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Original article

LIFETIME SEDENTARY IS A MAJOR CAUSE OF CHRONIC DISEASES

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Abstract*

Aim. Lifetime sedentary, has become in recent decades a dominant feature of the lifestyle that has emotional impact on European countries'population. It's a social and cultural phenomenon that concerns both sexes, involving all age groups and mostly affects the most disadvantaged social classes. Smoke, obesity and physical inactivity, are primary cause of most chronic diseases. Chronic diseases are major killers in the modern age. The study conducted in Italy is twofold: 1) to estimate how much a sedentary lifestyle contributes to the increase of chronic degenerative diseases; 2) to assess how the attitude towards weekly physical activity produces benefits for health gain. The following diseases have been analyzed: ischemic heart disease, type 2 diabetes, colon cancer, breast cancer, overall mortality.

Methods. The indicators used are: number of cases and PAF (Population Attributable Fraction). Surveillance System Steps using the conversion factors used by the reference I-Min Lee's study.

Results. Analysis of the results showed that the prevalence of inactive in the Italian national territory is higher in the south than in the north. Therefore, the fraction of disease attributable to physical inactivity considered varies from region to region presenting around twice in the most virtuous regions, compared to the most needed.

Conclusions. The data obtained through the heads of the "inactive" in the individual regions makes it possible to detail the percentage of diseases due to physical inactivity and consequently estimate the terms of health gain that would be obtained if we eliminated / we reduced the prevalence of physical inactivity at the local level.

Keywords: Lifetime sedentary, chronic disease, daily physical activity.

Introduction

Resilient scientific evidence shows that lifetime sedentaryincreases the risk of many adverse health conditions, including the world's major non-communicable diseases (NCDs) of coronary heart disease (CHD), Type 2 diabetes, and Breast and Colon cancers, and shortens life expectancy (Després, 2016).

Epidemiological study have documented that physical inactivity rises the incidence of at least 17 unhealthy conditions, almost all of which are chronic diseases or considered risk factors for chronic diseases. The incidence of sedentary at less than the levels recommended for enhancing health is high; from 17 to 91% in developing countries and from 4 to 84% in developed countries. The WHO has signaled a shift from the treatment of illness to promotion of health, with an emphasis on changing modifiable health-risk factors, including smoking, unhealthy diets and physical inactivity. Lifetime sedentary, has become in recent decades a dominant feature of the lifestyle that has emotional impact on European countries' population. Smoke, obesity and physical inactivity, are primary cause of most chronic diseases. Chronic diseases are major killers in the modern age. ''Chronic disease'' is well-defined as a illness that is slow in its progress and long in its continuance (Sattelmair et al., 2011). Major examples of chronic disease are coronary heart disease (including atherosclerosis, heart failure, hypertension, and stroke), obesity, Type 2 diabetes, some cancers, osteoporosis, and sarcopenia.

It would be hard to find someone in the general public who is exempt from the devastating effects of chronic diseases. If an individual does not suffer directly from chronic disease, they most likely suffer indirectly as aresult of the stress of care giving to others, the death of family members or friends, and/or increased health care costs.

Cardiovascular disease was the primary cause of deaths; type 2 diabetes has become so common in our society that it has been said to have reached epidemic proportions; obesity is growing quickly, it's considered a comorbidity
of some of the most prevalent diseases of modern society. Higher prevalence of diseases such as hypertension, osteoarthritis, type 2 diabetes and gallbladder disease is also associated with increasing obesity.Undoubtedly, one of the best public health approaches would be to concentrate on measures that prevent obesity. Physical activity/exercise is examined as primary prevention against 35 chronic

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conditions: sarcopenia, metabolic syndrome, obesity, insulin resistance, prediabetes, type 2 diabetes, non-alcoholic fatty liver disease, coronary heart disease, peripheral artery disease, hypertension, stroke, congestive heart failure, endothelial dysfunction, arterial dyslipidemia, hemostasis, deep vein thrombosis, cognitive dysfunction, depression and anxiety, osteoporosis, osteoarthritis, balance, bone fracture/falls, rheumatoid arthritis, colon cancer, breast cancer, endometrial cancer, gestational diabetes, preeclampsia, polycystic ovary syndrome, erectile dysfunction, pain, diverticulitis, constipation, and gallbladder diseases. In addition, physical activity primarily prevents, or delays, chronic diseases, implying that chronic disease need not be an inevitable outcome during life (Hupin et al., 2015; Carter et al., 2016; Francesconi et al., 2016).

Physical activity and exercise are not synonymous: physical activity is defined as any bodily movement produced by the contraction of skeletal muscles that results in a substantial rise in caloric requirements over resting energy expenditure; instead, exercise is a type of physical activity consisting of planned, structured, and repetitive bodily movement done to improve and/or maintain one or more components of physical fitness.Physical fitness is defined as a set of attributes or characteristics individuals have or achieve that relates to their ability to perform physical activity.

The physical inactivity as "physical activity levels less than those required for optimal health and prevention of premature death" (ACSM's, 2010).

The study conducted in Italy is twofold: 1) to estimate how much a sedentary lifestyle contributes to the increase of chronic degenerative diseases; 2) to assess how the attitude towards weekly physical activity produces benefits for health gain. The following diseases have been analyzed: ischemic heart disease, type 2 diabetes, colon cancer, breast cancer, overall mortality.

Methods

For this study following diseases have been analyzed: ischemic heart disease, type 2 diabetes, colon cancer, breast cancer, overall mortality. The indicators used are: number of cases and PAF (Population Attributable Fraction). PAF is a measure used by epidemiologists to estimate the impact of a risk factor on disease incidence in a population. It estimates the proportion of new cases that would not occur, absent a particular risk factor. PAF is related to prevalence of the risk factor and its associated relative risk (RR).For the analysis of the indicators was used I-Min Lee's study (Lee et al., 2012).

For the five diseases considered it will calculate the PAF through the following formula:

$$Prevalenza\ di\ esposti\ tra\ i\ Casi\left(\frac{(RR-1)}{RR}\right) = RA$$

From I-Min Lee's study, are highlighted:

- Prevalance of inactivity in population;
- Incidence of inactivity among persons eventually developing the outcome;
- RR unadjusted;
- RR, adjusted;
- PAF, for five diseases. Table1

The present analysis supports the importance of physical activity in preventing / countering chronic degenerative diseases.

In addition, of the Lee's study, is outside a given extremely important and that is, as in Italy there is a high rate of sedentary, and thus a higher mortality than the data found in Europe and in the world.

In this study to calculate the prevalence of sedentary in Italy through Surveillance System Steps using the conversion factors used by the reference of I-Min Lee's study. (Lee et al., 2012).

Through this system it was possible to determine the percentage of the active / active subjects partially / sedentary for each region.

Analysis of data shows that in the period between 2011 and 2014 in Italy, 32% is active, partially active 35.8% and 31% sedentary.

Figure 1, shows a higher prevalence of inactive the south than the northand we show us in which regions we should expect a greater impact on health due to a sedentary lifestyle (Sanità Istituto Superiore di Sistema di Sorveglianza PASSI, 2007).

Fig.1

Results

Using the methodology of I-Min Lee'spaper, it was possible to determine the prevalence of PAF thanks to the data of the different regions of our country (Lee et al., 2012).

Calculating in detail the proportion of disease attributable to physical activity is found that the greatest impact is in southern regions than in northern ones (eg: ischemic heart disease the Province of Bolzano has a PAF = 7.4%, Basilicata has a PAF = 13.1). This means that in the Bolzano Province 7.4% of ischemic heart disease is due to physical inactivity against the 13.1% of Basilicata.

Similar results have been examined in other diseases. (Table 2).

Tab.2- Summary of estimates Population attributable fractions (PAF) associated with physical inactivity for five diseases in Italy

Disease	CF	PS (%)	EP (%)	RR	PAF (%)
CHD	1,20	66,8	80,2	1,16	11,1
Type 2 diabetes	1,23	66,8	82,2	1,2	13,7
Breast cancer	1,05	66,8	70,1	1,33	17,4
Colon cancer	1,22	66,8	81,5	1,32	19,8
All-cause mortality	1,22	66,8	81,5	1,28	17,8

CF = Conversion Factor; **PS** = % Sedentary; **EP** = % estimated; **RR** = Relative Risk; **PAF** = Population Attributable Fractions. **CHD** = Coronary Heart Disease

Discussion

By calculating the PAF performed for each region you can have a more accurate picture of the disease burden caused by physical inactivity. From the reading of the data also shows that the percentages of PAF are different depending on the disease in question because the relative risk is different between the diseases studied.

From the experience of our data and I-Min Lee's paper, we can say how this information is particularly useful to all those who need to perform public health interventions. This data provides us with usefulinformation on how the physical activity games a fundamental role on health.

In Italy the percentage of mortality due to physical activity is 14.6%, in Europe it is 8.8%. The difference is determined exclusively by the fact that in Italy the percentage of inactive people is higher than the European average (66.7% compared to 40.3%).

By the Supervisory System Steps prevalence's of "inactive" in the individual regions was possible to detail the percentage of diseases due to physical inactivity in the single region and the entire country and estimate the health gains that we can get if we reduced / we eliminated the prevalence of physical inactivity in our territory.

Trial evidence on exercise interventions suggests that physical activity and exercise are often potentially similar in terms of their mortality benefits in the secondary prevention of coronary heart disease, rehabilitation after stroke, treatment of heart failure, and prevention of diabetes, Brest cancer, Colon cancer and all-cause mortality.

In patients with CHD exercise-based interventions in patients with coronary heart disease reported a statistically significant benefit in patients receiving exercise therapy compared with usual medical care (Sadarangani et al., 2011).

Patients with diabetes and prediabetes are at high risk for micro- and macro-vascular complications. A multifactorial management strategy improves their prognosis considerably.Physical exercise, as crucial part in the prevention and treatment of diabetes, has marked acute and chronic effects on glucose disposal and related inflammatory signaling pathways. Exercise can stimulate molecular signaling pathways leading to glucose transport into the cell. he intensity of physical training appears to be the primary determinant of the degree of metabolic improvement modulating the molecular signaling pathways in a dose-response pattern, whereas training modality seems to have a secondary role (Röhling et al., 2016).

Developments in breast cancer treatment have decreased mortality such that in the USA, long-term survival often exceeds 90 %. Dangerous systemic effects ascending from cancer treatment-induced toxicity can contribute to acute and chronic myocardial pathologies both of which severely compromise aerobic fitness.Fortunately, among these women, cardiovascular disease related mortality is now more common than breast cancer-related death.Weight gain after treatment, participation in free-living physical activities can be especially difficult for breast cancer survivors (BCS). Evidence suggests more than half of all BCS report persistent fatigue after treatment.Further studies will be needed,

but the data suggests that even relatively modest gains (+1.0 mL/kg/min) in aerobic fitness can be of clinical value to BCS (Lakoski et al., 2013).

Cancer survivors spend upward of 70% of their day in sedentary behavior. A salient and growing body of literature indicates regular and continued moderate-vigorous physical activity is associated with health-related quality of life and reduced fatigue symptoms among colorectal cancer survivors (Vallance et al., 2014).

It is well established that regular physical activity is an efficient strategy for successful ageing. It increases life expectancy and improves quality of life.It has been shown to reduce all-cause mortality. The health benefits of 150 min a week of moderate-to-vigorous-intensity physical activity in older adults, as currently recommended, are well established. but the suggested dose in older adults is often not reached. It is therefore necessary, as continuously recommended by the World Health Organization, to motivate people to "move" since the transition from inactivity to regular light to moderate physical activity has a huge impact on health. The physical activity should be part of all our daily routines (WHO, 2015). So the goal for everyone working in the health care community should be to motivate the population towards a healthier lifestyle based primarily on healthy eating and increased physical activity. By doing so it will manage to eradicate much of the chronic degenerative diseases and we will have a huge health gain because it would save 9.1% of CHD, 11.2% of Type 2 diabetes, about 16% of Breast cancer and Colon cancer and 14.6% of mortality from all causes, as reported by the work of I-Min Lee's study (Lee et al., 2012).

Conclusions

The data obtained through the heads of the "inactive" in the individual regions makes it possible to detail the percentage of diseases due to physical inactivity and consequently estimate the terms of health gain that would be obtained if we eliminated / we reduced the prevalence of physical inactivity at the local level.

Aknowledgments

Thank you to all of our participants of research.

Summary of estimates of the prevalence of physical inactivity;* relative risks (RR); and population attributable fractions (PAF) for CHD, type 2 diabetes, breast cancer, colon cancer, and all-cause mortality associated with physical inactivity

	CHD	Type 2 diabetes	Breast cancer	Colon cancer	All-cause mortality
Prevalence of inactivity in population*	35.2 (22.3–40.5)	35.2 (22.3–40.5)	38.8 (23.3–44.3)	35.2 (22.3–40.5)	35.2 (22.3–40.5)
Prevalence of inactivity among persons eventually developing the outcome*	42.2 (23.0–56.2)	43.2 (23.6–57.6)	40.7 (22.5–56.7)	42.9 (23.4–57.1)	42.9 (23.4–57.1)
RR (95% confidence interval), unadjusted†	1.33 (1.18–1.49)	1.63 (1.27–2.11)	1.34 (1.25–1.43)	1.38 (1.31–1.45)	1.47 (1.38–1.57)
RR (95% confidence interval), adjusted†	1.16 (1.04–1.30)	1.20 (1.10–1.33)	1.33 (1.26–1.42)	1.32 (1.25–1.39)	1.28 (1.21–1.36)
PAF, using unadjusted RR‡	10.4 (7.2–13.4)	18.1 (10.8–22.8)	11.6 (6.8–15.5)	11.8 (6.8–15.1)	14.2 (8.3–18.0)
PAF, using adjusted RR‡	5.8 (3.2–7.8)	7.2 (3.9–9.6)	10.1 (5.6–14.1)	10.4 (5.7–13.8)	9.4 (5.1–12.5)

*Defined as insufficient physical activity to meet current recommendations, overall median (range of medians for WHO regions). Details on country-specific values for the population are available from reference 9; country-specific values for persons eventually developing the listed NCDs are provided in webappendix pp 3–7.

†For details on calculation of unadjusted RRs, please refer to webappendix pp 12–18. The unadjusted RR pooled both crude and age-adjusted RRs, since the crude RR was often unavailable. Comparing the pooled unadjusted RR with the pooled RR calculated using only crude RRs, values were similar (see text). The adjusted relative risk of CHD was obtained from Sattelmair et al,[10] type 2 diabetes, Jeon et al,[11] breast cancer, see webappendix pp 14–15, colon cancer, Wolin et al,[12] all-cause mortality, see webappendix pp 17–18.

‡Overall median (range of medians for WHO regions). Details on country-specific values calculated using unadjusted RRs are provided in webappendix pp 8–11; country-specific values calculated using adjusted RRs are shown in Table 3.

Tab. 1 - Summary of estimates of the prevalance of physical activity; RR; PAF, for 5 disease associated with physical inactivity.(Lee et al., 2012)

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