Injury Surveillance of Non-Professional Salsa Dance

Domene, P. A., Stanley, M. & Skamagki, G.

DOI 10.1123/jpah.2017-0498
ISSN 1543-3080
ESSN 1543-5474
Publisher: Human Kinetics

Domene PA, Stanley M, Skamagki G. Injury Surveillance of Non-Professional Salsa Dance. J Phys Act Health; accepted and in press. domenep@gmail.com

Title

Injury Surveillance of Non-Professional Salsa Dance

Authors

Pablo A Domene[1*], Michelle Stanley[1], Glykeria Skamagki[2]

Institutional Affiliations

[1]School of Life Sciences, Coventry University, Coventry, United Kingdom; [2]School of Nursing, Midwifery and Health, Coventry University, Coventry, United Kingdom

***Corresponding Author**

Pablo A Domene, BA (Hons), MSc, PhD, School of Life Sciences, Coventry University, Priory Street, Coventry, CV1 5FB, United Kingdom

E-mail

domenep@gmail.com

Sources of Funding

None

Conflicts of Interest

None

Title

Injury Surveillance of Non-Professional Salsa Dance

Abstract

Background: The present investigation sought to (i) establish the extent of injuries, (ii) determine the odds of sustaining an injury, and (iii) calculate the injury incidence rate in non-professional salsa dance. ***Methods:*** Salsa dancers were invited to complete an anonymous web-based survey containing 11 demographic background and 10 (1 yr retrospective) injury history questions. ***Results:*** The response rate was 77%. The final sample of respondents included 303 women and 147 men, of which 22% and 14%, respectively, sustained ≥ 1 injury during salsa dance in the past year. The odds of injury was 2.00 (95% CI 1.14 – 3.50) times greater ($p < 0.05$) for women than for men. Age, body mass index, and salsa dance experience were also found to be significant (all $p < 0.05$) predictors of injury. The injury incidence rate for women and men was 1.1 (95% CI 0.9 – 1.4) and 0.5 (95% CI 0.3 – 0.7) injuries per 1000 h of exposure, respectively. ***Conclusions:*** This is the first study to have described salsa dancers in terms of their injury history profile. Our results indicate that the likelihood of sustaining an injury during this physical activity is similar to that of ballroom, but lower than that of Spanish, aerobic, and Zumba® dance.

Introduction

Injury risk exists in all physical activities. In sport,[1] fitness,[2] and dance[3] it is acknowledged that thorough risk assessment and injury surveillance are necessary to guide injury reduction and, thus, health promotion strategies. In a sporting context, these strategies involve identification of the magnitude of the injury risk, identification of the associated risk factors for injury, implementation of a programme for future injury risk reduction, and lastly, an evaluation of the effectiveness of the programme via repetition of the first stage.[4] The utility of comprehensive injury reduction efforts, similarly, has been described in detail in a professional context for dance.[3] It is logical to assume that this may also be applicable to genres of leisure, recreational, amateur, or non-professional dance, such as salsa, where individuals are likely choosing to participate for pleasure/relaxation- and health/fitness-related purposes.[4]

Non-professional salsa dance is a popular social physical activity taken part in by both women and men.[5] It has been suggested that this genre of dance may have potential in terms of the promotion of physical[6,7,8] and mental[9,10,11] health outcomes in adults. However, despite the recent health-oriented research interest in non-professional salsa dance, no empirical work has been published in the peer-reviewed literature in terms of the injury surveillance of this specific physical activity. In a search of the MEDLINE and CINAHL databases from 1986 up to and including December 2016, no surveillance studies of injuries related to leisure, recreational, amateur, or non-professional salsa dance were found. On the other hand, injury surveillance work has already been conducted in genres of dance that are somewhat similar to that of salsa, such as Spanish,[12] ballroom,[13] aerobic,[14] and Zumba®,[15] although it remains unclear whether the reported injury rates, patterns, severity, and risk factors are comparable to those found in non-professional salsa dance.

In light of these points, the objectives of the current work were to (i) establish the extent of injuries, (ii) determine the odds of sustaining an injury, and (iii) calculate the injury incidence rate in non-professional salsa dance using an anonymous web-based 1 yr retrospective injury history survey. It was hypothesised that being female[16] and having a higher age,[16] higher volume of salsa dance engagement per week,[16] higher volume of non-salsa dance-related moderate to vigorous physical activity (MVPA) engagement per week,[13] and higher body mass index (BMI)[17] would increase the likelihood of sustaining a time-loss injury during salsa dance. It was further hypothesised that having a greater amount of salsa dance experience[13] and regularly engaging in a warm-up[13] prior to performance would decrease the likelihood of sustaining a time-loss injury during salsa dance.

Methods

Respondents

Salsa dancers were invited to complete an anonymous web-based survey. The survey was hosted on a secure web server (Bristol Online Surveys, University of Bristol, United Kingdom). The web-based social networking services Facebook, Google+, and Twitter were used for recruitment purposes. Ethical approval for this study was granted by the Faculty of Health and Life Sciences Ethics Committee at Coventry University. Informed consent, shown on the first page of the survey, was obtained prior to commencement. Inclusion criteria stated that the respondents had to be aged 18 – 64 yr, currently involved in salsa dance as a non-professional (defined as not making 100% of their living through salsa dance), and have ≥ 1 yr of salsa dance experience. No specific exclusion criteria were stated in terms of minimum salsa dance engagement per week or health condition.

Survey

There were 11 demographic background and 10 injury history questions contained in the survey, all of which had to be answered in order to submit the completed responses. Through pilot testing it was estimated that the survey questions would require 5 – 15 min to complete. Sex, age, stature, mass, and salsa dance experience in years/months were self-reported. BMI was calculated arithmetically. Respondents were asked how many salsa dance sessions (defined as any class, rehearsal, performance, or social dance) per month, on average, they took part in, as well as the average duration in hours/minutes of these sessions. Salsa dance engagement per week was determined using these data. Respondents were asked if they regularly undertook a warm-up (eg dynamic stretching) prior to and/or a cool-down (eg static stretching) after their salsa dance sessions. The following question regarding MVPA was asked, “Apart from salsa dance, do you currently do any other forms of dance, exercise, or physical activity that are intense enough to raise your breathing rate (excluding housework or physical activity that may be a part of your job)?”. If the answer was yes, the respondent was then asked about the duration in hours/minutes per week, on average, of these activities. The wording of this physical activity estimate was based on the validated single-item survey method by Milton et al.[18] Non-salsa dance-related MVPA engagement per week was determined using these data.

The injury history questions were asked over a 1 yr retrospective period. This method has been demonstrated to have fair validity with an accuracy of 61 – 100% for injury history recall in community sport.[19] This method has also recently been used in the surveillance of self-reported Zumba® dance injuries.[15] Respondents were asked to recall the number, severity, type, location, and associated risk factors of any salsa dance-related time-loss injuries they experienced. Respondents were also asked to recall the number of physical complaints they experienced that were related to salsa dance. All responses were recorded in a self-report fashion and without diagnosis by medical personnel. The

definition of time-loss injury used in this study was any injury sustained during a salsa dance session that resulted in ≥ 1 day lost from being able to participate in salsa dance, irrespective of the need for medical attention.[3] A physical complaint resulted in no days lost from being able to participate in salsa dance.[3] Time-loss injuries were characterised as being either minor (1 – 7 days lost from being able to participate in salsa dance), moderate (8 – 28 days lost from being able to participate in salsa dance), or severe (≥ 29 days lost from being able to participate in salsa dance) in terms of severity.[3] The definition of recurrent injury used in this study was any injury with the same type and location as a previous injury occurring within the past two months; recurrent injuries were excluded from the data analysis.[3] The following 10 exclusive categories were used to code injury type[3]: blister; bone (eg fracture); bruise or swelling; concussion; cramp or spasm; cut or graze; joint (eg cartilage, dislocation) or ligament (eg sprain, tear); muscle or tendon (eg rupture, strain, tear); nerve (eg numbness, pins and needles); and other. The following 12 exclusive categories were used to code injury location[3,20]: ankle and foot; back and pelvis; chest; forearm and wrist; hand; head and neck; hip; knee; lower leg and Achilles tendon; shoulder; upper arm and elbow; and upper leg. The following 19 non-exclusive categories were used to code associated risk factors for injury[20,21]: a result of other lifestyle activities; choreography was inadequately taught; choreography was too difficult; collision with another dancer; failed to perform choreography correctly; felt fatigued or exhausted; ignored early warning signs of injury; inadequate environment (eg flooring, lighting, temperature); inadequate partner; inadequately hydrated; inadequately warmed-up or cooled-down; inappropriate clothing; inappropriate footwear; intensity of session (eg class, rehearsal, performance, social dance) was too high; other; psychological reasons; room was overcrowded; stepped on by another dancer; and too many repetitive movements. The method of Knowles et al.[22] was used to calculate injury incidence rate.

Data Analysis

The programming language R (R 3.1.1, The R Foundation for Statistical Computing, Austria) was used to conduct all statistical analyses. Prediction of the odds of injury was performed using binomial logistic regression analysis with simultaneous fitting. Differences between groups were ascertained using Mann-Whitney tests. Categorical data were analysed using Pearson chi-square tests of independence. Centrality and spread are shown as median (Q1 – Q3) with 95% confidence intervals (CI) presented where appropriate. Significance was set at $p < 0.05$. The initial logistic regression covariates of age, BMI, non-salsa dance-related MVPA engagement per week, salsa dance engagement per week, salsa dance experience, sex, and warm-up were selected based on previous dance injury research.[13,16,17] Using the method of Peduzzi et al.,[23] an a priori sample size calculation was performed whereby an events per variable of 20 was chosen with the aforementioned seven covariates and a predicted 33%[13] salsa dance percentage injury rate. This yielded a sample size of at least 424 respondents required to ensure an unbiased logistic regression model.

Results

Demographics

Eight of the initial 590 people who accessed the survey were screened out due to not meeting the inclusion criteria. Of the 582 respondents that attempted the survey, 132 did not finish the questions and were excluded from the data analysis. The response rate was therefore 77% for the survey (582 – 132 = 450; 450 / 582 = 0.77; 0.77 x 100 = 77). Three hundred three women and 147 men comprised the final sample of respondents. Of these salsa dancers ($N = 450$), 76% of the women and 74% of the men answered yes to the physical activity estimate question. No difference ($p > 0.05$) between these proportions was found. A warm-up was performed by 35% of the women and 33% of the men. Again,

no difference ($p > 0.05$) was revealed between proportions. A cool-down was performed by 14% of the women and 8% of the men. Here, a trend ($p = 0.06$) was noted between proportions. Further demographic background characteristics of the salsa dancers are presented in Table 1.

Injuries

Salsa dance engagement per week, non-salsa dance-related MVPA engagement per week, and warm-up were found to be non-significant (all $p > 0.05$) covariates in the initial logistic regression model. These variables were subsequently removed from the analysis. The final logistic regression model is presented in Table 2. The odds of injury was 2.00 (95% CI 1.14 – 3.50) times greater ($p < 0.05$) for women than for men. There was a 3 (95% CI 1 – 5) % greater ($p < 0.05$) odds of injury for every 1 yr increase in age. There was also a 7 (95% CI 1 – 13) % greater ($p < 0.05$) odds of injury for every 1.0 kg/m^2 increase in BMI. The odds of injury, however, was reduced ($p < 0.05$) by 7 (95% CI 1 – 12) % for every 1.0 yr of salsa dance experience gained. The overall evaluation of the logistic regression model was acceptable; this was indicated by a significant ($p < 0.01$) likelihood ratio test and a non-significant ($p > 0.05$) Hosmer-Lemeshow test.

When comparing between injured and non-injured salsa dancers, there were no differences (all $p > 0.05$) in age, BMI, non-salsa dance-related MVPA engagement per week, salsa dance engagement per week, salsa dance experience, and warm-up. It was found that a higher ($p < 0.05$) proportion of women sustained ≥ 1 injury during salsa dance in the past year when compared to men (22% versus 14%). A total of 83 injuries were reported in women, of which 34% of these required medical attention. In men, a total of 23 injuries were reported, of which 17% of these required medical attention. The average number of injuries sustained in both women and men was 1 (1 – 1). In terms of physical complaints, 345 and 110 were reported in women and men, respectively. The average

number of physical complaints sustained in women was 2 (1 – 3) and in men was 1 (1 – 2). The majority of injuries were characterised as being minor in severity. The self-reported injury severity of salsa dance is presented in full in Figure 1. The most frequent type of injury in women was muscle or tendon (eg rupture, strain, tear)-related, whereas in men it was joint (eg cartilage, dislocation) or ligament (eg sprain, tear)-related. Self-reported salsa dance injury types are presented in full in Figure 2. In terms of injury locations, women sustained the most injuries in the ankle and foot, however, men sustained the most in the knee. Self-reported salsa dance injury locations are presented in full in Figure 3. The highest rated risk factor associated with injury in salsa dancers experiencing ≥ 1 injury during the past year was “stepped on by another dancer”. Self-reported risk factors attributed to injury in salsa dance are presented in full in Figure 4. The injury incidence rate for women and men was 1.1 (95% CI 0.9 – 1.4) and 0.5 (95% CI 0.3 – 0.7) injuries per 1000 h of exposure, respectively.

Discussion

This is the first study we are aware of to have described the injury surveillance of non-professional salsa dance. In summary, during this physical activity, women sustain a greater number of time-loss injuries than do men. In terms of the prediction of injury, sex, age, BMI, and salsa dance experience were all found to be successful predictors of time-loss injury during salsa dance. However, not all of our hypotheses were supported. Salsa dance engagement per week, non-salsa dance-related MVPA engagement per week, and warm-up did not successfully predict time-loss injury, despite these variables having been selected based on the dance injury literature in non-professional performers.[13,16] In our sample of 450 salsa dancers, a higher proportion of women reported sustaining a time-loss injury during salsa dance in the past year when compared to men. Slightly more than one third of these injuries in women required medical attention to be sought. In men,

however, medical attention was sought in less than one quarter of the cases. The most prevalent injury types and locations were different between women and men. Severity of injury, however, was found to be consistent between sexes. Similarly, agreement was shown between sexes in terms of the perceived risk factors for injury during engagement in this physical activity.

Non-professional salsa dance was found to have an injury incidence rate comparable to ballroom (0.5 and 1.5 injuries per 1000 h of exposure in men and women, respectively),[13] but lower than that of Spanish (1.5 injuries per 1000 h of exposure; sex not specified),[12] aerobic (2.9 injuries per 1000 h of exposure; sex not specified),[14] and Zumba® dance (3.9 injuries per 1000 h of exposure in women).[15] The aforementioned dance injury surveillance studies were all undertaken using non-professional performers, as was the case in our own research. The four highest rated perceived risk factors for injury all involved other individuals; both female and male salsa dancers reported that being stepped on, having an inadequate partner, colliding with other dancers, and dancing in an overcrowded environment accounted for the main reasons why they experienced time-loss injury. Non-professional salsa dance is primarily performed as a partnered social dance and it is probable that participation, given enough time, would involve dancing with both novice and experienced partners. Hence, the likely mixed background of non-professional salsa dancers, in terms of training and technique, especially at social dance events, may explain why some of the reported injuries occurred. In comparison, the four highest rated perceived risk factors for injury in Zumba® dance, which is non-partnered, were reported to be: a result of other lifestyle activities; felt fatigued; ignored early warning signs of injury; and too many repetitive movements.[15] These same perceived risk factors were rated only moderately important in terms of injury risk in the current sample of salsa dancers.

In the present investigation, the final logistic regression model was fit with four predictors of time-loss injury; sex, age, BMI, and salsa dance experience. In aerobic dance, it was reported that sex is not a causative risk factor for injury.[16] Conversely, in ballroom dance, and more in line with the findings of this study, female dancers more often reported sustaining an injury than their male counterparts.[24] Pellicciari et al.,[25] however, reported contrasting findings. In their study of ballroom dance, no difference was revealed between sexes in terms of those who sustained an injury and those who did not. For age and its potential relationship with injury risk in dance, again, dissimilar findings have been reported in the literature. Studies evaluating aerobic,[26] ballroom,[25] and Zumba®[15,27] dance indicate that age does not predict dance-related injury. Despite these, and our own, findings, Miletic et al.[28] demonstrated a moderate relationship between increasing age and lower back pain prevalence in ballroom dance. In the current sample of salsa dancers, injury risk increased with increasing BMI. This, however, is inconsistent with previous research undertaken in ballroom[25] and ballet[17] dance, where no relationship and a negative relationship, respectively, were reported. In terms of dance experience, in genres of dance other than salsa, the utility of this measure for the prediction of injury, again, remains unclear. No predictive value of dance experience was reported in the injury surveillance of aerobic[29] and ballroom[25] dance. In contrast to these, and our own, findings, however, Kuisis et al.[13] reported that in ballroom dance, experience was indeed positively associated with the number of injuries sustained. On the whole, the predictors of injury in non-professional salsa dance do not appear to be consistent with other popular genres of non-professional dance. This may be explained by the performance of salsa dance itself being primarily for social, as opposed to competitive or artistic, purposes, generally speaking. However, it is acknowledged that some salsa dancers do indeed perform for competitive or artistic purposes, even as non-professionals. Additionally, no official

codification or systematic progression of training and technique exists.[5] It is likely, therefore, that performance of this physical activity is highly variable between individuals, thus making it difficult for clear comparisons of measures associated with dance-related injury to be made.

The coding of injury types and locations in dance injury surveillance research has generally not been performed consistently.[3] Nevertheless, we feel it is still relevant for guiding injury reduction efforts in non-professional salsa dance to compare the most frequent self-reported injury types and locations with those found in the literature. In terms of injury types, these were muscle or tendon (eg rupture, strain, tear)-related and joint (eg cartilage, dislocation) or ligament (eg sprain, tear)-related injuries in women and men, respectively. These results are consistent with the most frequent self-reported injury types reported in female Zumba® dancers, which were muscle or tendon (eg strain)-related, joint (non-bone) or ligament (eg dislocation, sprain)-related, and bruise-related injuries.[15] The aforementioned self-reported injury types comprised 58%, 39%, and 3%, respectively, of physical complaints and 60%, 20%, and 20%, respectively, of time-loss injuries. In terms of self-reported injury locations, in the current work, the ankle and foot (in women) and the knee (in men) were the most prevalent. Similar results were found in ballroom dance, where the ankle, foot, and toes (40%), followed by the back and neck (20%), and the knee and patella (20%) were the most frequently injured locations; there were no differences between females and males in this self-report study.[13] One possible explanation for why a higher proportion of ankle and foot injuries was found in the current sample of female salsa dancers, when compared to the males, may be the commonness of open-toed shoes worn by some women during performance of salsa dance. The highest rated perceived risk factor for injury in the present investigation was “stepped on by another dancer”. Although we did not ask respondents to describe their usual footwear worn during salsa

dance, it is logical to assume that the prevalence of open-toed shoes worn by women (eg high heels) is higher than in men. It is likely, therefore, that female salsa dancers are more susceptible to injury than their male counterparts if salsa dancers of both sexes are getting stepped on.

Despite the current work being the only surveillance study of injuries related to leisure, recreational, amateur, or non-professional salsa dance that we are aware of, certain limitations of our research must be acknowledged. Firstly, the salsa dancers answered the survey questions retrospectively and via self-report. It has been proposed that dance injury surveillance data should be collected prospectively and with the recording of injury incidents undertaken by medical personnel.[3] This would likely lead to a reduced risk of recall bias and improved injury recording accuracy.[3] Secondly, in terms of the response rate, it is not possible to know the representativeness[30] of those salsa dancers who began the survey questions but did not finish them, as respondent data were only made available to us from the secure web server upon full survey completion. Moreover, as data were collected entirely through the use of social networking services, our findings are only representative of those individuals who subscribe to these services. Thirdly, as administration of the survey was web-based, as opposed to in-person, we recognise that the absence of verbal communication and guidance to the respondents may have affected the responses.[30]

In conclusion, although it is accepted that non-professional salsa dance is a rigorous physical activity, our results indicate that its participants are as likely to sustain an injury during performance as participants of ballroom dance and less likely than participants of other somewhat similar genres of non-professional dance, such as Spanish, aerobic, and Zumba®. Avoiding dancing when the environment is clearly overcrowded, taking extra care not to collide with or step on other dancers, and wearing shoes that

provide optimal foot protection (eg not open-toed shoes) are some practical recommendations for non-professional salsa dancers that may reduce the chances of getting injured during performance.

References

1. Aman M, Forssblad M, Henriksson-Larsen K. Insurance claims data: A possible solution for a national sports injury surveillance system? An evaluation of data information against ASIDD and consensus statements on sports injury surveillance. *BMJ Open.* 2014;4:e005056.
2. Gray SE, Finch CF. Epidemiology of hospital-treated injuries sustained by fitness participants. *Res Q Exerc Sport.* 2015;86:81–87.
3. Bronner S, Ojofeitimi S, Mayers L. Comprehensive surveillance of dance injuries. A proposal for uniform reporting guidelines for professional companies. *J Dance Med Sci.* 2006;10:69–80.
4. van Mechelen W, Hlobil H, Kemper HC. Incidence, severity, aetiology and prevention of sports injuries. A review of concepts. *Sports Med.* 1992;14:82–99.
5. Renta P. Salsa dance: Latino/a history in motion. *Centro J.* 2004;16:138–157.
6. Domene PA, Easton C. Combined triaxial accelerometry and heart rate telemetry for the physiological characterization of Latin dance in non-professional adults. *J Dance Med Sci.* 2014;18:29–36.
7. Domene PA, Moir HJ, Pummell E, Easton C. Physiological and perceptual responses to Latin partnered social dance. *Hum Mov Sci.* 2014;37:32–41.
8. Domene PA, Moir HJ, Pummell E, Easton C. Salsa dance and Zumba fitness: Acute responses during community-based classes. *J Sport Health Sci.* 2016;5:190–196.
9. Birks M. Benefits of salsa classes in treatment of depression. *Nurs Times.* 2007;103:32–33.
10. Coruh EA. The comparison of wellness levels between individuals participating and nonparticipating in recreational Latin dancing. *Procedia Soc Behav Sci.* 2014;152:368–371.

11. Guidetti L, Buzzachera CF, Emerenziani GP, et al. Psychophysiological responses to salsa dance. *PLoS One.* 2015;10:e0121465.

12. Echegoyen S, Acuna E, Rodriguez C. Injuries in students of three different dance techniques. *Med Probl Perform Art.* 2010;25:72–74.

13. Kuisis SM, Camacho T, Kruger PE, Camacho AL. Self-reported incidence of injuries among ballroom dancers. *Afr J Phys Health Educ Recreat Dance.* 2012;18:107–119.

14. Garrick JG, Gillien DM, Whiteside P. The epidemiology of aerobic dance injuries. *Am J Sports Med.* 1986;14:67–72.

15. Domene PA, Clarke ND, Delextrat AA, Easton C. Injury surveillance of female adult Zumba® dancers. *J Sports Med Phys Fitness.* 2017;57:1642–1649.

16. Scharff-Olson MR, Williford HN, Brown JA. Injuries associated with current dance-exercise practices. *J Dance Med Sci.* 1999;3:144–150.

17. Benson JE, Geiger CJ, Eiserman PA, Wardlaw GM. Relationship between nutrient intake, body mass index, menstrual function, and ballet injury. *J Am Diet Assoc.* 1989;89:58–63.

18. Milton K, Bull FC, Bauman A. Reliability and validity testing of a single-item physical activity measure. *Br J Sports Med.* 2011;45:203–208.

19. Gabbe BJ, Finch CF, Bennell KL, Wajswelner H. How valid is a self reported 12 month sports injury history? *Br J Sports Med.* 2003;37:545–547.

20. Ojofeitimi S, Bronner S, Woo H. Injury incidence in hip hop. *Scand J Med Sci Sports.* 2012;22:347–355.

21. Riding McCabe T, Ambegaonkar JP, Redding E, Wyon M. Fit to dance survey: A comparison with dancesport injuries. *Med Probl Perform Art.* 2014;29:102–110.

22. Knowles SB, Marshall SW, Guskiewicz KM. Issues in estimating risks and rates in sports injury research. *J Athl Train.* 2006;41:207–215.

23. Peduzzi P, Concato J, Kemper E, Holford TR, Feinstein AR. A simulation study of the number of events per variable in logistic regression analysis. *J Clin Epidemiol.* 1996;9:1373–1379.

24. Wanke EM, Fischer T, Pieper HG, Groneberg DA. Dance sport: Injury profile in Latin American formation dancing. *Sportverletz Sportschaden.* 2014;28:132–138.

25. Pellicciari L, Piscitelli D, De Vita M, et al. Injuries among Italian dancesport athletes: A questionnaire survey. *Med Probl Perform Art.* 2016;31:13–17.

26. Garrick JG, Requa RK. Aerobic dance. A review. *Sports Med.* 1988;6:169–179.

27. Inouye J, Nichols A, Maskarinec G, Tseng CW. A survey of musculoskeletal injuries associated with Zumba. *Hawaii J Med Public Health.* 2013;72:433–436.

28. Miletic D, Miletic A, Milavic B. Age-related progressive increase of lower back pain among male dance sport competitors. *J Back Musculoskelet Rehabil.* 2015;28:551–560.

29. Rothenberger LA, Chang J, Cable TA. Prevalence and types of injuries in aerobic dancers. *Am J Sports Med.* 1988;16:403–407.

30. Oppenheimer AJ, Pannucci CJ, Kasten SJ, Haase SC. Survey says? A primer on web-based survey design and distribution. *Plast Reconstr Surg.* 2011;128:299–304.

Tables

Table 1 Demographic Background Characteristics of Non-Professional Salsa Dancers

	Total	**Women (*n* = 303)**	**Men (*n* = 147)**	***p***
Age (yr)	35 (29 – 44)*	34 (28 – 44)	36 (30 – 48)	< 0.05
Stature (cm)	168 (162 – 175)*	165 (160 – 169)	178 (173 – 183)	< 0.001
Mass (kg)	65 (58 – 75)*	62 (55 – 68)	78 (70 – 88)	< 0.001
BMI (kg/m^2)	23.1 (21.0 – 26.0)*	22.3 (20.4 – 25.0)	24.7 (22.4 – 27.0)	< 0.001
Salsa dance experience (yr)	5.7 (2.7 – 8.6)*	5.1 (2.6 – 8.3)	6.3 (3.0 – 10.0)	< 0.05
Salsa dance engagement per week (h)	3.7 (1.8 – 6.9)*	3.5 (1.8 – 5.8)	4.6 (2.8 – 8.2)	< 0.01
Non-salsa dance-related MVPA engagement per week (h)	3.0 (0.0 – 5.0)	2.5 (0.9 – 4.5)	3.0 (0.0 – 5.8)	0.18

*Significant difference between groups.
Abbreviations: BMI, body mass index; MVPA, moderate to vigorous physical activity.
Note. Data are presented as median (Q_1 – Q_3).

Table 2 Binomial Logistic Regression Analysis Used for Prediction of the Odds of Injury During Non-Professional Salsa Dance in Women (*n* = 303) and Men (*n* = 147)

	β	SE	χ^2	df	*p*	OR	95% CI
Constant	–4.09	0.84	23.96	1	< 0.001		
Sex (female/male)	0.69	0.29	5.85	1	< 0.05	2.00	1.14 – 3.50
Age (yr)	0.03	0.01	5.66	1	< 0.05	1.03	1.01 – 1.05
BMI (kg/m^2)	0.06	0.03	5.27	1	< 0.05	1.07	1.01 – 1.13
Salsa dance experience (yr)	–0.07	0.03	5.68	1	< 0.05	0.93	0.88 – 0.99

Abbreviations: BMI, body mass index; CI, confidence interval; OR, odds ratio; SE, standard error.
Note. Classification table accuracy = 80%.

Figure Captions

Figure 1 – Self-reported severity of injuries sustained during non-professional salsa dance in women (*n* = 303) and men (*n* = 147).

Figure 2 – Self-reported types of injuries sustained during non-professional salsa dance in women (*n* = 303) and men (*n* = 147).

Figure 3 – Self-reported locations of injuries sustained during non-professional salsa dance in women (*n* = 303) and men (*n* = 147).

Figure 4 – Self-reported risk factors attributed to injuries sustained during non-professional salsa dance in women (*n* = 303) and men (*n* = 147) experiencing ≥ 1 injury during the past year.

Figure 1

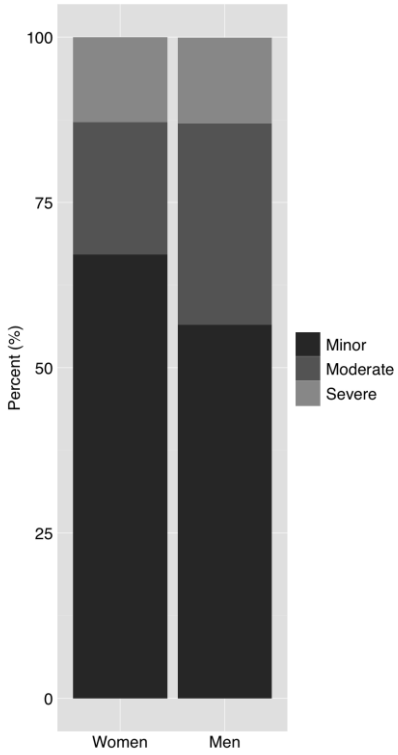

Figure 2

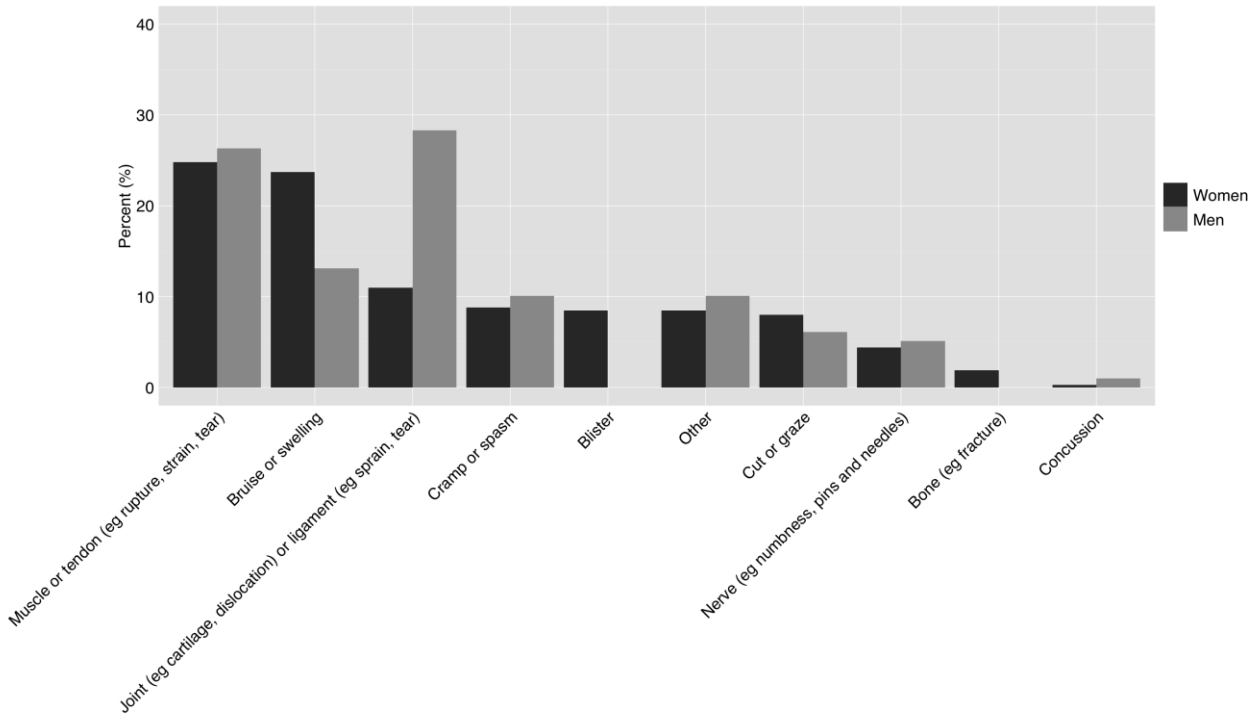

Figure 3

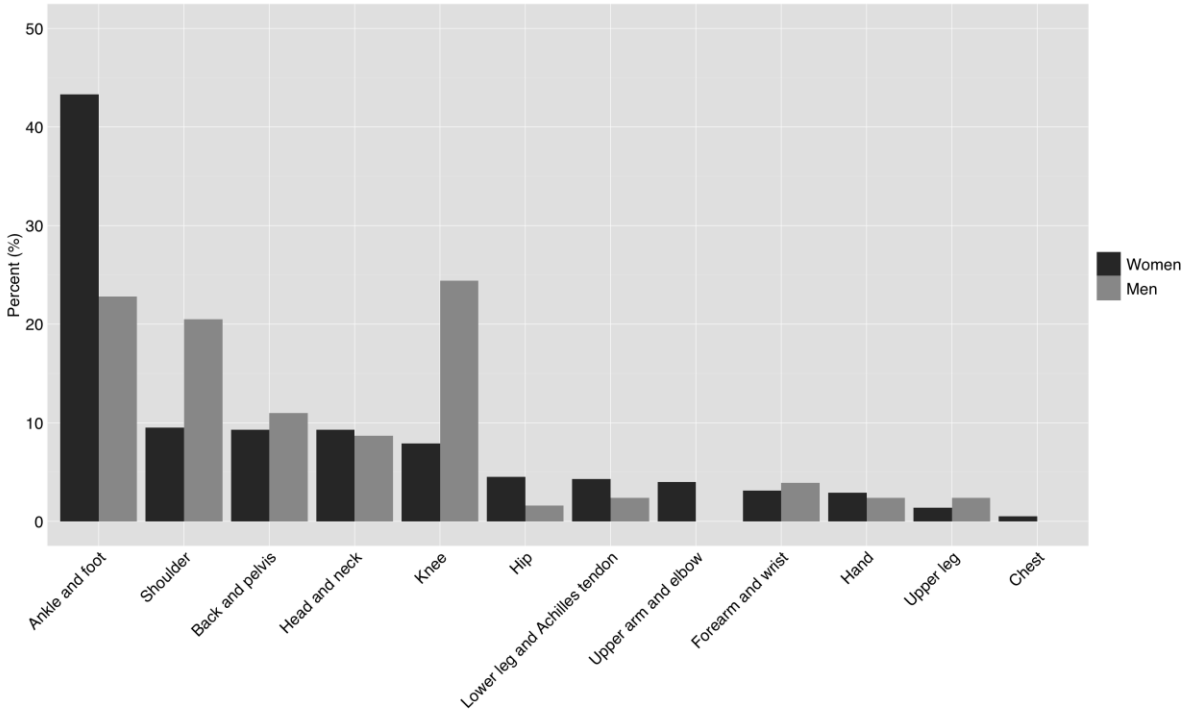

Figure 4