Health impact assessment of major collective events: an overview of the available experiences

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ABSTRACT

BACKGROUND: major sporting and cultural events are a sensitive political and social issue. The aim of this study was to perform a critical review of the international literature regarding health impact assessment (HIA) studies of major events to identify all the health indicators available in the literature.

METHODS: we drew up a review of available literature on HIAs pertaining to major sports and cultural events. The papers obtained were read and then assessed in relation to the inclusion criteria, and the health indicators used were listed and commented upon.

RESULTS: we found three published HIA reports. One is a full report, and the other two are a screening report and a rapid HIA report. Through a detailed analysis, it has been possible to develop a set of indicators that can be used for future HIAs on major sporting and cultural events.

CONCLUSIONS: reports of HIAs for major events that are available online identify several health impacts. In the pre-event phase, negative effects are predominant; in the post-event period, positive impacts prevail. The characteristics of the different stakeholders involved in the events play an important role in the evaluation process.

Key words: Health impact assessment; Major events; Sport events; Health impact indicators

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DOI: ***10.2427/8902***

Published as Online First on March 4, 2014

INTRODUCTION

Several factors are involved in defining the state of health in a population. These are often identified as the "determinants" of health and are represented as social, economic, environmental and biological influences [1].

The realisation of several types of projects, programs or policies - e.g., the building of new roads, urban regeneration programs and transport strategy modifications - can influence the health status of a population, but it is still a complex task to define what the global health impacts of such initiatives can be and which health determinants are involved [2].

In this context, health impact assessment

(HIA) tries to answer these questions despite the difficulty that few things are measurable and many aspects of the scientific results are far from conclusive [3].

Many authors have proposed definitions of HIA and have tried to identify content and structure requirements [4, 5, 6]. In 1999, the Gothenburg Consensus Conference [7] established a definition that is consistent with the recommendations provided by the Canadian Institute of Advanced Research (CIARA), the WHO Regional Office for Europe [7] and guidelines created by other local and national institutions [8-15].

The different actors involved agree on the need to proceed to a multidisciplinary approach and to give priority to opinions and expectations of those potentially affected by the proposed policy during the different phases of the evaluation process. However, commentators do not show complete agreement or uniformity as regards the practical implementation of a HIA [16, 17].

In Europe, HIA was introduced with the Amsterdam Treaty (Art.152) [18], signed in 1997. A few years later, the European Constitution obliged each member country to have specific legislation relating to HIA. Nonetheless, HIA is regularly used only in some countries, such as the Netherlands, Sweden and the United Kingdom.

The planning of major events is a very sensitive political and social issue and can have important health impacts. In fact, major collective events (e.g., sporting or recreational events) are one of the initiatives that present great public health, economic and social impacts.

The literature regarding the health impact of major collective events is poor, and it is mainly focused on sports events [19, 20]. Even though previous works [21-26] reported many health-related outcomes of sport events, such as increases in suicide risk, asthma in children, paediatric health service demand and illicit drug use, a recent systematic review [19] underlined the impossibility of measuring the global positive or negative health impacts of such events on host populations. At the same time, this review underlined that most available works focused on environmental, economic or social aspects and that the overall health impact was unclear.

In many cases, major events redesign the city's image, structure and social organisation of its spaces. Traces of many great events remain indelibly in the history of the city, becoming part of its urban heredity. Major events tend to introduce structural changes in the city and then act on the social and territorial balance. Policies that come with these type of events aim to increase urban competitiveness and to attract global attention [27-29]. In addition, the marginal areas of the city may be involved in major events. In these areas, there may be a risk of perpetuating processes of social exclusion and urban segregation, even if the realisation of a major sporting event may also provide an important opportunity for the development of marginal areas and for the acceleration of their growth processes [30].

There is, therefore, a possible contradiction between development opportunities and the risk of depleting the assets and resources of the area, compromising long-term development [31].

The community's need for information about risks and health protection on the one hand and the need for administrators to take decisions on the other imposes a responsibility to provide answers based on scientifically sound evidence, having recourse to the appropriate means of communication and participation [32, 33]. For these reasons, a proper HIA should always be conducted prior to decide the hosting of a major event.

The aim of this study was to perform a critical review of the international literature regarding HIA studies on the role of sporting, cultural or major events to identify a series of indicators that can be used for future HIA in similar circumstances.

METHODS

We drew up a review of the available literature on HIA regarding major sports and cultural events.

We initially compiled a list of keywords, including "sports event/events", "sport event/events", "social event/events", "cultural event/events", "major event/events", "Olympic Games" and "health impact", "health and impact" and "health impact assessment". Then, we identified the search engines we wanted to use.

The research was divided into two areas: official literature and grey literature. The official literature was searched using Pubmed, Medline, SciELO, the Cochrane Database of Systematic Reviews, Embase and Web of Knowledge. No specific terms were found from the Medical

Subject Headings (MeSH). Time limits were not included. The grey literature was searched using Google Scholar, Google, the WHO website, the CDC website, the UK Department of Health website, institutional websites and national and international blogs dedicated to HIA [34-48]. The research was conducted from July 2011 to July 2012.

The search was restricted to works in English and Italian. A further search was also conducted through a manual examination of reference lists of relevant literature identified in the previous search.

After removing duplicate publications, the list was reduced by excluding all papers that could not be considered proper HIA reports according to WHO criteria [7]. In particular, all works not presenting at least both a screening and scoping phases were excluded.

Relevant papers were analysed and compared with each other using a grid of reading specifically constructed by the authors to extrapolate the indicators and to highlight any similarities or differences among the papers (Table 1). Then, we selected a set of indicators that may be used for future HIA of major sport events. Four characteristics were considered to select eligible indicators:

- Importance: the relevant risk factors or health determinants
- Significance: the clear and shared meaning for operators, policy makers and stakeholders
- Measurability: no requirement for hard-to-find data to be measured
- Reproducibility: the ability to be used in different contexts and times.

RESULTS

In total, 145 scientific articles were initially identified, of which only one met the inclusion criteria: that is, it described the results from a full HIA [49].

There were also identified 56 works belonging to the grey literature, of which three met the relevance criteria [50-52]. One of these [50] refers to the full HIA cited above, whereas the other two papers were a HIA screening [51] and a rapid HIA report [52]. McCartney's full report [50] presents all phases provided by European Union EIA Directive 97/11, excluding the monitoring phase; the Rapid HIA presents the appraisal, screening and scoping phases; and the HIA screening by Chappel et al. [51] was essentially based on the Rapid HIA by Buroni [52]. The characteristics of the HIA reports are detailed in Table 2.

The three reports were related to HIA conducted in the UK and were relative to international sports competitions. Two were conducted from the point of view of the population of the host city, whereas the third was conducted from the perspective of the population living in the suburbs (London North

TABLE 1

DESCRIPTION OF THE GRID OF READING

ELEMENTS OF THE GRID	DESCRIPTION
Time and place	Description of location and timing of the HIA realisation
Clients	Indications and description about the institution that commissioned the HIA
Phases	Presence and completeness of the HIA official phases
Objectives	Explanation of the objectives
Collaborators, population involved and methods	Description of the role played by citizens and local institutions and explanation of the methods used for data collection
Health impacts indicators	Description of direct/indirect and positive/negative health impacts considered in the assessment
Results and consequences	Description of the results obtained and of the possible consequences that result from the event considered

TABLE 2

LIST OF SELECTED PAPERS

AUTHOR	TITLE	HIA TYPE	PUBLICATION	SOURCE
Mc Cartney G. et al.	A Health Impact Assessment of the 2014 Commonwealth Games in Glasgow	Full HIA	Paper (2010)	Public Health 124 (2010) 444-451
			Online report (2009)	www.glasgow.gov.uk
Chappel D. et al.	The Health Impact of the 2012 Games	HIA screening	Online report (2006)	www.nepho.org.uk
Buroni A.	Rapid Health Impact Assessment of the Proposed London Olympic Games and Their Legacy	Rapid HIA	Online report (2004)	www.erm.com

East Region). The evidence regarding possible health impacts were gathered in a more complete way by McCartney using different methods such as a survey, the administration of an electronic questionnaire and workshops.

The principal characteristics of the reports, analysed using the grid of reading (Table 1) are reported in Table 3.

The list of indicators selected and analysed using the set of criteria described are reported in Table 4.

Both direct and indirect health impacts were identified. Direct indicators are those that measure outcomes, such as variations in incidence of pathological conditions. The indirect indicators are process indicators describing changes in distal determinants and risk factors.

We classified both direct and indirect indicators as positive and negative.

Only the two HIAs related to the 2012 London Olympic Games [51, 52] focused on direct health impacts. Both indicated a reduction in metabolic diseases and an increase in mental wellbeing as positive impacts, whereas Buroni [52] also identified a reduction of cardiovascular and respiratory diseases. McCartney [50] mainly focused on indirect health impacts.

Chappell also described some direct negative health impacts, including increases in sports-related and occupational injuries, in alcohol abuse and in the risk of major incidents, underlining that the staging of the Games could imply a shift in medical resources from surrounding areas to the Olympic location.

On the contrary, all the authors identified both positive and negative indirect health impacts related to major sports events.

Indirect health impacts included an increase in physical activity and healthy alimentation. Chappel [51] focused on a series of indirect positive health impacts in the economic and social fields. The economic impacts can be divided into factors involving personal skills (e.g., knowledge of new languages, improving social skills and an increase in international links and collaborations) and changes in urban services (e.g., improving public transport or the construction of new sport facilities).

Among indirect negative impacts both McCartney and Buroni [50, 52] identified an increase in noise, air pollution and traffic accidents.

Buroni's paper [52] underlines that some interventions implemented inside the Olympic areas can determine negative indirect impacts mainly in the pre-Olympic phase, due to the construction of new facilities and services. On the contrary, in the post-Olympic phase the availability of new services and facilities can positively impact the population's health. Buroni [52] took into consideration not only local aspects but also national ones. He identified the Games' potential to spread economic and sporting benefits to a wider population, across London and in the UK, though he admitted these benefits were difficult to quantify.

Finally, the HIA screening by Chappel et al. [51] demonstrated that the Games could have positive health impacts for the North East Region, but it underlines some risks, which have to be mitigated, such as an increase in alcohol and high fat food consumption and an inequitable distribution

TABLE 3

EVALUATION OF HIA EXPERIENCE			
	MC CARTNEY G. ET AL.	CHAPPEL D. ET AL.	BURONI A.
Time and place	United Kingdom, Glasgow. 2014 Commonwealth Games	Unite Kingdom, North East region, London. 2012 Olympic and Paralympic Games	Unite Kingdom, London. 2012 Olympic and Paralympic Games
Clients	Glasgow City Council NHS Greater Glasgow and Clyde University of Glasgow Glasgow Centre for Population Health	North East Health Theme Group North East England Forum for the 2012 Games	London Health Commission London Sustainable Development
Phases	All phases of full HIA (screening, scoping, appraisal, decision making, monitoring and evaluation)	HIA screening	Composed by three of the phases (screening, scoping and appraisal)b c
Objectives	Incorporate a strong equalities perspective Make recommendations that ensure that inequalities do not widen as a result of the Games Propose actions that are sensitive to the different needs of Glasgow's people Ensure that the health and wellbeing of Glasgow's people can be improved through the Games	Inform population about the development of a regional strategy for the Games Inform about the development of the National Delivery Plan for Health & 2012 Stimulate discussion at regional meetings.	Identify the potential health impacts and benefits likely to arise throughout the lifecycle of the London Olympic Games, in contrast to a counterfactual 'No Games' Scenario Support the development of health indicators to be applied within the Department of Culture Media and Sport Identify potential means to mitigate health impacts and maximise health benefits.
Collaborators, population involved and methods	Information was gathered involving over 3 000 people from Glasgow's communities Different methods were used: -working with the National Standards of Community Engagement to distribute information about HIA and the way to be involved -allowing people to share their views through the Glasgow Household survey -developing a specific design questionnaire survey in both electronic and face-to-face versions -organising interactive workshops	A single workshop involving people from a range of sectors People were divided among six small groups. Each group worked on one of the six themes identified by the business plan: 1) creating an inspirational Games, 2) economic benefits, 3) sporting benefits, 4) sustainability and environmental benefits, 5) promotion of the UK and its diversity and 6) cultural and social benefits They finally identified potential health impacts in relation to three dimensions: direction, area and timing of the impact. A single workshop that included local, regional and national perspectives from community groups and primary care trusts was performed The initial workshop task required participants to reflect upon the determinants of health, which can be influenced during the construction, hosting and legacy stages of the Games, and upon the consideration of health outcomes in the "No Games" scenario	

a. The HIA screening by Chappel et al. was performed with the following: a rapid analysis of data proposed by the rapid HIA by Buroni; the draft national delivery plan for the Games, the official document by the UK Department of Health on national action plans on physical activity, the official statement on North East region on hosting Olympic and Paralympic Games and a single workshop involving some representatives over a range of sectors that may be interested by the policy

b. Authors refer back to the European Union EIA Directive 97/11

c. In the Rapid HIA on the London Olympic and Paralympic Games by Buroni, the main phase is represented by the appraisal phase. The other two phases are not made explicit by the authors but it is possible to recognise a screening phase in the review of the literature, whereas the scoping phase may coincide with the contextualisation of the project in the local community

TABLE 4

HEALTH IMPACT INDICATORS					
INDICATORS		DESCRIPTION	MC CARTNEY G. ET AL.	CHAPPEL D. ET AL.	BURONI A.
POSITIVE	DIRECT	Reduction of cardiovascular disease			✓
		Reduction of respiratory disease			✓
		Reduction of diabetes		✓	✓
		Reduction of obesity		✓	✓
		Mental wellbeing		✓	✓
		Reduction of depression and anxiety			✓
	INDIRECT	Physical Activity	✓	✓	✓
		Healthy alimentation	✓	✓	✓
		Smoke free environment	✓		
		New employment		✓	
		Health education		✓	
		Knowledge of new languages		✓	
		Improving public transport		✓	
		Change in socio-economic structure		✓	
		Building new sport facilities		✓	
		New social skills		✓	✓
		Reduction of health and social inequality			✓
		Increase international links and collaborations		✓	
NEGATIVE	DIRECT	Increase in sports related and occupational injuries		✓	
		Increased risk of major incident		✓	
		Alcohol abuse	✓	✓	
	INDIRECT	Noise	✓		✓
		Air pollution	✓		✓
		Traffic accidents	✓		✓
		Violence		✓	
		Sedentary life(watching Games on TV)		✓	
		Sponsorship on unhealthy eating		✓	

of resources. It also underlined the fact that it would be essential to avoid a totally London-focused organisation for the Games because it could take away positive opportunities and resources - such as volunteering and sponsorship - from the North East Region.

Even if several positive and negative impacts were identified, none of the authors could state if the choice of hosting Olympic Games would have a global positive or negative health impact on the community living in the involved areas.

For example, the report by McCartney et al. [50] concluded that hosting the Commonwealth Games could have a positive global socio-economic impact on Glasgow, but it could not identify a net health impact on the city. Nonetheless a set of recommendations was made to improve the effects of the possible positive health impacts it identified and to mitigate the negative ones (e.g., involving local people in the event planning, granting transparency over the event budget, paying attention to building new facilities that are designed to meet the needs of local people in future years, and minimising the impact of the disruption and construction phase).

DISCUSSION

Main finding of this study

The overall analysis showed that negative indirect impacts could prevail in the construction and preparatory phases (pre-event phase), such as an increase in noise and pollution. On the contrary, both direct and indirect impacts - such as an increase in physical activity and healthy alimentation - could prevail during the course of the event, and it is conceivable that they can also play a role in the post-event phase.

It is very difficult to clearly identify global positive or negative health impacts on the community living in the involved areas of major sport events. In addition, the HIA screenings reported a number of positive health impacts that were larger than the negative ones, many of which were described as acting in the long term, whereas the full HIA can provide a series of recommendations to maximise positive health impacts and minimise the negative ones.

It is important to underline also that the characteristics of the different stakeholders involved play an important role in the evaluation process.

For example, HIA reports conducted from the point of view of the communities living in the areas directly involved by the Games may focus on health impact indicators linked to the construction of new facilities and infrastructure. In particular, the study we examined underlined the possibility of increased pollution and noise-related illnesses. On the contrary, from the point of view of people living in surrounding areas, the long-term benefits of the games - such as the availability of new facilities - may become most relevant, and the negative aspects may be mainly perceived as related to the games-phase (e.g., the increase in violence and street accidents, the increase in sedentary lifestyle, the sponsorship of unhealthy eating, the risk of subtraction of resources from outlying areas to the games area).

The overall assessment may also depend on the urban development and regeneration perspectives of the area concerned.

McCartney et al. [50] concluded that hosting the Commonwealth Games could have a positive global socio-economic impact on Glasgow. This could be related to the fact that Glasgow can be considered today one of the most deprived and unhealthy cities in the UK.

The London project included a construction phase in the Games scenario and in the no-Games scenario (restructuring and renovation of old quarters). For this reason, the London rapid HIA concluded that both scenarios caused similar negative impacts in the construction phases. Conversely, it was supposed that the Games could have a positive impact on local communities arising from increased employment and income opportunities, greater physical activity and enhanced community cohesion.

Finally, only one of the reports [51] analysed possible positive and negative effects on the National Health System (NHS). There may be extra-pressure on the NHS mainly due to an increase in sport-related and occupational injuries in the pre-event phase and in major incidents and outbreaks during the games phase. On the contrary, some long-term positive impacts were identified due to the improvement of sports medicine services and to the availability of opportunities for staff updating and training.

Nonetheless, none of the analysed works focused on the need to apply the principles of "mass gatherings medicine" or "special event medical care", a specific discipline created to plan and provide preventive measures, primary care, hospital and emergency care to persons attending or participating in major sports, recreational or political events [20, 53, 54]. This point is very relevant because high profile events, such as the Olympic Games, require particular attention to the planning and execution of dedicated medical care [20].

What is already known on this topic

To the best of our knowledge, this is the first review to analyse available HIA experiences on major collective events. Even though we found few examples of HIA reports, it was possible to obtain a grid of health impact indicators related to the hosting of major events.

At present, few HIA reports regarding major sport or cultural events are available online. All the reports we analysed were related to HIAs conducted in the UK and were relative to international sports competitions. Only one of these - the HIA report regarding the 2014 Commonwealth Games - can be considered a full HIA and was published.

All the reports took into consideration both direct health impacts and indirect health impacts related to cultural, environmental, social, economic and sporting fields.

What this study adds

The HIA reports analysed in this study have identified a large number of possible modifications that might occur in the context of major events, determining many positive and negative health impacts. Particular attention should be paid to indirect health impacts and on the specific temporal period in which any single health impact plays a major role. Furthermore, it emerges that a key role is played by pre-existing socio-economic conditions of the hosting city, which can influence the impact of some negative aspects. For this reason, it is of primary importance, according to the authors, to always conduct an HIA before each major event.

Limitations of this study

This review is limited in three main ways. First, we found only three HIA reports regarding major sport events, two of which reported the results of screening HIAs conducted through a single workshop. Second, the reports were all conducted in a single European country, and we cannot exclude the existence of other reports not available online or published in languages different from English and Italian. Finally, all the reports we found are relative to ongoing or future events, so that there are no data concerning the monitoring phase.

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