Incidence and prevalence of musculoskeletal disorders work related. A Systematic Review

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1. INTRODUCTION

Work-related musculoskeletal disorders (WRMSDs) are, by definition, a subset of musculoskeletal disorders (MSDs) that arise out of occupational exposures. Their impact on earning capacity and workforce reduction has a very high cost. Official data from the U.S. suggest that WRMSDs represent 40% of the volume of compensation for work-related illnesses, with annual costs that may be higher than 50 billion USD (Denisa 2008). Several authors suggest epidemiologic evidence between MSD and occupational ergonomic exposures such as forceful exertions, highly repetitive motions, sustained static muscle loading, lack of sufficient rest, awkward body postures, localized mechanical stress, whole body and segmental vibration, low temperatures, and features of the organizational structure of the work environment such as restrictive, high demand low control jobs (Forde 2002). One of the major problems when we search for evidence between exposure (occupational risks factors) and their effects on health (disease/symptoms) is the huge number of variables that may influence the outcome of these studies. Malchair, in a revision made some years ago, identified more than forty factors (occupational and confounders) that could interfere with the results (Malchaire, 2001). With this range of variables it should be difficult to find methodologically suitable studies to evince and assess the incidence and prevalence of MRMSDs.

In a systematic review on the available literature between 2000 and 2010, we found that despite being a common concept, there are few scientific studies with adequate methodology allowing to realize the role of a given occupational risk factor and the development of an occupational disease (Torres Da Costa 2012).

The aim of this paper is to present a systematic review of prevalence and incidence of MSD related with occupational risk factors.

2. MATERIALS AND METHOD

The literature database was extracted by a systematic search of the PubMed, Embase and MetaLib (ExLibris) (databases accessed on July 6, 2012) and a search engine (Google) using appropriate keywords, such as "occupational musculoskeletal, disorder, disease, injury; work-related musculoskeletal, disorders, diseases, symptoms, complains, upper extremity, arm, low back, spine, lower limb, knee, ankle-foot, combined with occupational risk assessment, risk factors assessment, disability prevention, ergonomic risk assessment". Some articles were selected from reference lists of the selected studies. The literature search was conducted using the PRISMA statement methodology (Liberati, 2009).

The articles with the following characteristics were considered relevant: published in an indexed journal, with publication subject to peer review, full text available, written in accessible language for authors (English, Portuguese, Spanish or French), with worker (symptoms questionnaire or medical examination) and ergonomic evaluation. Articles were selected by two independent evaluators and assessed on: informed consent and ethical approval, study design (cohort, case-control study, cross-sectional study or prospective), professional activity, medical, professional or leisure background, publication year, country of origin, musculoskeletal segment evaluated, demographic and anthropometric data, clinical and ergonomic evaluation, and incidence or prevalence data.

3. RESULTS AND DISCUSSION

2016 papers were obtained (PubMed 1226, Embase 425, MetaLib 282, Google search engine 47, reference lists of the selected studies 36). From those 1931 were excluded: 804 repetitions (8 with results published twice), 248 out of scope, 24 published outside deadlines, 43 other language, 39 full text not available, 19 without peer review, 160 revision papers, 99 methods description, 71 methods validation, 108 without clinical or ergonomic evaluation, 27 position papers, 104 protocols presentation, 74 interventions programs, and 111 case studies.

Eighty-five were selected (clerical workers, computer users, automobile industry, health care workers, footwear, hairdressers and transport, among others). Studies had/were: 37 informed consent, 38 ethical approval, 27 longitudinal studies, 17 control group, 47 described population and sample selection or inclusion criteria. Healthy worker effect was controlled in 23 studies, 11 had data blinded between observers, 38 analysed workers background (clinical or professional), 66 presented demographic or anthropometric data, and 46 analysed occupational confounding variables that may have interfered with results. Twenty-nine studies addressed all body segments, 48 upper limb, neck and shoulder and 15 lower back.

From the 85 studies selected, 46 had prevalence or incidence among the objectives. From the remaining (nr 39), incidence could be calculated in 10 and prevalence in 25. In 12 studies neither incidence nor prevalence could be obtained. Large differences could be observed in the definition of incidence (range between 6 and 36 months) and prevalence (range between 1 and 12 months). One study that addressed incidence did not define the time-period. A similar situation was observed among 13 studies with prevalence evaluation.

From the studies that addressed incidence (nr 25), eight had only symptom evaluation, 1 had disease evaluation, and the remaining addressed both symptoms and disease. Among the prevalence studies (nr 61), symptoms were evaluated in 41, disease in 3. Symptoms were defined regarding the duration, frequency and intensity. In 29 studies symptoms had

no definition and in one case disease has not their criteria explained. The incidence of WRMSDs ranged between 1,6% and 58%, and a huge variation was observed among prevalence results (ranged between 3,3% and 91,3%). Although there were few studies with similar characteristics, it was also possible to observe a large variation in prevalence and incidence among similar groups (body segment and/or occupation). For instance, on health care workers there are 19 studies. From those, 14 were symptoms questionnaires and only one addresses incidence which was of 20,7%/year. In these 14 homogenous studies prevalence ranged from 53% to 93%. Among studies that addressed the carpal tunnel syndrome (nr 13), a similar variation was also observed. For instance, the annual incidence ranged from 1,6% (disease) to 58% (symptoms), and prevalence from 4,8% (disease) to 85% (symptoms). In table 1, we can see the incidence and prevalence of the three most referred upper limb WRMSDs. From this 15 studies, only three have a group control.

Table 1 – Incidence and prevalence of disease

Author	Activity	Population	Control group	Incidence (%)			Prevalence (%)		
				RCS	EC	CTS	RCS	EC	CTS
Andersen (2003)	Computer users	6 943	No	-	-	1.2	-	-	4.8
Brandt (2004)	Computer users	6 943	No	0.08	-	-	0.14	-	-
Descatha (2007)	Shoe factory	253	No	8	7	15	-	-	-
El-Bestar (2011)	Video display	60	Yes	-	-	-	-	-	6.3
Gardner (2008)	Miscellaneous	1 108	No	-	-	-	-	-	-
Gell (2005)	Clerical Workers	985	No	-	-	1.2	-	-	13.8
Gerr (2002)	Computer users	632	No	2.2	-	0.9	0.5	-	0.5
Lassen (2008)	Computer users	6 943	No	-	0.45	-	-	1.17	-
Leclerc (2001)	Miscellaneous	700	No	-	4.2	9.1	-	12.2	21.9
Mehlum (2009)	Miscellaneous	217	No	-	-	-	-	-	-
Roquelaure (2002)	Shoe factory	253	No	6.3	2.1	2.6	9.5	3.7	4.2
Roquelaure (2004)	Shoe factory	253	No	-	-	-	-	-	-
Roquelaure (2006)	Miscellaneous	2 685	Yes	5.1	1.3	1.8	7.7	2.4	2.2
Roquelaure (2009)	Miscellaneous	3 710	Yes	-	-	-	7.4	2.6	3.1
Silverstein (2009)	Miscellaneous	733	No	-	-	-	7.5	-	14.9

- - not available.
RCS - rotator cuff syndrome.
EC - lateral epicondylitis ; medial epicondylitis ; hand or wrist flexor peritendinitis or tenosynovitis.
CTS - cubital tunnel syndrome ; radial tunnel syndrome ; ulnar nerve entrapment.

4. CONCLUSIONS

Studies with an adequate methodology designed to elucidate the incidence and prevalence of WRMSDs are sparse. The main reason for this outcome is the absence of an unequivocal definition of what we are looking for, i.e., symptoms or disease, the rareness of studies with control groups designed to compare frequency with the general population, and a large list of confounding factors that may interfere with the outcome. For those reasons we found that the data presented by different authors have different values for incidence and/or prevalence that may depend upon the activity and occupational risks involved. Although this may be truth, the incidence or prevalence referred is not different from what is supposed for the general population. Taking this in account, it is difficult to assume with accuracy the role of the occupational risk factors on the development of occupational MSDs.

6. REFERENCES

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