

Work-related Musculoskeletal Disorders Among Percussionists in Greece

A Pilot Study

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The performing arts medicine literature indicates that the prevalence of work-related musculoskeletal disorders in musician instrumentalists is approximately 43%. The primary purpose of this study was to record rates of the most common musculoskeletal disorders among professional and student percussionists in Greece. The secondary aim was to uncover relationships between the percussionists' musculoskeletal disorders and work-related factors such as their age, main musical activity, and practice time in musical training. **METHODS:** Thirty percussionists of both sexes, in active musical activity, aged 20 to 60 years, participated. The Musicians Health Questionnaire was used to record their musculoskeletal disorders as assessed in four factors: personal data, musical activity, total body musculoskeletal disorders, and treatment. **RESULTS:** In the 30 percussionists, 32% of musculoskeletal disorders involved the upper limb, 20% the vertebral column, 8% muscle tissue, 13% psychological problems, and 27% the rest of the body. The most common problems were tremor (20%, $n = 6$), neuralgia in the arms (17%, $n = 5$), and backache (20%, $n = 6$). Statistically significant correlations were found between upper-limb tremor and main musical activity ($r = 0.53$, $p = 0.01$), backache and age ($r = 0.48$, $p = 0.01$), and neuralgia in the arms and musical practice time (in hrs/day; $r = 0.45$, $p = 0.01$). **CONCLUSIONS:** The findings of this study indicated that most musculoskeletal disorders among percussionists in Greece affect the upper limbs and involve multiple risk factors. Because of the limited number of respondents, this study should be considered as a pilot population study. *Med Probl Perform Art* 2010; 25:116–119.

The performing arts medicine literature indicates that the overall prevalence of work-related musculoskeletal disorders in professional musician instrumentalists is in the range of approximately 43 to 50%.^{1,2} In instrumentalist musicians, complaints have focused on pain and discomfort of the whole body focusing on the neck, back, and upper extremities.^{3,4} Common musculoskeletal disorders of musicians include musculotendinous overuse injuries, tendinitis, epicondylitis, and peripheral nerve entrapment syndromes.^{5–7} Percussionists are among the instrumentalists who are at higher risk for playing-related musculoskeletal disorders. It has been reported that the most common problems in percussionists are overuse

musculoskeletal disorders, tendinitis, arthritis, ganglion, entrapment syndromes, and other neuropathies.^{8,9}

Zaza et al.¹⁰ studied 281 professional musicians and university music students, which included 13 percussionists in the sample. The majority of the percussionists (65%) experienced most symptoms in the hand and forearm. Roach et al.¹¹ compared 90 instrumental university students with 159 non-instrumentalists and found that instrumentalists had more musculoskeletal complaints. As well, the 17 percussionists were 6.3 times more likely to have hand pain and 3.9 times to have wrist pain in comparison with the other instrumentalists.

Sandell et al.¹² examined 279 percussionists experienced on basic percussion instruments and reported a 77% prevalence of playing-related musculoskeletal disorders and stress-related health problems among them. They found that the highest prevalence of playing-related musculoskeletal disorders for the whole group was evident in the bilateral hand and low back region. As for stress-related problems, percussionists reported primarily problems with fatigue, depression, and stage fright.

Several risk factors for work-related musculoskeletal disorders have been identified in various occupational groups. These factors mainly include individual variables such as age, gender, and work-related factors such as high physical load, static load, use of vibrating tools, and psychological stress.¹⁰

Despite the plethora of information on the prevalence of musculoskeletal disorders in performing art musicians, there no related studies that provide data on musculoskeletal disorders in percussionists in Greece. Our study had two objectives: The first one was to collect information on the musculoskeletal disorders among Greek percussionists including professionals and students, and the second was to identify relationships between the most common musculoskeletal disorders and work-related factors such as musician age, main musical activity, and the practice time in musical training.

METHODS

Sample

Thirty Greek professional percussionists, 22 males and 8 females, aged 20 to 60 yrs, were recruited in this study. Participants were recruited from the conservatory of Athens through advertisements and notices within professional organizations of musician instrumentalists in Athens. Among the percussionists, 4 were soloists, 5 orchestra musicians, 10 teachers of music, and 11 students at advanced level of classic percussion.

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TABLE 1. Demographic Information on the 30 Greek Percussionists

		%
Sex (n)		
Male	22	73
Female	8	27
Age (yrs)	21-25	40
Main musical activity (n)		
Students	11	37
Professional orchestra musicians	10	33
Music teachers	4	13
Soloists	5	17
Starting age of musical activity (yrs)		
6-10	4	13
11-15	11	37
16-20	11	37
21-25	3	10
26-30	1	3

Inclusion criteria used by the primary researcher in identifying potential recruits to the study population were as follows: the musicians were qualified in classical music education, active musicians participating in live public concerts for over a year, their percussion instrument training was >5 hrs/wk, and they were from Attiki in Greece. The exclusion criteria were a recent upper-limb operation, abstinence from music practice and participation in live public concerts for over a year, and the percussion instrument training of <5 hrs/wk.

This study received ethical approval from Research Committee of the Physiotherapy Department, Technological Education Institute (TEI) of Athens. All participants were informed about the research process and sign a written consent form.

Outcome Measures

To assist in developing the demographic data, the Musicians Health Questionnaire was used as an assessment tool to collect data about the musculoskeletal disorders in percussionist musicians. This questionnaire, from Marco Brazzo from University of Rovert of Italy, was adapted to Greek percussionists and was translated in Greek by an experienced English person and two independent researchers. Closed questions were used and belonged to scale items and categorical responses. This qualitative questionnaire has not been assessed for validity, reliability, and cross-cultural adaptation.

The Musicians Health Questionnaire includes four selected items that were used as the evaluation factors among the percussionists:

- personal data information (sex, age, main music activity, starting age of music activity, exercise routine),
- musical activity participation (public concerts, career satisfaction, goals achievement, resting time before concert, exercise, diet, prevention exercises, practice hours per day, practice months per year, practice days per week, relaxation techniques),
- musculoskeletal problems (lumbar problems, backache, neck pain, brachialgia, neuralgia in the lower limbs, shoulder pain,

TABLE 2. Percussionists' Musical Activity

Musical Activity		%
Concerts per year (n)	9-12 (n = 6)	20
Prevention exercises		
Yes	21	70
No	9	30
Diet (Mediterranean)		
Yes	15	50
No	15	50
Practice hours per day	1-3 (n = 13)	43
Practice days per week	1-7 (n = 17)	57
Practice months per year	10-12 (n = 21)	70
Rest before concert (days/wk)	1 (n = 15)	50
Relaxation techniques		
Yes	5	17
No	25	83

n identifies the number of respondents.

epicondylitis, headache, pains in the jaw, tendinitis, tendinous cysts, fibromyalgia, focal dystonia of the hands, tremors, tinnitus, loss of hearing, eye problems, tachycardia, circulation problems, sleeplessness, depression, nervous exhaustion, asthenia/chronic fatigue, pharyngitis, laryngitis, aphonia) and d) therapeutic treatment (such as operations, modes of treatment, and use of drugs and stimulants).

The researcher was present during the completion process. The questionnaire was used only for the one trial run. Furthermore, this pilot study determined whether the instructions were adequate and provided valuable explanations about the questionnaire format, content, expressions, and importance of selected items.

Statistical Analysis

The statistical analysis was done via SPSS v16.00 (SPSS Inc., Chicago, IL). Frequencies were used as a demographic distribution for personal information (sex, age, main music activity), music participation (concerts, practice time, exercise), musculoskeletal disorders (ganglion, tendinitis, focal dystonia), and therapeutic methods (drugs, other treatments). Pearson correlation was used to assess relationships between personal information, musical activity, and musculoskeletal disorders. Statistical significant levels were set at $p = 0.05$ and 0.01 .

RESULTS

Of the 30 participants, 22 were men (73%) and 8 women (27%). Their mean age ranged from 21 to 25 yrs (40%). Of those who participated, 11 were students (37%) and 19 were professionals (63%) (Table 1). Their starting age of playing percussion ranged from age 6 to 30 yrs (Table 1).

The second factor that corresponded to the musical activity was either concert participation or the training process, including prevention exercises, diet, and relaxation techniques. One fifth of the normal active percussionists played in concerts 9 to 12 times per year (20%), 43% practiced per-

TABLE 3. Most Common Musculoskeletal Disorders of the Upper Extremities, Neck, Head, and Back

Musculoskeletal Disorders	Percent (No.)*		
	Never	Rarely	Often
Lumbar problems	40 (12)	50 (15)	10 (3)
Neck pain	43 (13)	47 (14)	10 (3)
Backache	40 (12)	40 (12)	20 (6)
Brachialgia (neuralgia in the arms)	50 (15)	33 (10)	17 (5)
Sciatica, neuralgia in the lower limbs	67 (20)	30 (9)	3 (1)
Shoulder pain	67 (20)	23 (7)	10 (3)
Epicondylitis	57 (17)	36 (11)	7 (2)
Headache	33 (10)	47 (14)	20 (6)
Pains in the jaw	97 (29)	3 (1)	0 (0)
Tendinitis, tendinous synovitis	40 (12)	50 (15)	10 (3)
Ganglion	73 (22)	20 (6)	7 (2)
Fibromyalgia	83 (25)	10 (3)	7 (2)
Focal dystonia	73 (22)	20 (6)	7 (2)
Tremors	73 (22)	7 (2)	20 (6)

*The number of participants is given in parentheses.

cussion for 1 to 3 hours daily and 57% practiced at least once (1 to 7 days)/week (Table 2).

Thirty-two percent of musculoskeletal disorders involved the upper limbs, 20% the vertebral column, 8% muscle tissue, 13% psychological problems, and 27% the rest of the body. Table 3 indicates the most common musculoskeletal disorders of the upper extremities, as well as pain in the neck, head, and back. The most common problem that was recorded from the upper extremities was tremors at 20% (n = 6 percussionists) and neuralgia in the arms at 17% (n = 5), backache at 20% (n = 6), and headache at 20% (n = 6) (Table 3).

Table 4 show the prevalence of other diagnoses and health problems according to the questionnaire items. Table 5 provides information on therapeutic modalities used by the percussionists.

Statistically significant correlations were found between upper-limb tremor and the percussionist's main musical activity (orchestra musicians) ($r = 0.53, p = 0.01$), between backache and the musicians' ages (21–25 yrs) ($r = 0.48, p = 0.01$), and between neuralgia in the arms and their practice hours per day (1–3 hrs/day) ($r = 0.45, p = 0.01$).

DISCUSSION

The primary purpose of this study was to collect data on the most common musculoskeletal disorders among percussionists in Greece. Thirty-two percent of musculoskeletal disorders were recorded in the upper limb and 20% in the vertebral column. The prevalence of the most common musculoskeletal disorders on percussionists experienced on in the upper extremities included tremors at 20% and neuralgia in the arms at 17%; other body regions with pain conditions included backache at 20% and headache at 20%.

According to literature, percussionists are typically affected by hand, wrist, arm, and shoulder problems, including carpal tunnel syndrome.^{10,14} In Sandell et al.'s report,¹² the majority of musculoskeletal disorders for percussionists on basic percussion instruments involved the bilateral hand and low back. The findings of our preliminary study in percussionists in Greece have identified a variety of musculoskeletal disorders involving the total body but focusing on the upper extremities and vertebral column. These results are in partial agreement with the above literature reports, but

TABLE 4. Other Diagnosed Health Problems

Musculoskeletal Disorders	Percent (No.)*		
	Never	Rarely	Often
Tinnitus	40 (12)	43 (13)	17 (5)
Loss of hearing	73 (22)	20 (6)	7 (2)
Eye problems	50 (15)	27 (8)	23 (7)
Tachycardia	67 (20)	23 (7)	10 (3)
Circulation problems	84 (25)	13 (4)	3 (1)
Sleeplessness	50 (15)	33 (10)	17 (5)
Depression	60 (18)	30 (9)	10 (3)
Asthenia (chronic fatigue)	60 (18)	33 (10)	7 (2)
Pharyngitis, laryngitis	74 (22)	17 (5)	9 (3)
Aphonia	90 (27)	7 (2)	3 (1)

*The number of participants is given in parentheses.

TABLE 5. Therapeutic Methods Used by Percussionists

Treatments	%
Surgery (n = 2)	7
Conventional medicine (n = 23)	77
Drugs and stimulants, only when necessary (n = 14)	47

definite conclusions cannot be made from our study due to the limited population who participated. Further research should study musculoskeletal disorders in a larger percussionist population.

The secondary purpose of our study was to identify relationships between the most common musculoskeletal disorders among percussionists in Greece and work-related factors such as musician age, main musical activity, and practice time of musical training. Despite the statistically significant correlations found in this study, the relationships indicted were weak between upper-limb tremors and their main music activity (orchestra musicians), between backache and their ages (21–25 yrs), and between neuralgia in the arms and practice hours per day (1–3). These results suggest work factors as predisposing risk factors for musculoskeletal upper-limb disorders in percussionists in Greece. These risk factors were related to the individual's occupation (orchestra musicians), increasing with their age and training hours. It is a consistent finding that the presence of two or more factors produces a synergistic effect on the prevalence of musculoskeletal disorders.

There is much evidence that high repetitions and high force are strong risk factors that associated with shoulder, elbow, hand, and wrist musculoskeletal problems.¹⁴ Other risk factors include increasing age, female gender, psychological stress, and work schedule and organization.^{1,10,15} Sandell et al.¹² found that a moderate to high level of stress was due to the work environment for the percussionists on basic percussion instruments. As well, the highest prevalence of their stress-related health problems was reported for fatigue, depression, and stage fright. Our results have been addressed some of these related factors, but no interpretation was done: firstly, it was beyond of the scope of this study, and secondly, it was difficult to distinguish the role and contribution of each risk factor among the musculoskeletal disorders in percussionists in Greece due to the limited population participated.

CONCLUSION

The findings of this study suggest that percussionists in Greece are typically affected by upper-limb musculoskeletal

disorders associated with combined risk factors such the individual's occupation (orchestra musicians), increasing age, and increasing training hours. This study should be considered pilot in nature due to its limited sample size. Our recording of musculoskeletal disorders among percussionists in Greece should be helpful in avoiding musculoskeletal injuries by assessing work-related factors as certain risk factors.

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