A COMPARATIVE STUDY REGARDING THE SOCIO-ECONOMIC IMPACT OF OSTEOARTHRITIS ON PEOPLE AND THE IMPORTANCE OF EARLY DIAGNOSIS

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ABSTRACT:
THIS ARTICLE INTENDS TO UNDERLINE THE ECONOMIC IMPORTANCE OF OSTEOARTHRITIS IN THE WORLD, FOUNDING ITSELF ON INFORMATION THAT WAS PUBLISHED REGARDING THE COSTS OF THIS DISEASE FOR PATIENTS AND GOVERNMENTS. OSTEOARTHRITIS DOESN'T ONLY AFFECT THE BUDGETS OF HEALTH SERVICES, BUT ALSO OF SOCIETY AS A WHOLE, THROUGH ITS IMPACT ON SICK PEOPLE, ON THE EMPLOYERS, ETC. IN THE CASE OF ACTIVE PATIENTS, THE INDIRECT COSTS ARE MUCH HIGHER, COMPARED TO THE DIRECT ONES. STUDIES CONCERNING THE COSTS OF THIS DISEASE IN DIFFERENT COUNTRIES ARE NOT COMPARABLE IN A DIRECT WAY, BECAUSE OF THE DIFFERENT APPROACHES, THE DEMOGRAPHIC CHANGES, AND THE CHARACTERISTICS OF THE HEALTH INSURANCE SYSTEM. DEVELOPING THE MOST EFFICIENT TREATMENTS, EARLY DIAGNOSIS AND PREVENTING THE DISEASE REPRESENT IMPORTANT STEPS IN ORDER TO DIMINISH THE CLINICAL AND ECONOMIC EFFECTS THAT THIS DISEASE CAUSES ALL OVER THE WORLD.

KEYWORDS: OSTEOARTHRITIS, COSTS, EPIDEMIOLOGY, PREVALENT, INCIDENCE, TREATMENT, PREVENTION

INTRODUCTION

Osteoarticular diseases such as: osteoarthritis, osteoporosis, and rheumatoid arthritis are prevalent and their impact on people is impressive.

Osteoarthritis affects around 10% of the world population[2] and it is ranked among the first five causes of disability[3].

The risk factors are divided in: general (genetic, nutritional, age, sex, hormonal status and bone density, cartilage and bone metabolism) and local or biomechanical (obesity, joint mechanic stress, cartilage loading, joint trauma and deformation, professional solicitation, muscle weakening[4]).

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[2] CG Helmick and DT Felson and RC Lawrence et al, "Estimates of the prevalence of arthritis and other rheumatic conditions in the United States", Part.I, *Arthritis and Rheumatology* 58 (2008): 15-25.

[3] CJL Murray and AD Lopez, "Global mortality, disability, and the contribution of risk factors: global burden of disease study", in *The Lancet*, vol. 349, no. 9063 (1997): 1436-1442.

[4] DT Felson et al, "Osteoarthitis: New Insights", A*nnals of Internal Medicine*, vol. 133 (2000): 635-46.

Pain is the most important symptom in the case of most people suffering from arthritis[5] and it is also the decisive symptom of disability for patients suffering from osteoarthritis[6].

This disorder is characterized by the impairment of the cartilage integrity, being associated with bone hypertrophy (osteophytes) and subchondral bone sclerosis.

The main definition of osteoarthritis for epidemiological studies includes radiological observations[7] and the presence of joint pain[8].

From a clinical point of view, this disease is characterized by joint pain, muscle limitation, crepitation accompanied by a varying degree of local inflammation.

Osteoarthritis might appear in any joint, but it is most often located in the hip, knee, hand, foot, shoulder or spine.

MAIN TEXT

This disease has recently regained general attention as the most prevalent joint disease, WHO declaring the first decade of the third millenium, 2000 – 2010, as the Bone and Joint Decade[9] in order to prevent and research the osteoarticular diseases.

The evaluation of the costs of osteoarthritis shows the impact that this disease had on society (on public health systems, on patients, etc.)

There is an approach of the prevalence of the disease, when it comes to the costs of all the patients affected by osteoarthritis, but there is also an approach of its incidence, which estimates the costs of some cases of the disease for a certain period of time.

Both epidemiological parametres (incidence and prevalence) are important, but the same importance is held by the impact of this disorder on mortality, morbidity, the quality of life or health costs.

The studies based on pevalence are much more common and more adequate for annual estimations regarding osteoarthritis[10].

The prevalence of this disease is expected to increase in the near future, due to demographical changes.

The economical costs of osteoarthritis are divided in: direct, indirect and indefinitie costs.

The established management of this disease is mainly a symptomatic one.

The direct costs are related to the disease and they might be considerable[11], being represented by:

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[5] LE Kazis and RF Meenan and JJ Anderson , "Pain in the rheumatic diseases. Investigation of a key health status component", *Arthritis and Rheumatology* 26 (1983):1017-22.

[6] ME van Baar and J Dekker and JA Lemmens and RA Oostendorp and JW Bijlsma, "Pain and disability in patients with osteoarthritis of hip or knee: the relationship with articular, kinesiological, and psychological characteristics", *Journal of Rheumatology* 25 (1998): 125-33.

[7] JH Kellgren and JS Lawrence and "Osteoarthritis and disk degeneration in an urban population," *Annals of Rheumatic Diseases* 17 (1958): 388-97.

[8] R Altman and E Asch and D Bloch and G Bole and D Borenstein and K Brandt et al, "Development of criteria for the classification and reporting of osteoarthritis. Classification of osteoarthritis of the knee. Diagnostic and Therapeutic Criteria Committee of the American Rheumatism Association," *Arthritis and Rheumatology* 29 (1986): 1039-49.

[9] AD Wolf and B Pfleger, "Burden of major musculoskeletal conditions," *Bulletin of the World Health Organization*, vol.81, no.9, (2003): 646-56.

[10] J Segel, "Cost-of-Illness Studies-A Primer", *RTI-UNC Center of Excellence in Health Promotion Economics* (2009).

[11] V Rabenda and C Manette and R Lemmens et al, "Direct and indirect costs attributable to osteoarthritis in active subjects," *Journal of Rheumatology* 33 (6), (2006): 1152-58.

- Pharmacological treatments, which include medication such as: acetaminophen, nonsteroidal anti-inflammatory drugs (NSAIDs, COX-2 inhibitor), and opioids or "slow-acting drugs", symptomatic treatments: glucosamine sulfate, chondroitin sulfate and hyaluronic acid.
- Non-pharmacological treatments, which include: kinesiotherapy, physiotherapy, patient education and weight loss.
- Costs for prosthetic surgery and osteotomy;
- Prevention costs;
- Treatment of the side effects of anti-inflammatory drugs (iatrogenic costs), which could be very expensive: gastroprotective drugs;
- Treatment of various complications;
- Appointments at the doctor;
- Medical check-ups;
- Days spent in the hospital;
- Research;

The indirect costs include: being absent from work; decrease of work efficacy; premature mortality; extra payments for disability/ benefits; productivity decrease because of pain; time for medical care.

The indefinite costs are represented by: pain; suffering; decrease of the quality of life; depression/ anxiety.

These last ones are still questionable, their approach being estimated only in some studies[12].

The costs for osteoarthritis in Europe between January 2000 and July 2012

Published studies concerning the economical costs of this disease were found in Belgium, France, Germany, Italy, the Netherlands and Spain.

In Italy, while studying 254 patients with an average age of 65, for 12 months, between the years 2000 and 2001[13], both direct and indirect costs were evaluated.

Direct costs/ 934 euros	**Indirect costs**/ 1236 euros
Days spent in hospital	Loss of productivity
Diagnosis	
Treatments	
Transportation	

The cost for each patient during one year was estimated to be 2,170 euros.

In the Netherlands, a number of 117 patients who suffered from knee osteoarthritis took part in a randomized clinical trial, the average age being 52. The costs were evaluated by Hermans et al[14] through questionnaires.

In Spain, in 2007[15], Loza at al estimated the direct and indirect costs on the basis of a number of 1,071 patients who were older than 50, the average age being 71. The patients had knee osteoarthritis or symptomatic hip osteoarthritis, which had been proven radiologically, and they were given primary care in the centres of all Spanish provinces.

[12] F Xie and J Thumboo and KY Fong et al, "A study on indirect and intangible costs for patients with knee osteoarthritis in Singapore," *Value in Health*, vol.11, no.1, (2008): 84-90.

[13] G Leardini and F Salaffi and R Caporali et al, "Direct and indirect costs of osteoarthritis of the knee," *Clinical and Experimental Rheumatology*, 22, (2004): 699-706.

[14] J Hermans and MA Koopmanschap and SMA Bierma-Zeinstra et al, "Productivity costs and medical costs among working patients with knee osteoarthritis," *Arthritis Care and Research*, 64, (2012): 853-861.

[15] E Loza and JM Lopez-Gomez and L Abasolo et al, "Economic burden of knee and hip osteoarthritis in Spain," *Arthritis Rheumatology*, 61, (2009): 158-65.

Total costs/ patient/ 2007	Direct costs 86%	Indirect costs 14%
1,502 euros	Check-ups Radiological tests Laboratory Other tests Medication Staying in hospital Non-medical costs	Loss of productivity

The national costs were evaluated by the authors equal to 4.7 billion euros, which represents 0.5% of the GNP (gross national product) in Spain. These high costs were associated with comorbidity and the decrease of the WOMAC score (Western Ontario and McMaster Osteoarthritis index).

In France, Le Pen et al used a national top-down approach, from 2001 to 2003[16], estimating the costs of osteoarthritis. The direct costs in 2002 were estimated to be 1.6 billion euros, representing 1.7% of the expenses of the French health insurance system. Out of this sum, 50% was paid for staying in hospital, and the costs for medication were of 574 million euros (34%), the rest representing medical check-ups.

Compared to 1993, because of the increasing number of patients with osteoarthritis, the direct costs in France were 156% higher, and the cost for each patient rose with only 2,5% per year.

A COART study in this country shows over 13 million visits at the doctor done by patients with osteoarthritis. While the study was carried out, 80,000 total hip prosthesis and 38,000 total knee prosthesis were made during one year, which cost 5,600 euros for THR (total hip replacement) and 4,500 euros for TKR (total knee replacement).

In Belgium, the costs were estimated for 1,811 people, with an average age of 51, in a prospective study over 6 months[17]. The prevalence of osteoarthritis was 34%.

Total costs/patient/year	Direct costs/patient/month	Indirect costs/patient/month
1330 Euros	44,5 Euros	66,3 Euros

Out of the total direct costs, 65% (29.10 euros a month) was paid by the Belgian health system, and 35% (15.40 euros a month) was paid by the patients.

In Germany, Sabariego et al tried to evaluate the direct medical costs for patients suffering from osteoarthritis, osteoporosis, back paine or fibromyalgia[18].

In the case of osteoarthritis, the direct costs were estimated at 1,511 euros, for a group of 97 patients who suffered from this disease.

In Great Britain, The Royal College of General Practitioners estimates that in 2006, over one million adults suffering from osteoarthritis saw their physicians.

Check-ups for osteoarthritis represent 15% of the osteoarticular check-ups in the case of people aged 45 or older, and over 25% in the case of those who are 75 or more, this being

[16] C Le Pen and C Reygrobellet and I Gerentes, "Financial cost of osteoarthritis in France. The "COART" France study," *Joint Bone Spine*, 72, (2005): 567-70.
[17] Rabenda and Manette and Lemmens et al, "Direct and indirect costs," 1152-58.
[18] C Sabariego and M Brach and G Stucki, "Determinants of major direct medical cost categories among patients with osteoporosis, osteoarthritis, back pain or fibromyalgia undergoing outpatient rehabilitation," *Journal of Rehabilitation Medicine*, 43, (2011): 703-708.

specified in another study from 2007. The cost for each check-up is estimated to be 36 pounds for a 12-minute check-up[19].

The National Institute of Clinical Excellence (NICE) published in 2008 the costs concerning a guide for the treatment of osteoarthritis. The costs in the case of osteoarthritis are estimated to be 1% of the GNP for the economy of Great Britain[20].

According to NHS (National Health Service) it is estimated that in this country the iatrogenic costs are between 254 and 561.5 million dollars each year[21].

In the USA, the direct costs of osteoarthritis are about 2,600 dollars each year[22], while in **Canada** they were estimated at 1,200 Canadian dollars each year[23].

Generally, this disease is much more prevalent in Europe and in the USA than in other parts of the world. Afro-american women are much more susceptible of developing arthritis in the knee than white women[24].

The indirect costs of absenteeism from work, as a result of osteoarthritis, were examined by Meanwhile, Kotlarz et al in 2010, on the basis of the evidence brought by a national health inquiry which had information from the period 1996 – 2005. The respective study estimates the costs mentioned above as being 10,3 billion dollars[25], out of which the costs for women were higher, compared to those for men, that is 5.5 billion dollars, respectively 4.8 billion dollars.

In 1997, March and Bachmeier found that the global cost of osteoarthritis in the USA, Canada, Great Britain, France and Australia was between 1 – 2.5% of the GNP[26].

A Canadian study from 2005, carried out by Gupta et al, evaluate the indirect costs for a patient who is over 55 and who suffers from arthritis in the hip and in the knee to be of $12,990, these costs being much higher than the direct ones, $2,300[27].

CONCLUSIONS

Deciding on the most efficient treatments in the case of osteoarthritis may be seen as a priority in this domain. It is essential to diagnose this disease early and to establish a primary and secondary prevention programme, by means of an adequate educational and weight management, considering the fact that obesity represents an important risk factor in the case of osteoarthritis.

Generally, studies concerning the costs of osteoarthritis in different countries are hard to be interpreted, as they have different methodologies and different approaches.

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[19] L Curtis, "Units Costs of Health and Social Care 2009" *UK: Personal Social Services Research Unit* (Kent: The University of Kent, 2010).

[20] H Arthritis, "Arthritis in the UK- the Key Facts", (2008).

[21] R Moore and C Phillips, "Costs of NSAID adverse effects to the UK National Health Service," *Journal of Medical Economics*, 2, (1999): 45-55.

[22] SE Gabriel and CS Crowson and ME Campion and WM OFallon, "Direct medical costs unique to people with arthritis," *Journal of Rheumatology*, 24, (1997): 719-25.

[23] JE Tarride and M Haq and DJ O'Reilly et al, "The excess burden of osteoarthritis in the province of Ontario, Canada," *Arthritis and Rheumatology*, 64, (2012): 1153-61.

[24] JJ Anderson and DT Felson, "Factors associated with osteoarthritis of the knee in the first national Health and Nutrition Examination Survey (HANES I). Evidence for an association with overweight, race, and physical demands of work," *American Journal of Epidemiology*, 128, (1988): 179-89.

[25] H Kotlarz and CL Gunnarsson and H Fang and JA Rizzo, "Osteoarthritis and absenteeism costs: evidence from US national survey data," *Journal of Occupational and Environmental Medicine*, vol. 52, no. 3, (2010): 263-68.

[26] LM March and CJM Bachmeier, "Economics of osteoarthritis: a global perspective," *Bailliere's Clinical Rheumatology*, vol. 11, no. 4, (1997): 817-34.

[27] S Gupta and GA Hawker and A Laporte and PC Croxford and PC Coyte, "The economic burden of disabling hip and knee osteoarthritis from the perspective of individuals living with this condition," *Rheumatology*, Vol. 44, no. 12, (2005): 1531-37.

As there is no cost normalization, it is not possible to justly compare them. For osteoarthritis the costs are currently high and they will continue to grow in the future. That is why it is necessary to draw up a more precise financial plan which may allow the creation of some deposits for the health services in different countries regarding the treatment of osteoarthritis in the following years.

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REFERENCES

Book

1. **Curtis, Lesley**. *Unit Costs of Health and Social Care 2009*. UK.: Personal Social Services Research Unit, The University of Kent, 2010.

Article in a print journal

2. **Altman R and Asch E and Bloch D and Bole G and Borenstein D and Brandt K**, et al. „ Development of criteria for the classification and reporting of osteoarthritis. Classification of osteoarthritis of the knee. Diagnostic and Therapeutic Criteria Commitee of American Rheumatism Association." *Arthritis and Rheumatism* 29 (1986): 1039-49.
3. **Anderson JJ and Felson DT**. „ Factors associated with osteoarthritis of knee in the first national Health and Nutrition Examination Survey (HANES I). Evidence for an association with overweight, race, and physical demands of work." *American Journal of Epidemiology* 128 (1988): 179-89.
4. **Felson DT** et al. "Osteoarthitis: New Insights." A*nnals of Internal Medicine* 133 (2000): 635-46.
5. **Gabriel SE and Crowson CS and Campion ME and Ofallon WM**. „Direct medical costs unique to people with arthritis." *Journal of Rheumatology* 24 (1997): 719-25.
6. **Gupta S and Hawker GA and Laporte A and Croxford R and Coyte PC**. „ The economic burden of disabling hip and knee osteoarthritis from the perspective of individuals living with this condition." *Rheumatology*, vol. 44, no.12 (2005): 1531-37.
7. **Helmick CG and Felson DT and Lawrence RC**, et al. „Estimates of prevalence of arthritis and other rheumatic conditions in the United States." *Arthritis and **Rheumatology*, Part I, 58 (2008): 15-25.**
8. **Hermans** J and Koopmanschap MA and Bierma-Zeinstra SMA, et al. „Productivity costs and medical costs among working patients with knee osteoarthritis." *Arthritis Care and Research*, 64 (2012): 853-61.
9. **Kazis LE and Meenan RF and Anderson JJ**. „Pain in the rheumatic diseases. Investigation of a key health status component." *Arthritis and Rheumatology*, 26 (1983): 1017-22.
10. **Kellgren JH and Lawrence JS.** „Osteoarthritis and disk degeneration in an urban population." *Annals of Rheumatic Diseases*, 17 (1958): 388-97.
11. **Kotlarz H and Gunnarsson CL and Fang H, and Rizzo JA**. „Osteoarthritis and absenteeism costs: evidence from US national survey data." *Journal of Occupational and Environmental Medicine*, vol. 52, no. 3 (2010): 263-68.
12. **Leardini G and Salaffi F and Caporali R**, et al. „Direct and indirect costs of osteoarthritis of the knee." *Clinical Experimental Rheumatology*, 22 (2004): 699-706.
13. **Le Pen C and Reygrobellet C, Gerentes I.** „Financial cost of osteoarthritis in France. The „COART" France study." *Joint Bone Spine*, 72 (2005): 567-70.
14. **Loza E and Lopez-Gomez JM, Abasolo L**, et al. „Economic burden of knee and hip osteoarthritis in Spain." *Arthritis Rheumatology*, 61 (2009): 158-65.
15. **March LM and Bachmeier CJM.** „Economics of osteoarthritis: a global perspective." *Bailliere's Clinical Rheumatology*, vol. 11, no. 4, (1997): 817-34.
16. **Moore R and Phillips C**. „Cost of NSAID adverse effects to the UK National Health Service." *Journal Medical Economy*, 2 (1999): 45-55.
17. **Murray CJL and Lopez AD**. „Global mortality, disability, and the contribution of risk factors: global burden of disease study." *The Lancet*, vol. 349, no. 9063, (1997), 1436-42.
18. **Rabenda V and Manette C and Lemmens R** et al. „Direct and indirect costs attributable to osteoarthritis in active subjects." *Journal of Rheumatology*, 33(6), (2006), 1152-58.
19. **Sabariego C and Brach M and Stucki G.** „Determinants of major direct medical cost categories among patients with osteoporosis, osteoarthritis, back pain or fibromyalgia undergoing outpatient rehabilitation." *Journal of Rehabilitation Medical* 43 (2011): 703-8.
20. **Segel J** „Cost-of-Illness Studies – A Primer." *RTI-UNC Center of Excellence in Health Promotion Economics* (2006).
21. **Tarride JE and Haq M and O'Reilly DJ**, et al. „The excess burden of osteoarthritis of knee in the first national Health and Nutrition Examination Survey (HANES I). Evidence for an association with overweight, race, and physical demands of work." *American Journal of Epidemiology*, 128 (1998): 179-189.
22. **Van Baar ME and Dekker J and Lemmens JA and Oostendorp RA and Bijlsma JW**. „ Pain and disability in patiens with osteoarthritis of hip or knee: the relationship with articular, kinesiological, and psychological characteristics." *Journal of Rheumatology*, 25 (1998): 125-133.

23. **Woolf AD and Pfleger B**. „Burden of major musculoskeletal conditions.” *Bulletin of the World Health Organization*, vol. 81, no. 9, (2003), 646-56.
24. **Xie F and Thumboo J and Fong KY** et al. „ A study on indirect and intangible costs for patients with knee osteoarthritis in Singapore.” *Value in Health*, vol. 11, no. 1, (2008), 84-90.