



## Cardiovascular Disease as Cause for Disability Pensions

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### Abstract

**Introduction:** In the last three years, in Brazil, most disability pensions (DP) were granted to cardiovascular diseases (CVD).

**Objective:** To identify CVD as a cause of DP.

**Method:** Literature review, including articles from 2000 to 2013, using the following descriptors: risk factors, pensions and cardiovascular diseases in the Pubmed/Medline, bireme, scopus, web of science and cochrane databases: After excluding duplicated items, articles not written in English or Portuguese and those not related to the topic of study, 7 papers remained.

**Results:** All papers showed a positive association between DP and CVD. In one study that used relative risk to compare retirement between CVD and musculoskeletal disability, no difference was found between the groups. In other studies there was association between increased uric acid, poorly controlled hypertension, perception of stressful work and inadequate postures at work with increased risk for retirement.

**Discussion:** There are high investments in preventive campaigns for the worker's health in the area of musculoskeletal disorders, but not always the same commitment to the prevention of CVD.

**Conclusion:** The CVD has high significance for the health of the worker, being a major risk factor for DP, and the implementation of policies to prevent these diseases should be encouraged.

**Keywords:** Risk factors; Pensions; Cardiovascular diseases

### Introduction

The relation between the work performed under certain conditions and diseases that they can provide the shortening of life in some situations or even death has been known for a long time [1,2] widely considered the father of occupational medicine, puts in his book that certain trades performed by workers, such as miners, for example, causing damage to them. It also speaks well to ask a patient what he feels, what is the cause and how many days ago, another question is in order: "and that art plays?"

Many authors try to define the concept of harm to workers' health. Mendes and e Waissmann [1] in his book cites classification adapted from Schilling dividing the work-related diseases in three categories: work as a necessary cause (lead poisoning, silicosis, etc.), work as a contributory or additional risk factor, but not necessary (coronary heart disease, locomotor varicose veins) and provocative work as a latent disorder or aggravating the already established disease (occupational asthma).

In Brazil, aiming to assist the diagnosis, treatment, health surveillance and the relationship of causation of the disease with the work, the Ministry of Health drafted a list of Work-Related Diseases in 1999, which is also adopted by the Ministry of Welfare and Assistance Social regulating the concept of occupational disease and disease acquired by the conditions in which the work is performed [3]. Address these grievances measures to improve working conditions and worker health were created by the government, such as the Regulatory Standards published since 1978 in ordinances, that deal with safety and occupational medicine, obligatory for private and public companies that, through the Secretary of Health and Safety at Work aim to inspect places of work and its conditions [4].

Several other measures were created to support the worker, among them we have Social Security, which is a social insurance for the worker who helps with this. Income transferred to Social Security

replaces the income of the taxpayer when the worker loses the ability to work (illness, disability, death, old age, involuntary unemployment, maternity and reclusion).

Among the benefits provided by Social Security have pensions, which are monthly payments made to the insured and lifetime due to contribution time, age, permanent disability or work performed on special conditions that jeopardize the health or physical integrity. Among these "entitled to disability pension that the insured, whether or not in enjoyment of sickness, is considered unable to work and unsusceptible to the rehabilitation exercise activity that guarantees the subsistence" [5]. The Law No. 8213 of July 24, 1991 understands that disability retirement is an event resulting from an accident at work, understood as what happens at the company carrying out the work or the insured defined by this law, causing bodily injury or disturbance functional causing death or loss or reduction, permanent or temporary capacity for work [6].

Within the Social Security Statistical Yearbook 2012 [7] we have the following concessions from urban pensions granted for disability (Table 1):

In this context we have the most general disability retirements

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**Received** October 14, 2014; **Accepted** November 19, 2014; **Published** November 24, 2014

**Citation:** Augusto TTR, Costa Sá E, Rocha LE (2014) Cardiovascular Disease as Cause for Disability Pensions. *Occup Med Health Aff* 2: 186. doi:[10.4172/2329-6879.1000186](https://doi.org/10.4172/2329-6879.1000186)

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| Study                  | Population                                | Results   | Association Measures (Confidence interval)  |
|------------------------|---|---|---|
| Karpansalo et al. [11] | Industrial construction workers (Finland) | Associates inadequate working postures with increase of risk of retirement for disability by cardiovascular diseases.   | 2.24 OR (1.57-3.21) for weight lifting, 1.97 (1.37-2.83) for static cargo, 1.93 (1.35-2.74) for comfortable work position, and 1.86 (1.32-2.63) for heavy physical work |
| Karpansalo et al. [12] | Rural workers (Finland)                   | Low maximum VO <sub>2</sub> and duration of exercise stress-testing when cardiovascular diseases were associated, which increased the risk of retirement due to disability. | 3,58 HR(1.91-6.70) and 4.56 (2.40-8.65) respectively  |
| Mantyniemi et al.      | Public employees (Finland)                | Associates stressing work perception with retirement for disability by cardiovascular diseases in manual workers.   | 1.35 HR (1.21-1.49) for men and 1.34 (1.28-1.40) for women  |
| Karlsson et al. [13]   | Ostergotland County workers(Sweden)       | Musculoskeletal disorders and cardiovascular diseases represent the same risk of retirement due to disability.  | 0,9 RR (0.8-1.1) retirement due to cardiovascular disease compared to musculoskeletal disorders   |
| Kark and Ramussen [14] | Military workers (Sweden)                 | Moderate or severe hypertension associated with increase of risk of retirement for disability by cardiovascular diseases.   | 1,24 HR (1.1-1.4) and 1.52 (1.04-2.22) respectively   |
| Arndt et al. [15]      | Civil construction workers (Germany)      | Associates cardiovascular disorders with retirement for disability in manual workers.   | OR de 1,6 (1,27 a 1,99) for heart failure   |
| Claessen et al. [16]   | Civil construction workers (Germany)      | Associates hyperuricemia with retirement for disability by cardiovascular diseases.   | 1.47 OR (1.1-1.95) for 5.24 mg/dl of uric acid (Note: OR raise with raise in acid uric dosage)  |

**Table 1:** Summary of surveyed data.

(acidentárias and pension) granted in the last three years were due to cardiovascular diseases, demonstrating the importance of these diseases in Brazil [7]. The association between removal from service and disability retirement is complex, and there are several studies showing predictors of risk of disability retirement factors.

Hultin, et al. [8] for example, when studying Swiss workers (Stockholm), on a cohort from 2002 to 2007, shows that prolonged withdrawal is a strong predictor of such retirement, finding that, in cases of long period of absence (greater than 30 days in the year), 18.6% of the sample was retired during follow-up study. Thus, the authors concluded that the risk for retirement in patients with long duration of leave is about 10 times higher than for patients with a shorter distance. It also found that patients who were long periods away from this study are mostly women, elderly and manual workers.

In the field of mental disorders have various causes disability retirement, and when associated with other diseases (such as back pain, for example), these disorders can be used as predictors of retirement [9]. The results of Ropponem et al. [9] have to dissatisfaction with life and neuroticism increase the risk of retirement in the lumbar r at 5-7%.

Mäntyniemi, et al. [10] to correlate stressful job with musculoskeletal disorders, depression and cardiovascular diseases is a clear association between stressful work, musculoskeletal disorders and disability pension, the group of manual workers. An association with depression when the analysis was done by self assessment of exposure was also found. As for cardiovascular disease the author finds conflicting results: objective analysis on the results tend to an association with the male in the female group self-assessment, which needs to be explained better defined for this purpose studies.

It can be seen that although circulatory diseases are the leading cause of disability pensions in Brazil, we lack studies on the association of these diseases with the granting of pensions.

## Objective

Identify cardiovascular diseases as causes for obtaining disability retirement.

## Methodology

In this study a literature review, including articles published from

2000 to 2013, with the lifting of those in the period from April to November 2013, using the following descriptors found in the portal Descriptors in Health Sciences (DeCS) in Portuguese and was held in English: risk, retirement and cardiovascular disease in data factors: PUBMED, BIREME, SCOPUS, WEB oF SCIENCE and COCHRANE.

Articles found in the search of databases, the last 13 years (2000-2013) that show no exclusion criteria were included in the study. Exclusion criteria were: articles that are not available in English or Portuguese; that are not available for free in the databases searched and the Library of the Faculty of Medicine, University of São Paulo.

By using the selected descriptors 8 articles found in PubMed, 8 articles in Bireme, 27 in Scopus, 2 articles in Web of Science and the 0 items in Cochrane. 16 articles were found in duplicate, resulting in 29 eligible articles in this phase of the study.

Were excluded 2 articles because they were not found in language relevant to the study, one item not be found in free or free bases by the Library of the Faculty of Medicine, University of São Paulo bases and after thorough reading, 19 articles not they relate to the theme. In the end, 7 articles were included in the study.

## Results

For organizing the results, separate the items by country in chronological order of publication.

Karpansalo, et al. [11] examined workers of industrial building Kuopio (Finland) in the range of 16 to 65 years, participants of a previous cohort study (Kuopio Ischemic Hearth Disease Risk), through records of Social Insurance Institution of Finland in May 2002, considering disability as removal for more than 300 days of work or disability retirement. Studied 861 cases comparing postures at work with early retirement, finding, for retirements of employees with cardiovascular disease, association with “lift and move weights” (OR 2.24), “static muscle load” (OR 1.97), “uncomfortable working position” (OR 1.93) and “heavy physical work” (OR 1.87).

Using the same basis of Kuopio, Karpansalo et al. [12] correlates the risk of disability pension to rural workers, including physical activity, and although retirement is determined by a number of factors, not just the disease, found a strong association between poor cardio-respiratory

activity and increased risk of disability retirement. A low VO2 max (OR 3.58) and a short duration of exercise (OR 4.56), when associated with cardiovascular diseases determine a significant increase in retirement, probably due to the association between favorable effects of exercise training on the system cardiovascular and osteomuscular.

Mäntyniemi, et al. [10] to study the relationships of stress at work in Finland, in a cohort of 70,000 public workers (divided into “manual” and “manual” activities), found a statistically significant relationship between this type of work and retirement disability for manual workers, and in association with cardiovascular diseases have a significant relationship for men (applying objective questionnaire to assess stress at work). When the research subject should refer for himself he was tension in his work (without application of a specific questionnaire) have a positive relationship for both men and women.

Karlsson, et al. [13] conducted a study in the Swedish County of Östergötland including people born in this region between 1985 and 87 had between 16 and 60 years, with time off for more than 8 weeks disease, following them for 10 years. Compared the risk of disability retirement for various diseases in relation to musculoskeletal disorders. As risk close to 1, one arrives at the conclusion that at least cardiovascular diseases contribute just as musculoskeletal disorders.

Kark and Rasmussen [14] studied military in Sweden between the years 1969 and 1994 through periodic examinations of this medium, selecting those born between 1951 and 1970 that contained in their exams and blood pressure measurements, comparing these with risk of obtaining disability retirement. Are a risk of this retirement because cardiovascular disease in military with moderate or severe hypertension (systolic) (RR 1.24 and 1.52 respectively, compared to normal pressure).

Arndt, et al. [15] conducts a study on Wuttenberg (Germany) with data recorded by the Social Security workers from 1986 to 1992, and these construction workers (plumbers, carpenters, painters, plasterers and bricklayers), male, between 25 and 64 years, for a total of 18 760 workers. During follow-up in 2247 obtained disability retirement, and cardiovascular diseases were the second reason for retirement with 19% of them (399 in total), the first being the musculoskeletal disorders (45% of total) and the OR for heart disease 1, 6 (CI 1.2 to 1.9).

Claessen, et al. [16] studied construction workers (19 421 men) of Southern Germany, recorded between 1986 and 1992, found 3002 cases with disability retirement. Obtained positive association between serum uric acid levels and disability retirement due to cardiovascular causes (second in frequency in this population, accounting for 17.3% of retirements) above 5.24 mg / dl (OR 1.47). The author argues that this association is probably due to most causes of disability from cardiovascular diseases are triggered by pressure, which has well-established association with hyperuricemia.

Summary of the data found in the studies in Table 2.

|  | 2010         | 2011         | 2012         |
|--|--------------|--------------|--------------|
| Total benefits                               | 160.624      | 159.377      | 158.932      |
| (Amount in million Brazilian real)           | 151.664      | 159.699      | 172.609      |
| Circulatory diseases                         | 24.462 (15%) | 23.653 (14%) | 23.140 (14%) |
| Osteomuscular and connective tissue diseases | 23.556 (14%) | 23.485 (14%) | 23.839 (14%) |
| Mental and behavioral disorders              | 15.431 (9%)  | 14.535 (10%) | 13.023 (8%)  |

**Table 2:** Number of general urban disability pensions granted according to the CID chapters 2010/2012, in Brazil (table adapted from Statistical Yearbook of Social Welfare 2013).

## Discussion

All items showed a positive relationship between disability retirement and cardiovascular disease (OR and RR tended to found significant value in these articles).

One of studies, in which we used relative risk, comparing removal by cardiovascular diseases and musculoskeletal disorders is the same value for retirement for both pathologies [13]. Understands that the prevention of cardiovascular disease should be addressed more aggressively by companies, since the association between low cardiorespiratory activity and risk of disability retirement [12].

There is also the need for good blood pressure control [14] and consequently the level of serum uric acid [16] in order to avoid the increased risk of this retirement and comorbidity of heart disease and its effects on health.

The organization of work also interferes with this retirement, shown by Mäntyniemi et al. [10] in their association with perceived work “stressful”.

Modesti et al. [17] discusses immigration in Europe, with emphasis on Italy migration, finding diabetes and hypertension was more prevalent among some ethnic groups, which leads to increased cardiovascular disease in the general population. Should observe the lifestyle, the culture, the genetic predisposition and access to services for each group to have an accurate estimate of the prevalence of these diseases and prevent them appropriately. However, in Brazil, studies on cardiovascular diseases taking into account the ethnic and population differences not were found yet.

We see that disability pensions in the years 2009 to 2011, in Brazil, mostly were granted in greater numbers due to cardiovascular diseases [7], a fact that, in addition to reducing productivity, as well biopsychosocial-being, increase morbidity and decrease survival, increases public spending on health and welfare. Already on pensions for accidents at work, this does not occur, the most frequent families, among the 50 most frequent CIDs, trauma, musculoskeletal diseases and mental disorders [6], probably due to lack of pension experts grant labor nexus with such diseases. We see that studies on this topic are concentrated in just three countries (Germany, Finland and Sweden).

Avoid an early exit from the labor market of people with appropriate programs and incentives, could be economically active and enjoying a better quality of life, and minimize the expenses incurred on medical care, welfare and lost production, can sometimes be accomplished through simple measures like changing postures at work [11].

Limitations of this study have the lack of Brazilian articles on this topic, and the criteria for retirement in the countries studied are not the same as those applied in Brazil.

## Conclusion

Cardiovascular diseases have high significance for the health of the employee, being an important risk factor for disability retirement.

The fact of disability pensions have the same relative risk compared cardiovascular and musculoskeletal diseases is of paramount importance because the high investment in prevention campaigns for workers’ health in musculoskeletal diseases, but not always the same commitment to the prevention of cardiovascular diseases such as hypertension, acute myocardial infarction, systolic or diastolic heart failure, among others, or in health promotion campaigns.

Should be encouraged to implement these prevention policies within the health worker to ease their early exit from the labor market, improve their quality of life, reduce morbidity and mortality caused by these diseases and reduce public spending on these.

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Citation: Augusto TTR, Costa Sá E, Rocha LE (2014) Cardiovascular Disease as Cause for Disability Pensions. *Occup Med Health Aff* 2: 186. doi:10.4172/2329-6879.1000186

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