The cost of physical inactivity: moving into the 21st century

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Physical inactivity is increasingly being recognised as a major problem in global health. The WHO estimates that 3.3 million people die around the world each year due to physical inactivity, making it the fourth leading underlying cause of mortality.[1] Physical activity has beneficial effects on 23 diseases or health conditions.[2] However, in most countries fewer than half of adults are active enough to reap most of these benefits.[3 4] Given that inactivity increases the risk for many of the most costly medical conditions such as type 2 diabetes, stroke, ischaemic heart disease, falls and hip fractures, and depression, it is not surprising that physical inactivity has a substantial cost burden in addition to a large health burden.

MOMENTUM IS GATHERING: ACTION STEPS

Despite impressive health and economic consequences, it is only recently that addressing physical inactivity has become a mainstream part of public health and health policy.[5] However, this is clearly occurring. The WHO Global Action Plan for NCDs emphasises physical activity as an important element of primary and secondary prevention, WHO released a global recommendations for physical activity in 2010,[6] the September 2011 United Nations General Assembly Summit on NCDs prominently include physical activity[4] and national public health policy in influential countries such as Brazil and the USA substantively incorporates physical activity promotion.[7 8] However, these are initial steps in addressing a global epidemic of NCDs and inactivity. The gap between the size of the problem and the scale of the public health response remains large. In such situations, effective advocacy is called for[9] and often times this means economic data which highlight the costs of not taking action. This seems to be an argument for more and better analyses and research publications on the costs of physical inactivity. However, in the following paragraphs we will present evidence that suggest that this does not appear to be happening.

WHAT DO WE KNOW ABOUT THE COSTS OF PHYSICAL INACTIVITY?

There have been a handful of analyses published on national healthcare costs due to physical inactivity. These are summarised in table 1. The 11 published national estimates from six highly developed countries used a variety of methods and involve several very different healthcare systems.[10–20] However, the results are quite consistent. From 1% to 2.6% of total healthcare costs are attributed to physical inactivity. A recent review found that the proportion of direct medical costs of cardiovascular disease (CVD) due to inactivity was similar (1.5–3.0%).[21] In addition, the indirect productivity losses due to premature death and disability, albeit, more challenging to measure and often not captured in physical inactivity cost analyses, are in many instances as high or higher than direct economic burdens, and can significantly affect the availability of economic resources.[22] For example, in Canada, in 2004, Katzmarzyk and Janssen reported that the indirect costs attributable to physical inactivity were more than double the associated direct costs.[13] We searched medical and economic databases from 1980 to 2009 to see if we could identify additional studies on national level costs due to physical inactivity. A total of 1708 unique articles were identified from the search terms, of which 147 actually involved physical activity and costs. Of these articles 39 addressed the economic burden of inactivity, but no new articles with national estimates of the cost burden of inactivity were identified. It appears that no new national estimates of direct medical costs due to inactivity have been published since 2007. What might account for the absence of papers in an area often identified as important for advancing physical activity and public health? It may be that the small number of papers which have been published have adequately characterised the cost burden of inactivity for the wealthy countries in which most research takes place. Cost burden estimates make the case for the importance of an issue to public health.[23] Once made, few researchers may be attracted to reinforcing the case. This is especially true if the analyses required for such studies are perceived as being basic, while actually requiring collaborative research teams that can be difficult to form. In addition, while policy relevant, cost of inactivity studies may not fit easily into academic paradigms emphasising new data and analytic techniques.

WHERE THE ACTION IS: LMICS

In low-income and middle-income countries (LMICs) where many public health systems are just beginning to address NCDs, and the health behaviours underlying them, there may be a greater need for analyses of the economic costs of physical inactivity. The gap between the health burden due to NCDs and the public health resources allocated to primary prevention of NCDs is especially large in LMICs.[4] While there are no studies published on the costs of inactivity in LMICs, we carried out analyses on the direct healthcare costs of physical inactivity in the state of Sao Paulo, Brazil in collaboration with CELAFISCS as part of a larger project. Data from a representative statewide household survey on physical activity provided an

Table 1 Studies of national-level healthcare costs of physical inactivity, 1986–2009: summary of findings

Study author(s), year (country)	Year(s) of source data	Definition of economic impact	National cost of inactivity* (in national currency)	Percentage of National Health Care Costs	Annual costs per inactive person (2010 US $)†
Keeler *et al*, 1989 (USA)	1974–1983	Lifetime subsidy from active to sedentary persons	N/A	–	6049
Reijnen and Velthuijsen, 1989 (Holland)	1983	Annual direct medical costs	Dfl 157 million net benefit from sports activity	1.0%	56
Pratt *et al*, 2000 (US)	1987	Annual direct medical costs	$29.2 billion	–	1412
Stam *et al*, 1996 (Holland)	1990	(1) Annual direct medical costs (2) Annual absenteeism costs	(1) Dfl 178 million (2) Dfl 1.192 billion	1.2%	(1) 48 (2) 323
Nicholl *et al*, 1994 (UK)	1991	Net direct medical costs per person per year	Young adults: −£25 Older adults: £20	–	Young adults: −143 Older adults: 114
Stephenson *et al*, 2000 (Australia)	1994	Annual direct medical costs	A$377.4 million	1.1%	163
Colditz, 1999 (USA)	1995	Annual direct medical costs	$24 billion	2.4%	1016
Katzmarzyk *et al*, 2000 (Canada)	1999	Annual direct medical costs	C$2.1 billion	2.6%	155
Martin *et al*, 2001 (Switzerland)	1999	(1) Annual direct medical costs (2) Annual indirect medical costs	(1) 1.6 billion SFr (2) 0.8 billion SFr Total: 2.4 billion SFr	–	(1) 637 (2) 319 Total: 956
Katzmarzyk and Janssen, 2004 (Canada)	2001	(1) Annual direct medical costs (2) Annual indirect medical costs	(1) C$1.6 billion (2) C$3.7 billion Total: C$5.3 billion	–	(1) 90 (2) 208 Total: 298
Allender *et al*, 2007 (UK)	2002	Annual direct medical costs	£1.06 billion	–	32

Table sorted by year(s) of source data collected.
*All costs given in the study country's national currency for the year of data collected unless otherwise indicated.
†Values calculated as costs/(prevalence×population) given the prevalence of physical inactivity and publically available historical national population estimates. Costs converted to 2010 USA dollars for comparison and to adjust for inflation.
A$, Australian dollar; £, British pound; C$, Canadian dollar; Dfl, Dutch gilder; Sfr, Swiss franc.

estimate of the prevalence of inactivity among adults (32%),[24] and the state health secretariat healthcare cost database provided public sector costs for 10 diseases and conditions related to inactivity (ischaemic heart disease, ischaemic and haemorrhagic stroke, diabetes, breast and colon cancer, hypertension, osteoporosis, falls and hip fractures).[25] Combining this information with published estimates of the relative risk for each of these diseases and conditions for inactive versus active persons we utilised a population attributable fraction method to calculate total direct healthcare costs due to physical inactivity among adults within the public healthcare system in the State of Sao Paulo. Total costs for 2000 were R$ 86 000 000, or 3.3% of total healthcare costs within the system. A similar approach was used in 2002 to calculate the burden of six NCDs associated to physical inactivity in Bogota, Colombia and extrapolated a direct medical cost of 15 000 million pesos, or about 2.5% of the city's health budget.[26] These results are consistent with the medical costs due to physical inactivity in the published studies from high-income countries. These analyses also demonstrate the feasibility of estimating the cost of inactivity in LMICs. More than 100 countries now have national data on the prevalence of inactivity[3] and in many of these countries sufficient healthcare cost data may also exist to calculate the economic burden of inactivity due to direct medical expenditures. Given the policy relevance of cost data, developing a simple 'Cost of Inactivity Calculator' into which national data on physical inactivity and medical costs can be entered seems like it may be quite useful.

RECOMMENDATIONS: NEXT STEPS

So, what can we recommend regarding research, practice, and policy related to the costs of inactivity? First, the experience of the past 5 years suggests that additional studies on the costs of inactivity in North America, Australia and Europe are not likely to be published soon. The case for physical activity as an important public health issue has already been made in North America, Australia and Europe as evidenced by national plans and policies, but the incremental value of updating the costs of inactivity may not be sufficient to spur many new research publications.[27] This may explain why no new studies of national costs of inactivity have been published in the past 5 years.

However, there is a need for additional cost of inactivity studies in at least two areas. First, for specific clinically important subpopulations such as older adults or persons at high risk for diabetes for whom better public health programmes might be facilitated by objectively demonstrated preventable disease and cost burdens. Economic studies that include a comparative component such as cost-effectiveness analyses, cost utility analyses and cost–benefit analyses may serve this purpose even better.[28 29] There is a major need for comparative economic analyses to guide resource allocation for public health, especially in LMICs which face challenging double burdens of infectious and chronic diseases.[1] The second area in which cost of inactivity studies may be of great value is in these LMICs where public policy and resource allocation have generally not caught up with the epidemiologic, demographic and lifestyle transitions that have made NCDs and physical inactivity paramount public health issues.[4 5] A very useful step forward might be developing a simple cost of inactivity tool that could be used in LMICs with basic data inputs. The successful experience in Europe with the HEAT tool developed by WHO Europe to estimate the cost effectiveness of investments in cycling infrastructure may be informative.[30] Increasing research capacity for economic analyses in LMICs should be a component of the many current

efforts to increase global capacity for NCD research in LMICs. Perhaps some of the investment in centres of excellence in LMICs that characterises this capacity building movement can be directed towards health economics. Economic evaluation clearly provides a very important contribution for guiding public policy in all countries. As promotion of physical activity and prevention of NCDs become central aspects of public health policy in more and more countries, economic analyses of physical activity and inactivity and the capacity to conduct these studies are becoming an essential component of good global public health.

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