open conversation about even the slightest occurrence of pain among young dancers, since it is possible that, if continued, the unchanged training stimuli which cause low intensity pain will lead to chronic injuries and possible end of a dancing career.

Methods

The study involved 137 female dancers who participated in the research voluntarily and whose mean age was 19.7. Mean body height was 166 cm and body weight was 57 kg. BMI values were 20.54 with an average training experience of eight years. All of the dancers are member of clubs that are a part of the Croatian Show Dance Organization and Modern Dance Organization of Bosnia &

Herzegovina and Serbia. Inclusion criteria were that the dancers are regularly competing in national championships and cups as well as in international competitions, like European and world championships and cups.

Exclusion criteria were as follows: uncompleted questionnaire, training frequency of less than three hours per week, dancers younger than 13 and older than 30 years. Data collection was implemented from 1 June 2015 to 1 January 2015. With the help of national federations, dancers were encouraged to voluntarily participate in this retrospective study. In order to enable the participation of a larger number of dancers, an "online" questionnaire was posted on a server *Survey Monkey* which is specialized for electronic data collection and analysis (Miletic, Miletic, & Milavic, 2015). For the research purposes, the dancers were divided into four groups in accordance with the number of training hours per week as follows: G1 – group training 3-6 hours per week; G2 – group training 7-10 hours per week; G3 – group training 11-15 hours per week; G4 – group training more than 15 hours per week. Basic data on training frequency and body status for each group are presented in Table 1. The survey consisted of: (1) basic data and health care related data questionnaire (Miletic, Miletic, & Milavic, 2015) and (2) Self-Estimated Functional Inability because of Pain (SEFIP) questionnaire which proved to be highly applicable among professional ballet dancers, sport dancers and dance students (De Mann, 1997; Miletic, Sekulic, & Ostojic, 2007; Miletic, Kostic, & Miletic, 2011).

Table 1. Descriptive statistics for street dance groups divided by hours per week of training and results of MANOVA Analysis (Post hoc Tukey's Test)*

Training (Hrs/wk)	N 137	Yrs of Dancing		Height (cm)	Weight (kg)	
G1 (3h-6h)	73	6.68±4.05[b]	18.38±5.16[a]	165.47±8.43	56.21±10.59	20.37±2.65
G2 (7h-10h)	34	7.41±3.85[c]	19.94±4.79	168.72±5.67	59.03±9.39	20.68±2.83
G3(11h-15h)	16	12.25±5.21	21.56±6.43	165.00±5.38	58,31±7.70	21.39±2.51
G4 (15>h)	14	13.00±5.14	23.64±7.95	168.00±7.01	56.79±7.57	20.09±2.09

*Data expressed as mean ±SD, [a] G1is significantly lower than G4 (p = 0.006), [b]G1 significantly lower than G3(p=0.000) and G4 (p = 0.000), [c]G2 significantly lower than G3(p=0.001) and G4 (p = 0.000)

SEFIP questionnaire requires the subjects to assess their current pain on a 5-point scale; with 0 being no pain and 4 being pain so severe they are unable to dance. The questionnaire covers 14 body regions (neck, shoulders, elbows, wrists/hands, upper back, lower back, hips, thighs (front), thighs (back), knees, shins, calves, ankles/feet, and toes). A sum score (range 0–56) can be achieved where 0 represents no pain and 4 maximal pain. Everything above zero is regarded as a positive finding. In terms of the basic data, the subjects were asked to complete a questionnaire through which the details about their current and previous training experience and dance status were obtained. The questionnaire included questions which refer to hours of training per week, number of years of dance training, body height, body weight, competition level and consultations with a physician when injured. Basic parameters referring to variables distribution were calculated for all four street dancers groups defined by hours of training per week: (1) number of years of dancing, (2) dancers' age (3) body height, (4) body weight and (5) BMI. One-way MANOVA was implemented in relation to five dependent variables: (1) number of years of dancing, (2) dancers age (3) body height, (4) body weight and (5) BMI. There was a significant multivariate effect ($F = 3.6$; $p < 0.001$), meaning that the whole set of composites could significantly discriminate the groups. In order to investigate which dependent variables contributed to the significant effect, post-hoc Tukey's HSD test was performed. Pearson's χ^2 test was applied in order to compare the proportions of pain experience in 14 body regions among the groups of dancers. The statistical significance level of 95% ($P < 0.05$) was applied.

Results

Body parameters referring to weight and BMI are of slightly higher values in street dancers than in sport dancers. However, height values compared to the age of dancers are the same. 20% of female sport dancers had average BMI of 16.76. 50% of dancers had average BMI of 19.35 and 30% of dancers had average BMI of 21.65 (Miletic et al., 2015). Among four study groups which are defined by hours of training per week and normally distributed according Kolmogorov Smirnov test ($P < 0.05$), a significant age difference was detected only between G1 group which practices 3-6 hours per week and G4 group which practices for more than 15 hours per week. As far as training experience is concerned, there is a significant difference between G1 group that practices 3-6 hours per week and both G3 (that practices10-15 hours per week) and G4 group (that practices for more than 15 hours per week). The most common pain reported by street dancers in total (Table 2) was pain in the lower back (54%) and upper back (50.4 %), knee (50.4%) and neck (40.9 %) region. Dancers in the first and the second investigated group with lower training frequency reported pain in the lower and upper back, knee and neck region. Apart from the usual back and knee pain, dancers in the other two groups, especially one with 15 hours of training per week, have reported high incidence of characteristic neck (57.1%) and shoulder pain (64.3%). 85.7% of the dancers from the group that practices 15 hours per week have reported pain in the lower back region.

Table 2. Differences between training frequency groups: number of dancers that reported pain (1, 2, 3 or 4) and their percentages in each the intensity of training (Hrs/wk) group, Chi square test results (χ^2) for each body region regarding all four groups and degrees of freedom (df).

	G1 3h-6h (*N*= 73)	G2 7h-10h (*N*= 34)	G3 11h-15h (*N*= 16)	G4 15>h (*N*=14)	TOTAL (*N*=137)	χ^2	df
Neck	29 39.7 %	13 38.2 %	6 37.5 %	8 57.1 %	40.9 %	9.2	9
Shoulders	26 35.6 %	10 29.4 %	7 43.7 %	9 64.3 %	37.9 %	14.3	1 2
Elbow	4 5.5 %	2 5.9 %	2 12.5 %	3 21.4 %	10.2 %	9.0	6
Wrists/ hands	10 13.7 %	11 32.3 %	5 31.2 %	5 35.7 %	22.6 %	9.2	6
Upper back	31 42.5 %	18 51.4 %	11 68.7 %	9 64.3 %	50.4 %	21.7*	1 2
Lower back	34 46.6 %	19 55.9 %	9 56.2 %	12 85.7 %	54.0 %	26.4**	1 2
Hips	7 9.6 %	3 8.8 %	2 12.5 %	4 28.6 %	11.7%	7.0	9
Thighs (front)	9 12.3 %	1 2.9 %	4 25.0 %	2 14.3 %	11.7 %	5.4	3
Thighs (back)	5 6.8 %	1 2.9 %	2 12.5 %	3 21.4 %	8.0 %	9.3	6
Knees	34 46.6 %	16 47,0 %	10 62.5 %	9 64.3 %	50.4 %	19.2	1 2
Shins	10 16.7 %	6 17.6 %	3 18.7 %	4 28.6 %	16.8 %	7.1	9
Calves	21 28.8 %	5 14.7 %	5 31.2 %	1 7.1 %	23.3 %	8.7	9
Ankles/ feet	27 37.0 %	11 32.3 %	5 31.2 %	4 28.6 %	35.8 %	11.6	9
Toes	6 8.2 %	7 20.6 %	5 31.2 %	0 0 %	13.1 %	12.5	9

*Denotes significant coefficients on the level $p<0.05$; **Denotes significant coefficients on the level $p<0.01$;

According to the results of χ^2 test (Table 2), there is a significant difference in frequency of pain prevalence in the region of upper ($p=0.04$) and lower back ($p=0.00$) between study groups defined by the number of hours of training per week. The occurrence of low level musculoskeletal pain can be noticed in all subject groups (Figure 1) – *some pain but not a problem* was typical for the neck, upper and lower back, shoulder and knees region (all above 28% per body region). The occurrence of the highest level musculoskeletal pain - *cannot practice because of the pain* was recorded in upper and lower back, knees and shoulders. However, this was recorded in small percentages (1.5 % and less). The intensity of musculoskeletal pain registered via SEFIP questionnaire is presented only for topological regions in which Pearson's χ^2 test shows a significant difference in the area of upper (Figure 2) and lower back region(Figure 3).

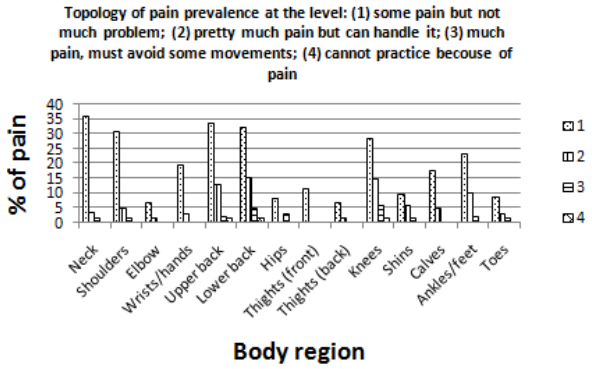

Figure 1. Percentage of pain intensity and prevalence by region presented on whole group of subjects (N=137)

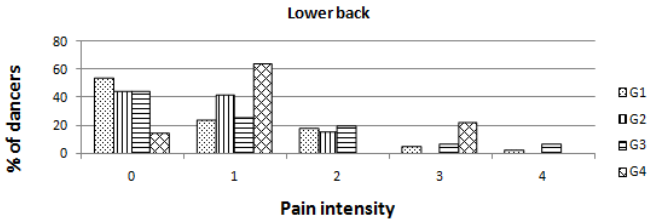

Figure 2. Intensity of pain prevalence among groups of street dancers in lower back region: (0) No pain; (1) Some pain but not much problem; (2) Pretty much pain but can handle it ; (3) Much pain, must avoid some movements; (4) Cannot practice because of pain

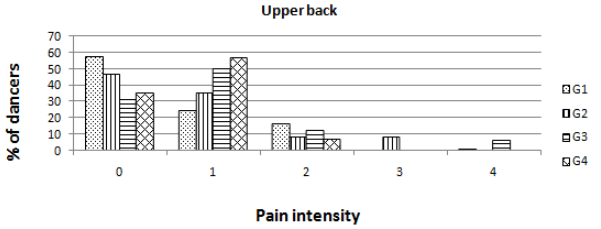

Figure 3. Intensity of pain prevalence among groups of street dancers in upper back region: (0) No pain; (1) Some pain but not much problem; (2) Pretty much pain but can handle it ; (3) Much pain, must avoid some movements; (4) Cannot practice because of pain

Discussion

Higher ranking competitions and increased training frequency caused decreased body weight and BMI values in female sport dancers. That was not the case with female street dancers - increased training frequency did not affect BMI values. Further studies including dancers' nutrition habits are required in order to determine whether the factors such as nutrition and high aesthetic standards put upon the sport dancers in high-level competitions affect the BMI values in the first class female sport dancers. It is troublesome that more than two thirds of female street dancers who participated in this study from the group training for more than 15 hours per week reported the occurrence of pain in the lower back region. Back pain in dancers is a well-known phenomenon (Salminen et al., 1995; De Mann, 1997; McMeeken et al., 2001; Miletic, Miletic, &

Milavic, 2015) as well as the fact that the level of dance training (McMeeken et al., 2001) is related to musculoskeletal pain experience among dancers. Hypermobility is a predisposing factor for musculoskeletal pain and injury (McCormack et al., 2004; Simmonds, & Kerr, 2007). Therefore, the flexibility training in street dancers should be carefully planned. Increasing weekly training hours lead to perfect mastering of more complex dance structures and figures that result in more attractive performance.

Training with the aim of developing flexibility always includes passive and dynamic stretching and increased amplitude of movement that could be followed by the occurrence of pain (Roussel et al., 2009). Street dancers, professional or amateurs, do not always have a controlled training environment, protective devices for the performance of the more dangerous elements, assistance when trying out acrobatic elements and they are not regularly doing warm-up and cool down exercises before starting to dance (Cho et al., 2009). Consequently, special attention needs to be paid on the balance between muscle strength and flexibility in dance training.

The results of this research suggest that the progression of back pain is indeed connected to the increased hours of training per week. This progression has especially been notable in the group practicing for more than 15 hours per week. There is a reasonable ground to suspect that, with the increasing training frequency, the occurrence of pain in the upper and lower back regions among street dancers will lead to the acute pain status becoming chronic and posing a threat to the training process and the dancer's career.

However, a more representative sample of street dances with greater stratification of investigated groups defined by hours of training is necessary for the future researches in order to confirm the obtained results. It has been determined on the sample of sport dancers (Miletic, Miletic, & Milavic, 2015) that lower back pain is an increasing health problem in male sport dancers, that it develops with age and that it cannot be resolved by decreasing training frequency. Different results are obtained from current study on female street dancers.

Nevertheless, future investigations are needed to confirm that decreasing the training frequency can resolve the occurrence of pain and injuries. Sport dance is performed in couples and an injury that occurred in the pre-competition or during a competition period can seriously affect the success and career of the dancing partner. That is one of the reasons why sport dancers often 'swallow up' the pain. 42% of sport dancers will not seek medical care because of an injury (Miletic et al., 2015). Only 11% of female street dancers answered negatively to the same question: *When you were injured, did you consult a physician?* The main limitation of this study is the fact that the data was obtained through a questionnaire that reflects subjective experience of pain and wish for adequate answering. The above mentioned can be avoided in future research with the introduction of medical examination and opinion. Apart from the mentioned, numbers of variables related to pain experience among dancers are limited in this study.

Various factors can present pain predisposition for dancers. These are psychosocial factors (Noh, & Morris, 2004; Wainwright, Williams, & Turner, 2005) such as sleep, mood, and personal relationship, (Dore, & Guerra, 2007) overuse injuries, (Askling et al., 2002; Bronner, Ojofeitimi, & Rose, 2003; Motta-Valencia, 2006) and hypermobility (Roussel et al., 2009).

Therefore, they need to be investigated in future researches which refer to street dancers. Certain pain progression related to increased training frequency has been reported in the neck, shoulder and knee regions. The highest percentage values were reported in the group practicing for more than 15 hours per week. Such studies have been conducted on a sample of ballet (Hamilton et al., 1989; Liederbach, Gleim, & Nicholas, 1994) and sport dancers (Miletic et al., 2015; Miletic, Miletic, & Milavic, 2015). However, no similar studies have been conducted on a sample of street dancers.

All of the street dance styles affect the knee, but also the shoulder and neck regions, except for those focusing on elements which are performed standing up with the upper body relaxed and following the leg movements for most of the time. After the regular occurrence of lower intensity pain has been reported, it is advisable to decrease the training frequency or the amount of training focused on dance techniques that specifically affect pain inflicted regions as a preventive measure.

The practical point derived from this study for young dancers is not to ignore musculoskeletal pain and to warn them about possible critical injury points that are frequent among street dancers and about importance of searching for medical help.

Conclusion

With constant development of competitive features of street dance, there has also been an increase in the required amount of training and reflection on pain prevalence among dancers. Variety of street dance styles causes workload on different body parts and therefore, affects different topological regions increasing pain prevalence mostly in the back, knee and neck region.

Aiming at long-term protection and prolongation of dancing careers, monitoring and early detection of low intensity pain accompanied by training duration and workload distribution can help decreasing frequency of pain status in the lower and upper back, knee, neck and shoulder region. There is a justified suspicion that dancers rarely seek medical help due to aggravating factor of pain prevalence investigation.

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PREVALENCIJA BOLI KOD ULIČNIH PLESAČICA

Sažetak
Cilj ove studije bio je utvrditi karakterističnu prevalenciju boli u uličnim plesačima kako bi posredno utjecali na cjelokupno zdravlje plesača i produžili njihove plesne karijere. Plesači koji su trenirali više od 15 sati tjedno zabilježili su znatno veću pojavu boli u gornjem i donjem dijelu leđa. Visokopostotna vrijednost prevalencije boli kod studijskih skupina koje su definirane sate treninga tjedno zabilježeno je u području leđa, ramena i koljena. Rano otkrivanje slabog intenziteta boli može pomoći u sprečavanju ozljeda, kao i poboljšanju profesionalnih smjernica i odgovarajućih sigurnosnih zahtjeva za plesačice ulice.

Ključne riječi: *zdravstvena zaštita, učestalost treninga, prevencija ozljeda.*

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