

OCCUPATIONAL HEALTH PROBLEMS AMONG SLOVENIAN PHYSICAL EDUCATION TEACHERS

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Abstract:

Physical education teachers (PETs) are exposed to the same psychological stress factors as teachers of other subjects, but the increased physical load in this subgroup may significantly influence the prevalence of certain health problems. This cross-sectional study was designed to assess the frequency of occupational health problems and to identify the role of some risk factors (age, gender, teaching level) for PETs. A self-administered questionnaire was used to examine this problem among 468 Slovenian PETs. The association between each health problem and the risk factors was analysed with two-way contingency tables, Cramer V and binary logistic regression. During their professional career, lower back pain, voice disorders, common cold and auditory problems are the most frequent health problems in PETs. Aging generally increases the odds ratio (OR) for most occupational health problems (OR between 1.01 and 1.11). Female PETs had significantly higher odds for urinary tract infection, headache, cervical spine disorder, dysphonia and aphonia in comparison with male PETs (OR=3.26, 2.40, 1.94, 1.92 and 1.82, respectively). Primary school PETs had approximately twice as high odds for lower back pain and dysphonia as secondary school teachers (OR=1.83 and 1.82, respectively). In order to maintain working ability, good preparation for work, understanding of the injury risk factors and chronic lesions mechanisms, regular prevention exercises and healthy working environments are required.

Key words: *working environment, professional career, physical educators, gender differences*

Introduction

The teaching profession is accompanied by occupational burdens that arise from the specific physiological and psychological demands of the profession (Chong & Chan, 2010; Erick & Smith, 2011; Gardner, 2010; Kovess-Masféty, Sevilla-Dedieu, Rios-Seidel, Nerriere, & Chan Chee, 2006). Teachers indicate that, besides high numbers of students in one class, they regard the destructive and aggressive behaviour of students as the primary stress factor that leads to psychosomatic disorders and the symptoms of the 'burnout' syndrome (Bauer, et al., 2006; Gardner, 2010) that, in turn, may be the main cause of the increasing rates of premature retirement of school teachers and particularly of school principals (Weber, Weltle, & Lederer, 2005). The relative frequency of psychosomatic problems among teachers was higher in women than in men, and the most frequent somatic diseases were cardiovascular diseases, followed by musculo-skeletal disorders and malignant tumours (Weber, Weltle, & Lederer, 2004). Apart from those problems, studies have also reported a great increase of diseases of the voice organs among teachers

(Bruck Marçal & Peres, 2011; Mattiske, Oates, & Greenwood, 1998; Russell, Oates, & Greenwood, 1998; Soklič & Hočvar-Boltežar, 2004; Thibeault, Merrill, Roy, Gray, & Smith, 2004).

Physical education teachers (PETs) are exposed to the same psychological stress factors as teachers of other subjects (Fejgin, Ephraty, & Ben-Sira, 1995), but it is the increased physical load in this subgroup that may significantly influence the prevalence of certain health problems (André, Cloes, & Deroanne, 1991; Lemoyne, Laurencelle, Lirette, & Trudeau, 2007; Sandmark, Wiktorin, Hogstedt, Klenell-Hatschek, & Vingård, 1999; Stergioulas, Filippou, Triga, Grigoriadis, & Shipkov, 2004). Some previous studies indicated that the physical workload among PETs is considerable due to the load on the lower limbs, and that the demands of the cardiovascular system are also relatively high in comparison to other occupational groups (Sandmark, et al., 1999). As a result of various injuries, particularly musculoskeletal (Lemoyne, et al., 2007; Sandmark, et al., 1999; Stergioulas, et al., 2004), only a small proportion of PETs are capable of working until the official retirement age (Sandmark,

2000). The importance and the extent of the physical workload may also be seen in the light of principal career reorientation, with younger PETs frequently invoking employment instability/uncertainty, while the more experienced PETs put more emphasis on teaching problems, work conditions and physical context, and were making a transition toward other teaching functions (Bizet, Laurencelle, Lemoyne, Larouche, & Trudeau, 2010).

The common occupational health problems among PETs include dysphonia (Simberg, Sala, Vehmas, & Laine, 2005; Smith, Kirchner, Taylor, Hoffman, & Lemke, 1998; Smith, Lemke, Taylor, Kirchner, & Hoffman, 1998) and auditory problems (Lemoyne, et al., 2007; Palma, Mattos, Almeida, & Oliveira, 2009) due to working under high levels of sound pressure during their classes and poor acoustics in sports halls (Jurak, et al., 2011; Mirbod, et al., 1994; Palma, et al., 2009). Those problems are more common among female PETs (Simberg, et al., 2005; Smith, Kirchner, et al., 1998; Smith, Lemke, et al., 1998; Mirbod, et al., 1994; Palma, et al., 2009).

PE in Slovenia is, similar to the other post-socialist countries, still performance-oriented (Hamar, Peters, Van Berlo, & Hardman, 2006; Kovač, Jurak, Starc, & Strel, 2011). PETs expressed the greatest appreciation for the disciplinary competencies, such as demonstration of movement skills, which are directly applicable in the classroom (Kovač, Sloan, & Starc, 2008). Furthermore, numerous PETs work part-time in the afternoons as coaches in addition to their regular job (Kovač, et al., 2011). Slovenian PETs are very satisfied with their current profession position but more likely to anticipate their retirement due to the extension of years of service (Mujanović & Doupona Topič, 2009). In the light of rather scarce scientific literature regarding the specific health problems of PETs from countries with performance-oriented PE, we have conducted a cross-sectional study on Slovenian PETs to determine the frequency of occupational health problems as well as the differences among them according to gender, age and teaching level.

Methods

Subjects

The sample included 468 PETs; 282 (60.3%) were men (mean age 43.4 ± 10 years) and 184 (39.3%) were women (mean age 41.5 ± 8 years), while two teachers did not state their gender. Men had on average 18.4 ± 11.1 years of work experience and women 17.5 ± 8.8 years; 296 (63%) taught in primary schools and 172 (37%) at secondary schools. The structure of the sample according to the gender, age, length of work experience and teaching level is similar to PET population data found in the registries of the Ministry of Education and Sport (2010).

Teachers were, on average, leisure/physically (sporting) active 7.2 ± 4.0 hours per week. The leisure physical activities (number of physical/sporting activity participation hours per week, the groups of sports, which teachers participated in the past and nowadays) of PETs have not been included in the final regression model for predicting chronic health problems, as it was found in the preliminary analysis that this predictor was not significant in explaining the odds of any of the chronic health problems.

Procedures

We constructed a self-administered questionnaire for the purpose of the study; at first, the questionnaire was qualitatively validated by a group of 20 PETs (10 men and 10 women), of different ages, amounts of working experience, and working at different teaching levels. According to their validation, we slightly shortened the original questionnaire.

The questionnaire consisted of the following parts: 1) demographic data (gender, length of work experience, age, teaching level), 2) subjects' leisure physical activity (number of hours of leisure physical activity per week; the three most frequently participated sports in leisure time; past experiences in sports), and 3) subjects' chronic health problems (the frequency of these problems in their professional career). Chronic health problems were defined as overuse injuries and/or pain in the specific joints (e.g. cervical spine pain, lower back pain) as well as the disorders and conditions related to the teacher's profession (e.g. voice disorders, auditory problems, common cold, etc.) that were frequently repeated and persisted for more than a year of teaching. The questionnaire was sent to all primary and secondary schools in Slovenia ($N=584$) by regular mail. According to the database of Ministry of Education and Sport (2010), it is estimated that approximately 1,300 PETs work in those schools; the rate of questionnaire return was 36%. Teachers were informed of the objectives of the study, and of the voluntary and anonymous character of their participation. The study was approved by the Human Research Ethics Committee of the Faculty of Sport in Ljubljana.

Statistical analyses

The data were analysed with the PASW Statistics 18.0 software. The basic statistics of variable distributions were calculated. The frequency of specific health problems were reported with a four-level scale (0=never, 1=rarely, 2=often, and 3=very often). For a better overview of results, the frequencies of PETs' specific health problems were joined into two groups (0=never and rarely, 1=often and very often). The frequency of problems was computed separately according to gender (male, female), age group (under 35 years of age, 36–45 years, over

45 years) and teaching level (primary school, secondary school). The bivariate association between health problems and each of the three confounding risk factors (gender, age and teaching level) was analysed with two-way contingency tables and Cramer V, while the joint effect of all three confounding risk factors on each of the health problems was analysed with binary logistic regression. The two teachers who did not state their gender have been excluded from the analysis where gender was explored as a confounding risk factor.

Results

The most common health problems in both genders were lower back pain, voice disorders (dysphonia and aphonia), common cold and auditory problems (Figure 1 and Table 1). The results of bivariate association between health problems and each of the three confounding risk factors (gender, age and teaching level) are shown in Table 1. Among the genders, there were only small differences in the frequency (reported as often and very often) of lower back pain, auditory problems and some joint disorders (lower limbs), but the frequency of dysphonia, aphonia, headache and urinary tract infection was higher in females than in males. There were age-related increases in the frequency of

auditory problems, lower back pain, cervical spine disorder and some joint disorders (hip, knee, elbow, shoulder). The teaching level also seemed to play a role in the rate of chronic health problems, with primary school PETs more commonly reporting lower back pain and dysphonia, while there were no significant differences in the occurrence of common cold. We must also note that primary school teachers were more likely to report other disorders such as auditory problems, ankle disorder and cervical spine disorder.

A logistic regression model was used to explore the influence of age, gender and teaching level on the occurrence of specific health problems (Table 2). The results have shown that the increasing age generally increases the odds ratio (OR) for all occupational health problems (the OR increased between 1.01 and 1.11 for each year of age); the ORs for auditory problems, major auditory impairment, urinary tract infection, cervical spine disorder, lower back pain, hip, knee, elbow and shoulder disorders were the ones statistically significant at the 5% level. Female PETs had significantly higher odds for urinary tract infection (OR=3.26, 95% CI: 1.40–7.57), headache (OR=2.40, 95% CI: 1.48–3.87), cervical spine disorder (OR=1.94, 95% CI: 1.16–3.24), dysphonia (OR=1.92, 95% CI:

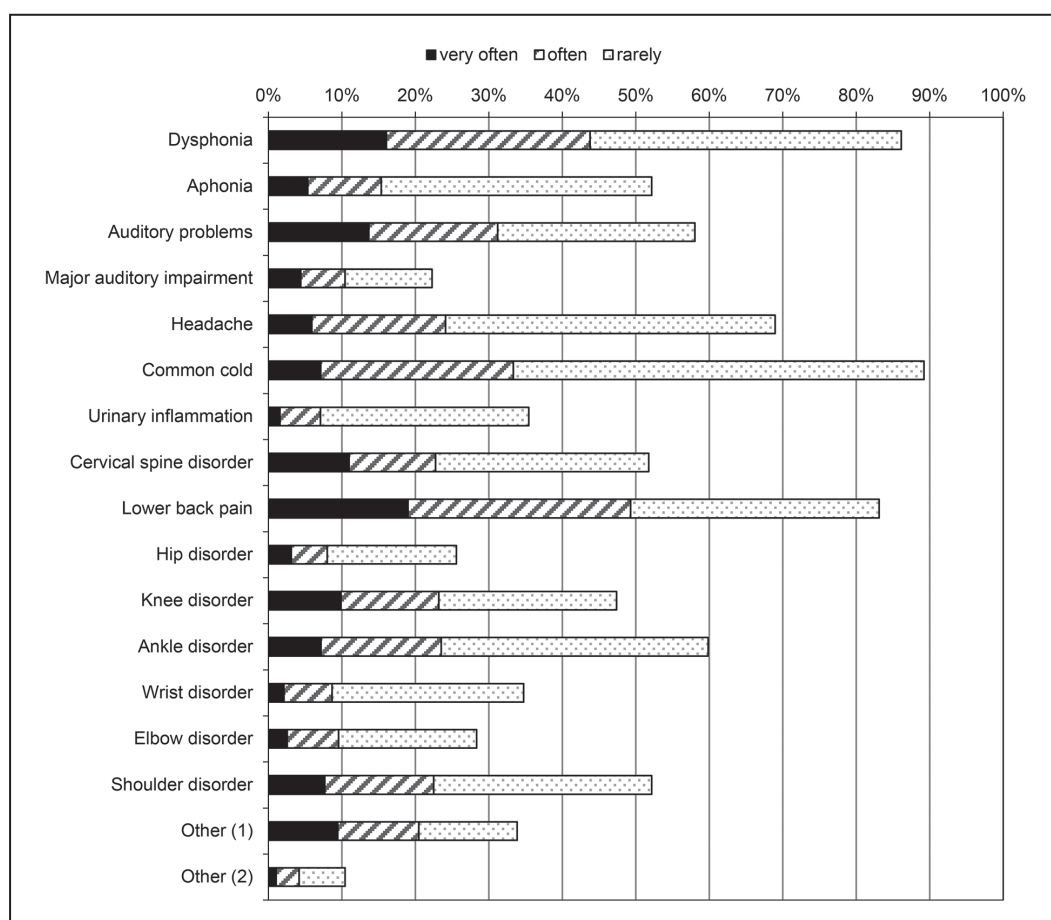


Figure 1. Proportion of health problems among PETs.

Table 1. Proportion of PETs with very frequent chronic health problems by gender, age group and teaching level

| Chronic health problems | Age group | | | Cramer's V | p |
|---------------------------|-------------------|--------------------|------------------|------------|-------|
| | < 35 years of age | 36-45 years of age | 46+ years of age | | |
| Dysphonia | 40.0% | 49.7% | 40.9% | .09 | .200 |
| Aphonia | 10.8% | 16.9% | 16.8% | .08 | .324 |
| Auditory problems | 10.9% | 34.0% | 43.0% | .09 | <.001 |
| Major auditory impairment | 1.9% | 7.0% | 21.1% | .28 | <.001 |
| Headache | 20.0% | 27.5% | 23.9% | .26 | .386 |
| Common cold | 26.5% | 37.2% | 34.2% | .07 | .183 |
| Urinary tract infection | 2.8% | 9.9% | 7.9% | .11 | .090 |
| Cervical spine disorder | 8.6% | 17.9% | 36.4% | .28 | <.001 |
| Lower back pain | 33.6% | 49.3% | 60.2% | .21 | <.001 |
| Hip disorder | 2.8% | 4.5% | 15.3% | .21 | <.001 |
| Knee disorder | 9.9% | 22.1% | 34.8% | .24 | <.001 |
| Ankle disorder | 23.1% | 18.1% | 28.5% | .10 | .121 |
| Wrist disorder | 8.3% | 6.8% | 10.1% | .05 | .628 |
| Elbow disorder | 1.9% | 10.4% | 13.8% | .17 | .005 |
| Shoulder disorder | 10.0% | 21.9% | 32.6% | .22 | <.001 |
| Other (1) | 14.3% | 21.2% | 26.7% | .13 | .329 |
| Other (2) | 2.4% | 3.8% | 6.9% | .09 | .652 |

| Chronic health problems | Gender | | | | Teaching level | | | |
|---------------------------|--------|--------|------------|-------|----------------|------------------|------------|------|
| | Male | Female | Cramer's V | p | Primary school | Secondary school | Cramer's V | p |
| Dysphonia | 37.7% | 52.4% | .15 | .003 | 48.8% | 35.1% | .13 | .007 |
| Aphonia | 12.1% | 19.8% | .10 | .038 | 16.7% | 12.9% | .05 | .308 |
| Auditory problems | 32.4% | 29.3% | .03 | .517 | 32.2% | 29.6% | .03 | .588 |
| Major auditory impairment | 12.4% | 7.9% | .07 | .169 | 10.8% | 9.8% | .02 | .753 |
| Headache | 17.4% | 32.9% | .18 | <.001 | 25.2% | 22.2% | .03 | .507 |
| Common cold | 32.4% | 34.5% | .02 | .647 | 33.6% | 32.9% | .01 | .884 |
| Urinary tract infection | 4.5% | 10.9% | .12 | .017 | 8.7% | 4.3% | .08 | .104 |
| Cervical spine disorder | 19.5% | 26.9% | .09 | .079 | 25.1% | 18.6% | .07 | .137 |
| Lower back pain | 49.2% | 49.4% | .00 | .964 | 54.7% | 39.9% | .14 | .003 |
| Hip disorder | 7.2% | 9.3% | .04 | .458 | 8.6% | 7.0% | .03 | .572 |
| Knee disorder | 25.9% | 19.1% | .08 | .120 | 24.2% | 21.4% | .03 | .539 |
| Ankle disorder | 25.3% | 20.7% | .05 | .290 | 25.8% | 19.6% | .07 | .162 |
| Wrist disorder | 7.9% | 9.8% | .03 | .515 | 10.5% | 5.7% | .08 | .109 |
| Elbow disorder | 11.7% | 6.7% | .08 | .106 | 10.1% | 8.5% | .03 | .603 |
| Shoulder disorder | 21.9% | 23.0% | .01 | .787 | 23.2% | 21.3% | .02 | .662 |
| Other (1) | 24.4% | 13.6% | .13 | .155 | 23.2% | 15.6% | .09 | .309 |
| Other (2) | 6.8% | 0.0% | .16 | .110 | 3.3% | 5.7% | .06 | .565 |

Table 2. Logistic regression results

| Chronic health problems | Nagelkerke R ² | Adjusted odds ratio (95% confidence interval) | | |
|---------------------------|---------------------------|---|--------------------|---------------------------------|
| | | Gender (female) | Age (in years) | Teaching level (primary school) |
| Dysphonia | .06 | 1.92‡ (1.28; 2.89) | 1.01 (0.99; 1.03) | 1.82‡ (1.19; 2.77) |
| Aphonia | .03 | 1.82† (1.03; 3.20) | 1.02 (0.99; 1.05) | 1.34 (0.73; 2.44) |
| Auditory problems | .10 | 1.02 (0.65; 1.60) | 1.07‡ (1.04; 1.10) | 1.13 (0.71; 1.77) |
| Major auditory impairment | .16 | 0.82 (0.38; 1.74) | 1.11‡ (1.07; 1.16) | 1.11 (0.53; 2.33) |
| Headache | .05 | 2.40‡ (1.48; 3.87) | 1.01 (0.98; 1.04) | 1.21 (0.74; 1.99) |
| Common cold | .01 | 1.12 (0.73; 1.71) | 1.02 (0.99; 1.04) | 1.00 (0.65; 1.54) |
| Urinary tract infection | .10 | 3.26‡ (1.40; 7.57) | 1.06† (1.01; 1.11) | 2.25 (0.87; 5.79) |
| Cervical spine disorder | .15 | 1.94† (1.16; 3.24) | 1.09‡ (1.06; 1.12) | 1.45 (0.85; 2.47) |
| Lower back pain | .09 | 1.15 (0.77; 1.72) | 1.05‡ (1.03; 1.07) | 1.83‡ (1.21; 2.75) |
| Hip disorder | .09 | 1.67 (0.77; 3.60) | 1.09‡ (1.04; 1.14) | 1.34 (0.60; 2.98) |
| Knee disorder | .11 | 0.78 (0.47; 1.31) | 1.07‡ (1.04; 1.10) | 1.13 (0.67; 1.90) |
| Ankle disorder | .02 | 0.78 (0.48; 1.28) | 1.02 (1.00; 1.05) | 1.36 (0.82; 2.26) |
| Wrist disorder | .02 | 1.26 (0.60; 2.62) | 1.02 (0.98; 1.06) | 1.89 (0.82; 4.33) |
| Elbow disorder | .11 | 0.60 (0.27; 1.31) | 1.09‡ (1.04; 1.13) | 1.09 (0.52; 2.31) |
| Shoulder disorder | .08 | 1.20 (0.73; 1.98) | 1.06‡ (1.03; 1.09) | 1.09 (0.65; 1.82) |

Legend: † – p<.05; ‡ – p<.01

1.28–2.89), and aphonia (OR=1.82, 95% CI: 1.03–3.20) in comparison with male PETs. The ORs for lower back pain (OR=1.83, 95% CI: 1.21–2.75) and dysphonia (OR=1.82, 95% CI: 1.19–2.77) among primary school PETs were around twice as high as in secondary school PETs. The highest odds ratio was found for urinary tract infection (OR=2.25, 95% CI: 0.87–5.79); however, it was not significant at .05 error rate ($p=.094$).

Discussion and conclusions

This is one of the few studies of occupational health problems among PETs working in countries with performance-oriented PE. Our study has highlighted several subgroups of PETs that require special concern in terms of specific preventive measures. These subgroups are older PETs, female PETs and all PETs (especially females) teaching at the primary school level.

PETs are healthier compared to the general population due to more healthy lifestyles (Mišigoj-Duraković, Duraković, Ružić, & Findak, 2004; Pihl, Matsin, & Jürimäe, 2002; Sandmark, 2000), but they have specific health problems associated with the characteristics of their profession (André, et al., 1991; Lemoyne, et al., 2007; Palma, et al., 2009; Pihl, et al., 2002; Sandmark, et al., 1999).

The results of binary logistic regression have shown that increasing age generally increases the odds for most occupational health problems, particularly musculoskeletal ones. This association can be interpreted as the effect of aging or a cumulative effect of workload on the musculoskeletal system of workers (Ono, et al., 2002). When analysing the nature of the PETs' profession, it was not surprising to find lower back pain as one of the most common occupational health problems. Lower back pain is a widely prevalent and complex syndrome of regional pain, often cited as a major cause of disability and inability to work (Deyo & Weinstein, 2001). In the systematic review of musculoskeletal disorders among school teachers, Erick and Smith (2011) found that the reported prevalence of back pain varied greatly across the literature, ranging from 4.7% to 76.7%. Furthermore, the prevalence among PETs is not uniform; for example, 63% of Greek PETs (Stergioulas, et al., 2004), 23% of Canadian PETs (Lemoyne, et al., 2007), but only 4.7% of Estonian PETs (Pihl, et al., 2002) reported back pain. In our study, only 17% of PETs had never reported back pain and 49% of them reported back pain often and very often. In contrast to other studies (Erick & Smith, 2011), Slovenian female teachers reported the same rate of lower back pain as that of their male colleagues. This problem is common also among Slovenian PE students; their reported six-month prevalence of lower back pain was 60.6% (Bučar Pajek, Peček Čuk, & Pajek, 2012). The risk for lower back pain is probably

related to long periods of standing with high static loading on their lumbar spine, which is further aggravated during some occupation-specific tasks, such as spotting pupils and students performing gymnastics, carrying heavy objects during and following the classes, etc. (Lemoyne, et al., 2007; Stergioulas, et al., 2004). We must also emphasize that lower back pain can also be attributed to the ground reaction forces related to the quality of the sports surfaces (Aoki, et al. 2010; Drago & Braun, 2010). Numerous Slovenian male PETs work part-time in the afternoons as coaches in addition to their regular job (Kovač, et al., 2011). Additional work similar to the regular profession was an important factor for a larger amount of chronic (overuse) injuries (Bizet, et al., 2010). Dysphonia was the second most common occupational health problem in Slovenian PETs, especially females. It has been documented that speech problems are more frequent among teachers than in the general population (32 to 58% vs 1%, respectively) (Roy, et al., 2004; Smith, Lemke, et al., 1998). There is also evidence that PETs are also at greater risk for developing voice organ disorders than other subjects' teachers (Smith, Kirchner, et al., 1998; Jonsdottir, Boyle, Martin, & Sigurdardottir, 2002), and that risk is even higher for females (Bruck Marçal & Peres, 2011; Jonsdottir, et al., 2002; Smith, Kirchner, et al., 1998; Russell, et al., 1998). Our results are similar to such findings. What our study adds to this knowledge is the fact that teaching at primary schools roughly doubles that risk. There are several possible explanations for the increased risk of PETs' speech problems. Firstly, the classes take place in halls with poor acoustics (Jurak, et al., 2011; Palma, et al., 2009), with large amounts of dust and with large student groups practising at the same time (Lemoyne, et al., 2007). Additionally, student discipline, especially at primary schools, may also require teachers to speak loudly (Lemoyne, et al., 2007; Simberg, et al., 2005; Russell, et al., 1998). We believe that more research should be aimed at the identification of objective and measurable acoustical parameters that are related to voice organ disorders, e.g. reverberation time in sports halls that may influence the understanding of the speech due to the changes in speech transmission index (Li & Cox, 2003).

Moreover, sound pressure has not been associated only with speech problems but also with auditory problems. More than a quarter of Slovenian PETs reported this problem and age-related increases in the frequency of auditory problems. Acceptable values for acoustic comfort are up to 55 dB(A) (Johnson, Papadopoulos, Watfa, & Takala, 2001), yet the highest mean values in the main session of the PE class were at 95 dB(A) (Mirbod, et al., 1994; Palma, et al., 2009). Thus, the sound pressure levels during PE classes may become a serious

occupational health hazard, considering that PETs are exposed to noise for several hours without any protection.

Common colds, as the most common presentation of upper respiratory illness, seem to be an indication that sport and exercise participation may increase those conditions, depending on the individual's immune system reaction (Weidner & Sevier, 1996). When analysing the risk factors for this problem, we should take into account the frequent changes of microclimatic conditions for PETs as well as the relatively low set point for temperature in sports halls (Jurak, et al., 2011), which may be suitable for highly active subjects, while persons with lower levels of physical activity participation may experience some problems including the increased risk for common colds (Weidner & Sevier, 1996).

Slovenian female PETs had significantly higher odds for aphonia, dysphonia, headache, cervical spine disorder and urinary tract infection in comparison with male PETs. More frequently reported speech problems among female teachers are partly explained by the gender-related differences of the larynx (Butler, Hammond, & Gray, 2001). Furthermore, social and cultural factors (e.g. higher strains on vocal cords in their daily life) may contribute to speech problems among women (Vilkman, 2004). In the study about the subjective health complaints in the teaching profession of Hong Kong, headache is one of the most frequently reported health complaints among the teachers (Chong & Chan, 2010). We did not find any data about the frequency of headache among female PETs, but in the general population, women experience various chronic pain conditions, such as headache, more frequently than men (Chong & Chan, 2010; Smitherman & Ward, 2011). From the reviewed literature, it appears that the prevalence of cervical spine disorder (Erick & Smith, 2011) and urinary tract infection (Nygaard & Linder, 1997) are positively associated with female teachers.

The odds for lower back pain and dysphonia occurring among Slovenian primary school PETs were almost twice as high as that of secondary school PETs. Our study does not allow us to explain why primary school PETs are more likely to sustain these health problems at work than secondary school PETs. Partial explanations are indirect and involve an association between a higher level of working load of primary school teachers and noisy installations. Slovenian primary school PETs have to teach 22 hours per week in comparison to secondary school teachers with 20 hours PE lessons per week. Furthermore, most of the primary school PETs are involved in additional in- and out-of-school PE activities (Kovač, et al., 2011). We have also noted that PE in Slovenian primary school is still performance-oriented and directed too much toward teachers' demonstrating the skills (Kovač,

et al., 2008). Movements perceived as risky, e.g. carrying heavy equipment, picking up objects off the floor or spotting students to prevent falls, as well as lack of discipline among students, students dribbling balls and multiple classes exercising simultaneously in sport halls were rated as more demanding to primary school PETs (Chong & Chan, 2010; Jurak, et al., 2010; Lemoyne, et al., 2007).

In order to maintain working ability, good preparation for work, understanding of the injury risk factors and injury mechanisms (Bahr & Krosshaug, 2005), regular prevention exercises (Bučar Pajek, et al., 2012) and healthy working environments are required.

The multifactorial nature of causes of dysphonia, its high prevalence and limited knowledge about vocal output have encouraged speech and language therapists to develop collective works with teachers (Bruck Marçal & Peres, 2011) as well as faculties to prepare student-teachers with the relevant knowledge of the professional use of voice. During lessons, PETs should use microphones and headphones to protect their ears and vocal cords.

The higher prevalence of chronic health disorders in older teachers and female teachers suggests that some mechanisms, e.g. progressive retirement, teaching fewer classes per week in sports halls, more frequent health-care support, within the school system should be available for those who are limited in their professional work due to occupational health problems.

This study had some limitations. The structure of the sample, according to gender, age and teaching level, is similar to the population of PETs. However, we cannot exclude the possibility of a selection bias, given that teachers concerned by work-related health problems were more likely inclined to complete the questionnaire.

Although a questionnaire with teachers reporting health problems themselves may have a low validity, it is the easiest way to obtain data (Erick & Smith, 2011; Lemoyne, et al., 2007). Such a research approach is appropriate because during their studies PETs become acquainted in detail with the musculoskeletal system, injuries, chronic health problems and their consequences; as such, they can reliably evaluate their own health status in relation to the characteristics of the profession they practice (Lemoyne, et al., 2007). We thus believe that our results are valid even though they originate from self-reports.

As a result of risk in the working environment, factors of professional risk and the effects of chronic health problems on the quality of work and life should be studied in detail with the systematic recording and reporting of health problems acquired during PETs' professional careers, because only large prospective studies will result in clear and undisputable answers. This is especially important due to the extension of years of service.

References

- Aoki, H., Kohno, T., Fujiya, H., Kato, H., Yatabe, K., Morikawa, T., et al. (2010). Incidence of injury among adolescent soccer players: A comparative study of artificial and natural grass turfs. *Clinical Journal of Sport Medicine*, 20(1), 1–7.
- André, C., Cloes, M., & Deroanne, R. (1991). La traumatologie des professeurs d'éducation physique. *Revue de l'Éducation Physique*, 31(4), 177–186.
- Bahr, R., & Krosshaug, T. (2005). Understanding injury mechanisms: A key component of preventing injuries in sport. *British Journal of Sports Medicine*, 39(6), 324–329.
- Bauer, J., Stamm, A., Virnich, K., Wissing, K., Müller, U., Wirsching, M., et al. (2006). Correlation between burnout syndrome and psychological and psychosomatic symptoms among teachers. *International Archives of Occupational and Environmental Health*, 79(3), 199–204.
- Bizet, I., Laurencelle, L., Lemoyne, J., Larouche, R., & Trudeau, F. (2010). Career changes among physical educators: Searching for new goals or escaping a heavy task load? *Research Quarterly for Exercise & Sport*, 81(2), 224–232.
- Bruck Marçal, C.C., & Peres, M.A. (2011). Self-reported voice problems among teachers: Prevalence and associated factors. *Revista de Saúde Pública*, 45(3), 503–511.
- Bučar Pajek, M., Peček Čuk, M., & Pajek, J. (2012). Low back pain in physically active young adults. *Zdravstveni vestnik*, 81(3), 205–217.
- Butler, J.E., Hammond, T.H., & Gray, S.D. (2001). Gender-related differences of hyaluronic acid distribution in the human vocal fold. *Laryngoscope*, 111(5), 907–911.
- Chong, E.Y., & Chan, A.H. (2010). Subjective health complaints of teachers from primary and secondary schools in Hong Kong. *International Journal of Occupational Safety and Ergonomics*, 16(1), 23–39.
- Deyo, R.A., & Weinstein, J.N. (2001). Primary care—low back pain. *New England Journal of Medicine*, 344(5), 363–370.
- Dragoo, J.L., & Braun, H.J. (2010). The effect of playing surface on injury rate: A review of the current literature. *Sports Medicine*, 40(11), 981–990.
- Erick, P.N., & Smith, D.R. (2011). A systematic review of musculoskeletal disorders among school teachers. *BMC Musculoskeletal Disorders*, 12(1), 260. doi:10.1186/1471-2474-12-260.
- Fejgin, N., Ephraty, N., & Ben-Sira, D. (1995). Work environment and burnout of physical education teachers. *Journal of Teaching in Physical Education*, 15(1), 64–78.
- Gardner, S. (2010). Stress among prospective teachers: A review of the literature. *Australian Journal of Teacher Education*, 35(8), 17–28.
- Hamar, P., Peters, D.M., Van Berlo, K., & Hardman, K. (2006). Physical education and sport in Hungarian schools after the political transition of the 1990s. *Kinesiology*, 38(1), 86–93.
- Johnson, D.L., Papadopoulos, P., Wafar, N., & Takala, J. (2001). Exposure criteria, occupational exposure levels. In B. Goelzer, C.H. Hansen & G.A. Sehrndt (Eds.), *Occupational exposure to noise: evaluation, prevention and control* (pp. 79–102). Dortmund/Berlin: World Health Organization.
- Jonsdottir, V.I., Boyle, B.E., Martin, P.J., & Sigurdardottir, G. (2002). A comparison of the occurrence and nature of vocal symptoms in two groups of Icelandic teachers. *Logopedics Phoniatrics Vocology*, 27, 98–105.
- Jurak, G., Strel, J., Kovač, M., Bednarik, J., Filipčič, T., Leskošek, B., et al. (2011). *Analiza šolskega športnega prostora. Delno poročilo*. [Analysis of school sport infrastructure. Partial report. In Slovenian.] Ljubljana: Fakulteta za šport.
- Kovač, M., Jurak, G., Starc, G., & Strel, J. (2011). The importance of research-based evidence for political decisions on physical education. In K. Hardman & K. Green, (Eds.), *Contemporary issues in physical education: International perspectives* (pp. 47–68). Maidenhead, UK: Meyer & Meyer Sport.
- Kovač, M., Sloan, S., & Starc, G. (2008). Competencies in physical education teaching: Slovenian teachers' views and future perspectives. *European Physical Education Review*, 14(3), 299–323.
- Kovess-Masfety, V., Sevilla-Dedieu, C., Rios-Seidel, C., Nerriere, E., & Chan Chee, C. (2006). Do teachers have more health problems? Results from a French cross-sectional survey. *BMC Public Health*, 6, 101–113.
- Lemoyne, J., Laurencelle, L., Lirette, M., & Trudeau, F. (2007). Occupational health problems and injuries among Quebec's physical educators. *Applied Ergonomics*, 38(5), 625–634.
- Li, F.F., & Cox, T.J. (2003). Speech transmission index from running speech: A neural network approach. *Journal of the Acoustical Society of America*, 113(4), 1999–2008.
- Mattiske, J.A., Oates, J.M., & Greenwood, K.M. (1998). Vocal problems among teachers: A review of prevalence, causes, prevention, and treatment. *Journal of Voice*, 12(4), 489–499.
- Ministry of Education and Sport. (2010). Database of teachers /On-line/. Retrieved September 15, 2010 from: <http://krkal.mss.edus.si/RegistriWeb>
- Mirbod, S.M., Lanphere, C., Fujita, S., Komura, Y., Inaba, R., & Iwata, H. (1994). Noise in aerobic facilities. *Industrial Health*, 32(1), 49–55.
- Mišigoj-Duraković, M., Duraković, Z., Ružič, L., & Findak, V. (2004). Gender differences in cardiovascular diseases risk for physical education teachers. *Collegium Antropologicum*, 28(Suppl 2), 251–257.

- Mujanović, Š., & Doupona Topič, M. (2009). Položaj športnih pedagogov in športne vzgoje v Sloveniji. [Status of physical education teachers and physical education in Slovenia.] *Šport*, 57(1–2), 9–12.
- Nygaard, I., & Linder, M. (1997). Thirst at work – An occupational hazard? *International Urogynecology Journal and Pelvic Floor Dysfunction*, 8(6), 340–343.
- Ono, Y., Imaeda, T., Shimaoka, M., Hiruta, S., Hattori, Y., Ando, S., et al. (2002). Associations of length of employment and working conditions with neck, shoulder and arm pain among nursery school teachers. *Industrial Health*, 40(2), 149–158.
- Palma, A., Mattos, U.A., Almeida, M.N., & Oliveira, G.E. (2009). Level of noise at the workplace environment among physical education teachers in indoor bike classes. *Revista de Saúde Pública*, 43(2), 345–351.
- Pihl, E., Matsin, T., & Jürimäe, T. (2002). Physical activity, musculoskeletal disorders and cardiovascular risk factors in male physical education teachers. *The Journal of Sports Medicine and Physical Fitness*, 42(4), 466–471.
- Roy, N., Merrill, R.M., Thibeault, S., Parsa, R.A., Gray, S.D., & Smith, E.M. (2004). Prevalence of voice disorders in teachers and the general population. *Journal of Speech, Language, and Hearing Research*, 47(2), 281–293.
- Russell, A., Oates, J., & Greenwood, K.M. (1998). Prevalence of voice problems in teachers. *Journal of Voice*, 12(4), 467–479.
- Sandmark, H. (2000). Musculoskeletal dysfunction in physical education teachers. *Occupational and Environmental Medicine*, 57(10), 673–677.
- Sandmark, H., Wiktorin, C., Hogstedt, C., Klenell-Hatschek, E.K., & Vingård, E. (1999). Physical work load in physical education teachers. *Applied Ergonomics*, 30(5), 435–442.
- Simberg, S., Sala, E., Vehmas, K., & Laine, A. (2005). Changes in the prevalence of vocal symptoms among teachers during a twelve-year period. *Journal of Voice*, 19(1), 95–102.
- Smith, E., Kirchner, H.L., Taylor, M., Hoffman, H., & Lemke, J.H. (1998). Voice problems among teachers: Differences by gender and teaching characteristics. *Journal of Voice*, 12(3), 328–334.
- Smith, E., Lemke, J., Taylor, M., Kirchner, H.L., & Hoffman, H. (1998). Frequency of voice problems among teachers and other occupations. *Journal of Voice*, 12(4), 480–488.
- Smitherman, T.A., & Ward, T.N. (2011). Psychosocial factors of relevance to sex and gender studies in headache. *Headache*, 51(6), 923–931.
- Soklič, T., & Hočevar-Boltežar, I. (2004). Glasovne motnje med pedagoškimi delavci v Sloveniji: prevalenca in nekateri dejavniki tveganja. [Voice disorders among teachers in Slovenia: prevalence and some risk factors. In Slovenian.] *Zdravstveni vestnik*, 73, 493–497.
- Stergioulas, A., Filippou, D.K., Triga, A., Grigoriadis, E., & Shipkov, C.D. (2004). Low back pain in physical education teachers. *Folia Medica (Plovdiv)*, 46(3), 51–55.
- Thibeault, S.L., Merrill, R.M., Roy, N., Gray, S.D., & Smith, E.M. (2004). Occupational risk factors associated with voice disorders among teachers. *Annals of Epidemiology*, 14(10), 786–792.
- Vilkman, E. (2004). Occupational safety and health aspects of voice and speech professions. *Folia Phoniatrica et Logopaedica*, 56(4), 220–253.
- Weber, A., Weltle, D., & Lederer, P. (2005). Ill health and early retirement among school principals in Bavaria. *International Archives of Occupational and Environmental Health*, 78(4), 325–331.
- Weber, A., Weltle, D., & Lederer, P. (2004). School principals – too ill for healthy schools? *Versicherungsmedizin*, 56(1), 17–24.
- Weidner, T.G., & Sevier, T.L. (1996). Sport, exercise, and the common cold. *Journal of Athletic Training*, 31(2), 154–159.

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PROFESIONALNE ZDRAVSTVENE TEGOBE SLOVENSКИH NASTAVNIKA TJELESNE I ZDRAVSTVENE KULTURE

Učitelji tjelesne i zdravstvene kulture (TZK) izloženi su istim psihološkim faktorima stresa kao i nastavnici ostalih predmeta, ali povećani fizički napor u ovoj podskupini mogao bi znatno utjecati na pojavu i učestalost određenih zdravstvenih problema. Ovo transverzalno istraživanje bilo je provedeno s ciljem utvrđivanja frekvencije profesionalnih zdravstvenih tegoba te identificiranja utjecaja nekih faktora rizika (dobi, spola, razine predavanja) u učitelja TZK. Za istraživanje navedenog problema kod 468 slovenskih nastavnika TZK korišten je upitnik. Povezanost između pojedinog zdravstvenog problema i faktora rizika analizirana je primjenom dvostrukih kontingencijskih tablica, Cramer V i binarne logističke regresije. Profesori TZK su kao najčešće zdravstvene tegobe svoje profesionalne karijere navodili križobolju, oštećenja glasnica, običnu prehladu te probleme sa sluhom. Starenje u pravilu povećava

omjere vjerojatnosti za pojavu većine profesionalnih zdravstvenih tegoba (OR između 1,01 i 1,11). Za profesorice TZK dobivena je značajno veća vjerojatnost za infekciju mokraćnih putova, glavobolju, probleme s vratnim dijelom kralježnice, disfoniju i afoniju nego li za njihove kolege (OR=3,26; 2,40; 1,94; 1,92 i 1,82). Učitelji TZK koji rade u osnovnim školama imali su otprilike dvostruko veću vjerojatnost za obolijevanje od križobolje i disfonije u odnosu na profesore TZK srednjih škola (OR=1,83 i 1,82). Da bi nastavnici TZK zadržali radnu sposobnost, potrebne su dobra priprema za rad, poznavanje rizičnih faktora ozljeđivanja i mehanizama kroničnih oboljenja, pravilne preventivske vježbe i zdrava radna okolina.

Ključne riječi: radna okolina, profesionalna karijera, učitelji TZK, spolne razlike