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Physical activity as a tool for health promotion: the evolution of international strategies and interventions

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Abstract
Physical activity (PA) has a great potential impact in the prevention and control of non-communicable diseases. However, epidemiologic data reporting a high percentage of inactive people, still indicate a scarce perception of PA benefits. Therefore, in the past decades, a number of documents has been produced by international organizations with the aim of changing policies and institutional actions towards the promotion of PA. Several actions have been put in place and an evolution process in international strategies for PA promotion is ongoing. Nevertheless, there is a need to continue updating these policies in light of new knowledge about evidence-based PA health effects. A stimulating discussion about effective PA promotion programs is useful for future planning of interventions. The aim of this work is to report the evolution of international strategies aimed to PA promotion, from early PA recommendations, to the recent WHO Global Action Plan on Physical Activity 2018-2030.

Key words
- physical activity
- health promotion
- non-communicable diseases
- prevention
- recommendations

INTRODUCTION

Physical activity (PA) is defined as "any bodily movement produced by skeletal muscles that require energy expenditure" [1], including that done during leisure time, for transport or work. The term "PA" should not be confused with "exercise", which is "a subcategory of PA that is planned, structured, repetitive, and aims to improve or maintain one or more components of physical fitness" [2, 3].

Physical inactivity is instead defined as "not meeting the applicable physical activity World Health Organization (WHO) recommendations" [2]. In recent years, a consistent body of epidemiological evidence proved that physical inactivity is a risk factor for the major non-communicable diseases (NCDs) responsible for premature death and disability in western countries [4, 5]. Moreover, sedentary behavior is defined as "any waking behavior characterized by an energy expenditure ≤1.5 metabolic equivalents" [6]. People's sedentary behavior has been described as the fourth leading risk factor for death in the world [7]. In recent years, especially among children and young people, PA has been replaced by more sedentary habits, and in adults and the elderly the opportunities to be active tend progressively to decrease [8].

On the contrary, it is widely recognized that PA is a main tool for the prevention of non-communicable diseases and the improvement of psycho-physical well-being and quality of life, for both sexes and at every age *(Table 1)*. Moreover, physically active populations tend to live longer than inactive ones. As a consequence of all these benefits, PA may reduce direct and indirect costs deriving from a sedentary lifestyle [9]. This is of particular relevance, if considering the population ageing occurring in developed countries, that is determining a growing burden of chronic diseases [10]. However, there is evidence that anyone who increases their level of physical activity, even after long periods of inactivity, can obtain health benefits irrespective of their age. Therefore, the WHO, the European Union (EU), and National Governments in recent years have directed their policies towards the promotion of an active lifestyle. Increasing the PA level in the population requires a whole of society and culturally relevant approach and therefore demands a collective effort across different sectors and disciplines [11]. Indeed, PA promotion is important not only at the individual level, but also for the entire society, and a multi-disciplinary and multi-sectorial approach is needed.

The best strategy is to act primarily on both individual and collective behaviors with legislative and regulatory interventions and/or health education. In this sense, the

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Table 1
Health effects related to physical activity as described by health-related organisations (Health Promotion and Disease Prevention Knowledge Gateway, at https://ec.europa.eu/jrc/en/health-knowledge-gateway/promotion-prevention/physical-activity)

Effect	Benefit
Cardiovascular health	Reduced risk of cardiovascular and coronary heart disease, and stroke Prevention of arterial hypertension and better control of arterial blood pressure in high blood pressure suffering individuals Reduction of LDL- and not HDL-cholesterol
Cardiorespiratory health	Good cardio-pulmonary function
Diabetes 2	Reduced risk of diabetes 2
Body weight and energy intake	Increased fat utilization, weight control and less risk of obesity Healthier body mass and composition
Mental health and cognitive performance	Maintenance of cognitive functions and lowered risk of depression and dementia Lower stress levels and associated improved sleep quality Improved self-esteem and optimism Reduction of anxiety disorders Decrease of feelings of fatigue
Musculoskeletal function	Improved bone mineralization. Prevention of bone fractures and osteoporosis Improvement in muscular strength, walking speed, muscular fitness and balance Better capacity in daily living activities. Lower risk of falling
Risk of cancer	Lowered risk of breast, prostate, colon, endometrial and bladder cancer
All cause mortality and premature death	All-cause mortality is delayed by regularly engaging in physical activity
Other health effects	Improved digestion and regulation of intestinal rhythm
General quality of life	Decreased absenteeism from work Delaying of chronic illnesses associated with ageing

concept of "prevention" is in line with that of "health promotion" [12].

Several actions have been put in place and an evolution process in international strategies for PA promotion is ongoing. Nevertheless, there is a need to continue updating these policies in light of new knowledge about evidence-based PA health effects.

In this review, we analyze the steps in the evolution of international strategies aimed to PA promotion, from early PA recommendations, to the recent WHO Global Action Plan on Physical Activity, retracing the history of strategies and programs, as well as the legislative evolution and intervention projects *(Figure 1)*.

A stimulating discussion about effective PA promotion programs can be useful for future planning of interventions.

PHYSICAL ACTIVITY AND HEALTH PROMOTION

In 1948, the WHO defined health as "(...) a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" [13]. This definition introduces and places for the first time the emphasis on cultural and psychic factors, including them in the meaning of "health", and highlighting the role of social and political environment. In this way, health represents a global, social and political process, aimed at changing social, economic and environmental conditions, in such a way that the impact of risk factors on public and individual health is reduced. The subsequent Alma Ata Declaration on Primary Health Care [14] gave rise to a different and new perspective on public health, drawing attention to the importance of prevention in national and international health policies, as well as within the national health systems.

The first and most important document for the "Health Promotion" was the Ottawa Charter, elaborated in 1986 in the context of the First International Health Promotion Conference, that defined health promotion as "… the process of enabling people to increase control over, and to improve, their health" [12]. The same document also shows how health promotion is based on concrete and effective community actions to achieve a better health status and focuses on defining priorities, making decisions, planning strategies and implementing them.

A further step in this direction was made in 1997 by the 4th International Conference on Health Promotion of Jakarta, entitled "New players for a new era: leading health promotion into the 21st century". The Jakarta Declaration [15] highlighted the need of using a wider range of resources to address the issue of health determinants in the 21st century, as it is essential that health promotion evolves to cope with social changes.

An important part of the Jakarta Declaration was the "Call for Action", in which the participants to the Conference were invited to share its key messages with their governments, institutions and communities, and to put the proposed actions into practice. The "Health Promotion" concept developed by WHO aims to answer to two main questions: how is health created? How to keep yourself healthy for as long as possible? Therefore, it works to motivate people to choose a healthy lifestyle in a conscious and autonomous way. In this context, PA will be one of the tools chosen and promoted to achieve this result.

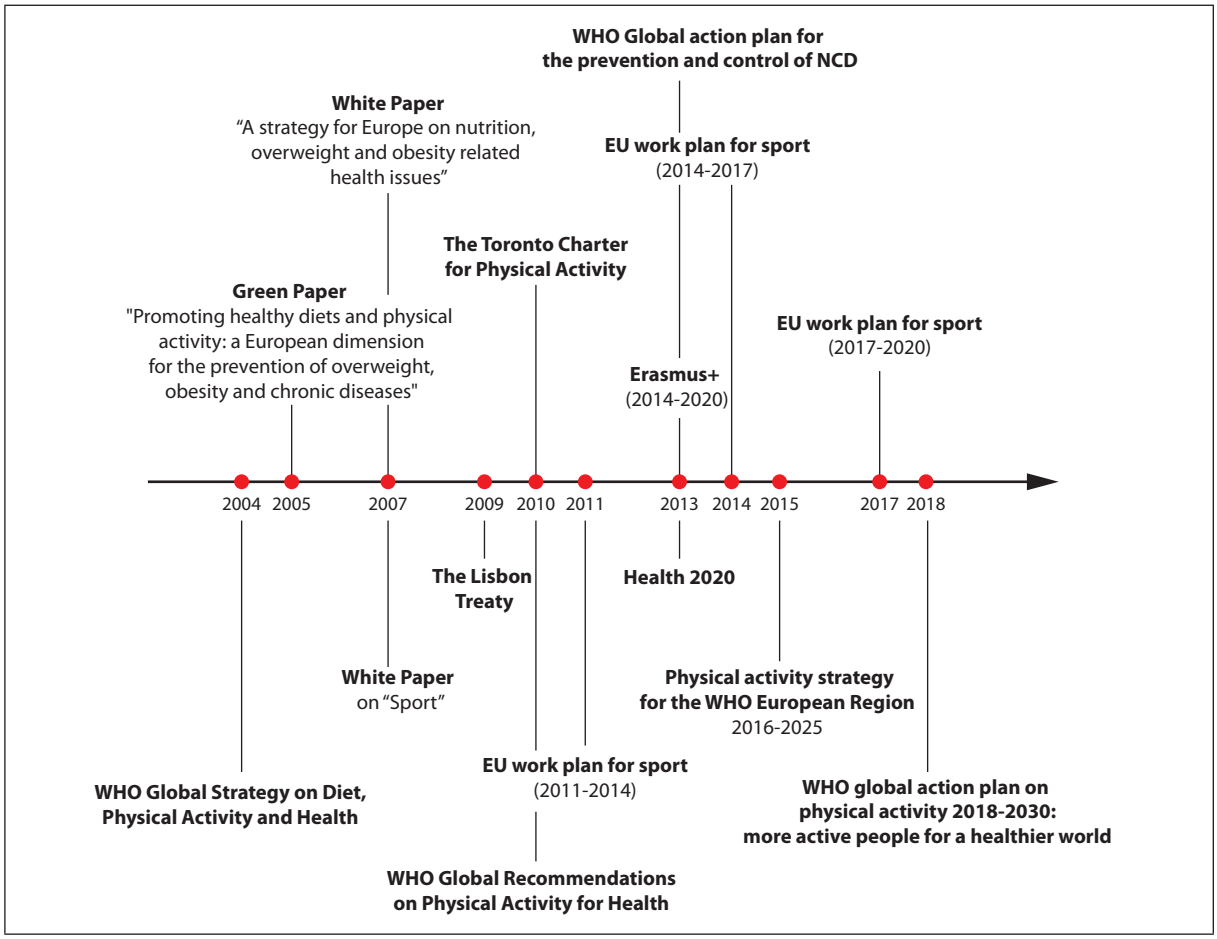

Figure 1
Evolution of international strategies and interventions for health promotion through physical activity.
WHO: World Health Organization; EU: European Union; NCD: non-communicable diseases.

The implementation of policies for health promotion through PA relies both on recommendations about type and dose of activity providing health benefits for people, and monitoring about PA levels in the population, as starting point for promoting initiatives.

Physical activity guidelines

The recognition of the functional risks of a sedentary lifestyle has led to the dissemination of numerous recommendations and guidelines about PA levels useful to improve public health.

The attention of scientific research on the relationship between exercise or PA and health began only in the second half of the 20th century and included two main relevant research fields: a) epidemiological studies, in which the relationship between PA and health outcome is assessed, and b) exercise training studies in a controlled laboratory environment, in which the potential of aerobic and/or strength exercise is the physiological variable taken into consideration [16].

The first systematic investigation on the health risks, with specific concern to coronary heart disease (CHD), associated with a sedentary lifestyle at work or during leisure time was conducted by Morris and coworkers [17]. Since that, hundreds of reports have been published in scientific peer-reviewed literature proving health risks determined by a physically inactive lifestyle, and advantages of PA practice [18, 19].

A limit of epidemiologic studies carried out until the mid-1980s was that data collected about PA levels were self-assessed, thus the inaccuracy linked to this type of data collection made difficult to measure the exact dose of exercise, in terms of type, quantity and intensity, associated with the observed health benefits. Subsequent studies used the cardiorespiratory fitness as more objective index to evaluate the relationship between exercise "dose" and health benefits [20-25]. Other investigators conducted controlled training studies providing quantification of the exercise dose needed to improve physical work capacity. This research flows provided the scientific basis for the recommendations: epidemiological research was used for the development of health-related activity guidelines, while exercise training research to quantify the frequency, intensity and duration of recommended PA. The American College of Sports Medicine (ACSM) and the American Heart Association (AHA) were the first to provide recommendations on specific exercises for clinical and rehabilitative medicine [26-33]. However, early guidelines and recommendations were based primarily on endurance exercise to enhance performance,

especially aerobic capacity. In subsequent years, results from large epidemiological studies showed benefits of moderate-intensity activities of daily living: quantity and quality of exercise needed to attain health related benefits may differ from that recommended for fitness benefits. Thus, a subsequent document from the Centers for Disease Control and Prevention (CDC)/ACSM [34] gave more specific indications, suggesting the practice of ≥30 minutes of moderate intensity PA each day. This report contains the most widely known evidence-based PA recommendations for public health, which were adopted by many other authorities worldwide, like the National Institutes of Health [35] and the WHO [36].

Since then, other specific recommendation of PA to control weight gain followed, like those by the IOM (Institute of Medicine) Committee on Dietary Reference Intakes [37] and the International Association for the Study of Obesity [38].

More recently, new recommendations based on updated scientific evidence have been published, such those from the US Physical Activity Guidelines Advisory Committee [39], the AHA/ACSM for adults and older adults [40], the US Department of Health and Human Services (US DHHS) [41], that contain specific guidelines for young people, people with disabilities, pregnant and postpartum women, and the WHO "Global Recommendations on Physical Activity for Health" [2], addressing three age groups: 5-17, 18-64 and 65 years old and above. All these documents introduced some differences respect to the first ACSM reports: recommendations are specific for target groups; some vigorous exercise and also muscle- and bone-strengthening activities are included; PA time is indicated as total weekly activity time (150 min per week).

Now, Physical Activity Guidelines have been published in several countries, as well as in the context of the WHO. The WHO's documents, that are based on the most recent scientific evidence, focus on PA as a tool for population-based primary prevention.

In Europe, the EU Physical Activity Guidelines were published in 2008 and several EU Member States have national PA Guidelines which help government agencies and private bodies to work together in order to promote PA [42].

At the moment, recommendations are oriented to suggest moderate-intensity activities, planned as total weekly PA, and targeted to the whole population and to specific target groups. Thus, providing evidence-based information about the relationship between PA and health, they represent the basis for strategies and policies of PA promotion at national and regional level [43].

Data collection and monitoring

The surveillance of population levels of PA using a standardized protocol is an important and necessary starting point in PA promotion policies. This kind of investigation is generally carried out through questionnaires, that are inexpensive and easy to administer, such as the Global Physical Activity Questionnaire (GPAQ, www.who.int/ncds/surveillance/steps/GPAQ_EN.pdf) developed by the WHO about a decade ago.

In Europe, the first manifestations of interest for studies and research on sports participation appeared in the '70s, when the sport began to be included in welfare policies. These early investigations examined the socio-economic and demographic characteristics of the participants, the modalities of participation, the reasons for sport practice or inactivity.

People participation in sport activities ("sport for all") reached a peak in the '80s and was monitored both at European and extra-European level. Subsequently, a new approach for measuring sports participation was designed, with the aim of harmonizing data collection between countries: the Compass project (Co-Ordinated Monitoring of Participation in Sports) [44, 45] and the subsequent Eurobarometer, a service through which the European Commission measures and analyzes the trends of public opinion in all Member States (MSs) in order to better prepare legislative proposals, to make decisions and to evaluate the EU work. The first Special Eurobarometer Physical Activity [46] evaluated PA in the Member States (MSs) using the "International Physical Activity Questionnaire" (IPAQ). The IPAQ analyzed frequency, duration and intensity level of respondents' PA over the last 7 days, as well as the context in which they were physically active and the perception of environmental and local opportunities that favor the practice of PA. Several Eurobarometers on sport and PA were produced in the following years [47-50].

However, data collected in recent years are not encouraging. The WHO estimated that, at a global level, 25% of adults is not sufficiently active and 80% of adolescents do not reach recommended levels of PA (www.who.int/news-room/fact-sheets/detail/physical-activity). Also, in the EU nearly half (46%) of Europeans never exercise or play sport, and that proportion has increased gradually since 2009. Only 7% exercise regularly (at least five times per week), and a high proportion of adults in Europe spend more than 5 h/day sitting [50]. Lack of time is the principal barrier for those with a sedentary behavior, but there are conflicting opinions among the states on the fact that local authorities do not enough provide their citizens with appreciable opportunities (39%). Finally, it should be noted that the survey observed a good perception of sport as a benefit to physical and mental health, reflecting citizen awareness of the role that PA plays in the prevention/treatment of several disease.

In Italy PA levels are monitored continuously through the following national surveillance systems, promoted by the Ministry of Health and led by the *Istituto Superiore di Sanità*: *Okkio alla salute* (Child Obesity Surveillance Initiative) collects data on children aged 8-9 years; The Health Behaviour in School-aged Children (HBSC) survey collects data on adolescents aged 11, 13 and 15 years*; Progressi delle Aziende Sanitarie per la Salute in Italia* (PASSI) collects data on adults aged 18-69 years. Additional data are collected by the National Institute for Statistics [51, Italy Physical Activity Factsheet]. According to these data, the estimated prevalence of sufficient PA levels is 82% for children 8-9 years old, 11% for adolescents 11-13 years old and 31% for people aged 18-69 years.

MAIN POLICIES AND INTERNATIONAL PROGRAMMES

During last years, WHO published several documents and gave a series of suggestions to guide policies towards PA promotion through an intersectoral approach. Moreover, to support member states, WHO set up partnerships with various organizations, the United Nations Organization for Education, Science and Culture (UNESCO) and the United Nations Office on Sport for Development and Peace (UNOSDP).

In 2004, in consideration of the dramatic increase of chronic degenerative diseases and obesity, WHO approved the Global Strategy on Diet, Physical Activity and Health [52], which aimed to design and suggest a worldwide interventional program to improve the situation. After this, all countries proposed political initiatives to control and promote interventions in line with WHO suggestions. In particular, in 2005 a Green Paper entitled "Promoting healthy diets and physical activity: a European dimension for the prevention of overweight, obesity and chronic diseases" has been published in Europe [53].The Green Paper gave rise to two documents in 2007: the White Paper on "A strategy for Europe on nutrition, overweight, and obesity related health issues" [54], and the White Paper on sport, including the "Pierre de Coubertin Action Plan" [55].

In 2008, the 61st session of the World Health Assembly approved the "Action plan for the global strategy for the prevention and control of NCDs", which is considered a strong worldwide initiative to emphasize the importance of PA as a prevention strategy [56]. In this document physical inactivity is listed as a risk factor for NCDs, together with tobacco consumption and unhealthy diet, and the goal of the global strategy was to reduce the level of exposure to these risk factors and to develop norms and guidelines for interventions to reduce the incidence of NCDs and improve health care. A few years later, the Global Action Plan for the Prevention and Control of NCDs 2013-2020 was also published [57].

These documents show how the promotion of PA is a topic of real interest at the global and at the European level. The WHO and the European Commission are currently involved in promoting and supporting policies that aim at an active lifestyle. One of the most recent results is the "Physical activity strategy for the WHO European Region 2016-2025" (see below) [58].

2005: The Green Paper on "Promoting healthy diets and physical activity: a European dimension for the prevention of overweight, obesity and chronic diseases"

The Green Paper presented by the European Commission in 2005 in Brussels set out various concepts for public debate on the promotion of a healthy lifestyle through proper nutrition and PA [53].

The document first illustrated the epidemiological situation at the European level in that period: incorrect nutrition and lack of PA emerged as main causes of preventable diseases and premature deaths in Europe; the growing prevalence of obesity across Europe was one of the major public health problems. The Council invited the Commission to contribute to the promotion of healthy lifestyles and to develop strategies to improve food habits in the EU, promoting healthy diets and PA. The Council stressed also the need to include issues concerning nutrition and PA in the relevant policies at European level.

Furthermore, a series of initiatives were launched in that period: the European Platform for Action on Diet, Physical Activity and Health, the Network on Nutrition and Physical Activity, and the Public Health Action Program, aimed to support projects to promote healthy eating habits and PA.

A very important part of the Green Paper is the Annex 2: "Relationship between diet, physical activity and health", containing scientific news to support the theme on which the book is based. The relationship between diet, PA and health has been established scientifically, in particular regarding the role of lifestyles as determinants of chronic NCDs and conditions such as obesity, heart disease, type 2 diabetes, hypertension, cancer and osteoporosis [59]. All these inputs, made known worldwide by the "Global Strategy on Diet, Physical Activity and Health" and at the European level by the Green Paper, will be the basis for practical proposals that will be contained in the subsequent White Papers [54, 55].

2007: The White Paper on "A strategy for Europe on nutrition, overweight and obesity related health issues"

The purpose of the first White Paper was to suggest an integrated European approach to improve population health status and decrease illness linked to poor nutrition, obesity and overweight [54]. It stressed the importance of individual responsibility for lifestyles improvement and emphasizes the important role of the public authorities in promoting the increase of PA level, developing a favorable physical and social environment.

Among the various topics addressed, the focus is on the "Encouraging physical activity" section. "The Commission believes that the MSs and the EU must take pro-active steps to reverse the decline in physical activity levels in recent decades (…). The individual's attempt to find ways to increase physical activity in daily life should be supported by the development of a physical and social environment" such as sustainable urban transport actions and walking and cycling projects.

Finally, the Commission ends this part by announcing that it will draw up a White Paper on Sport that will be "aimed at putting forward proposals to boost participation rates for sport in the EU and to extend the sport movement to include physical activity more generally."

2007: The White Paper on "Sport"

The White Paper on Sport was one of the main contributions to the theme of the role of sport in daily life of European population [55]. It contained several proposed actions, which were then brought together in the "Pierre de Coubertin Action Plan". The White Paper on Sport aimed to enhance the social role of PA to reach a social cohesion and inclusion of vulnerable groups; moreover, it aimed to enhance the role of PA in educating and training and to stress the concept of public

health through PA, to increase the rates of participation in sports and to set up a European network to promote sport as a health-enhancing method. The second part of the White Paper focused also on the economic dimension of sport, emphasizing the contribution given by PA as a growth and job creation in the European context. Then, the Commission monitored the progresses of all the initiatives with a structured dialogue in which the sport organizations were involved.

First of all, the indications concerning the minimum levels of PA recommended by the WHO were clarified: minimum 30 minutes of moderate PA per day for adults and 60 minutes for children. Public authorities and private organizations in the MSs should all contribute to achieving this goal, but generally, no progress worthy of note has been shown.

Therefore, the White Paper foresaw the following activities:

a) The Commission proposed to develop new guidelines on PA before the end of 2008. It recommended strengthening cooperation at ministerial level between the health, education and sport sectors in the MSs to define and implement consistent strategies to reduce overweight, obesity and other health risks. In this context, the Commission encouraged MSs to examine how to promote the concept of active life through national education and training systems, including teacher training.
b) The Commission committed itself to supporting a European network of PA for the benefit of health (so-called HEPA activity: Health-Enhancing Physical Activity).
c) The Commission had set itself the goal of making "physical activity for the benefit of health" a reference point for its sports-related activities and sought to better take into account this priority in the relevant financial instruments, which included: the 7th Framework Program for research and technological development lifestyle aspects of health; the public health program 2007-2013; the youth and citizenship programs (cooperation between sports organizations, schools, civil society, parents and other partners at local level); the lifelong learning program (teacher training and cooperation between schools).

2009: The Lisbon Treaty

The 2007 White Paper on Sport and the related "Pierre de Coubertin Action Plan" launched in 2008 were of fundamental importance for laying the foundations for an EU sport policy and also if the treaties do not provide for a specific legal competence in sport matters before 2009, with the Lisbon Treaty the EU has acquired a specific competence in this area [60].

The EU became responsible for developing policies based on concrete elements, as well as promoting cooperation and managing initiatives to support PA and sport in Europe. Article 6 (e) of the Treaty on the Functioning of the European Union (TFEU) stated that the EU has power to carry out actions to support or supplement the action of MSs in the field of sport, while article 165 contains the detailed aspects of sport policy: "The Union shall contribute to the promotion of European sporting issues, while taking account of the specific nature of sport, its structures based on voluntary activity and its social and educational function". Article 165 (2) aims to develop "the European dimension in sport, by promoting fairness and openness in sporting competitions and cooperation between bodies responsible for sports, and by protecting the physical and moral integrity of sportsmen and sportswomen, especially the youngest sportsmen and sportswomen".

Given its many benefits, the attention at European level towards the promotion of PA has grown more and more, and the Lisbon Treaty has provided the legal basis for the EU to require the development of European dimension in sport and the promotion of sports issues at European level.

2010: The Toronto Charter for Physical Activity

In 2010 another fundamental Paper has been published: the "Toronto Charter for Physical Activity: a global call for Action", which raised the awareness of the national, regional and local decision-makers in the importance of promoting PA [61]. The Toronto Charter was written in 2010 by the International Society for Physical Activity and Health (ISPAH), a group of experts from the Global Advocacy for Physical Activity (GAPA), and then integrated in 2011 by "The best investments for Physical Activity" document; it became the worldwide reference text for the promotion of PA and defined a set of individual and social spheres of action in which to invest to obtain a more active and therefore healthier life. From 2011, all the organizations and individuals interested in promoting PA used this Charter to raise awareness and bring together decision-makers at national, regional and local levels in achieving a shared goal. These organizations include the health, transport, environment, sport and leisure time, education and urban planning sectors, as well as public administration, civil society and the private sector.

The Toronto Charter has identified and proposed, based on the most up-to-date scientific evidence, four fundamental action areas:

a) implement a policy and an action plan at national level;

b) introduce policies that support PA (from urban transport to communication campaigns, through sport and education);

c) redirect services and funding to give priority to PA (workplaces, green spaces, health, etc.);

d) develop partnerships for action (intersectoral working groups, collaborations between profit and non-profit organizations, etc.).

The four actions are based on guiding principles, and invite all countries, regions and communities to urge greater political and social commitment to enhance the importance of PA and improve the health of all.

Recommendations and strategies in Italy

Italian strategies are in line with WHO Action plans and the EU policies. All initiatives take into account health determinants conditioning lifestyle and aim to realize effective actions of health promotion with an intersectoral and integrated approach.

Since 2007 the action plan *Guadagnare salute: rendere facili le scelte salutari* (Gaining health: encouraging healthy choices) has been put into practice [62]. The plan is an integral part of the chronic disease prevention and control strategies for the "gaining health", promoted by the WHO in 2006. The main objectives are to prevent and change unhealthy conducts which are the main risk factors for non-communicable diseases with the highest epidemiological relevance and strongest impact on public health: cardiovascular diseases, cancer, diabetes mellitus, chronic respiratory pathologies, disorders of the muscle-skeletal and gastro-intestinal system, mental health problems. The initiative relies on the promotion of healthy choices and correct lifestyles (stop smoking, follow a correct diet, limit the alcohol intake and exercise regularly). Moreover, this supports local sanitary authorities in the implementation of the National Prevention Program (*Piano Nazionale della Prevenzione* 2014-2018), which aims to increase the prevalence of physically active adults (+30%) and people aged >64 (+15%) (www.salute.gov.it/portale/temi/p2_6.jsp?id=456&area=stiliVita&menu=attivita).

INTERVENTION PROJECTS

The introduction of legislative initiatives on sport and PA confirms the increase in global interests about this topic, with reference to the possibility of achieving improvement in the quality of life through the practice of PA and sport. This process has created the ideal basis for establishing real intervention programs whose main purpose is the promotion of PA to obtain a better health status.

Among the interventions, we find both initiatives mainly addressed to the sport field and initiatives focused on "PA for health".

Erasmus+ (2014-2020)

Sport is an integral part of the Erasmus+ program, the EU program for education, training, youth and sport starting in 2014. In accordance with one of the new elements introduced in the Lisbon Treaty, Erasmus+ supports activities aiming at developing the European dimension in sport. The Programme promotes the creation and development of European networks, providing opportunities for cooperation among stakeholders and the exchange and transfer of knowledge and know-how in different areas relating to sport and PA. The Programme intends promoting mobility opportunities for students and staff at various levels of education and for youth workers, by giving financial support to people submitting project proposals. In the 2014-2020 period, and for the first time, a budget line specifically dedicated to support projects and networks in the sports sector within the Erasmus+ program was made available. Almost 2% of the annual budget of the Erasmus+ program was dedicated to sport related activities, with the aim of supporting collaborative partnerships and non-profit European sporting events.

A particular initiative within this project is the "European Sport Week". This was proposed in the 2012 Resolution of the European Parliament following the dramatic data emerged from the above mentioned Eurobarometer. Each year, the EU promotes the European Sport Week with initiatives at EU, national, regional and local level to raise public awareness of the benefits of physical exercise for health. In general, such projects must lead to increased levels of participation in sport and the Erasmus+ Sport program will help develop the European dimension of sport by improving cooperation between sport organizations, public administrations and other interested parties.

Moreover, the network of Erasmus students annually organizes the International Erasmus Games (IEG). Countries send teams of Erasmus+ students to participate in sports competitions. In local and national qualifying rounds, teams from different cities, made up of friends of different nationalities, compete for the honor of representing the host country.

EU work plan for sport (2017-2020)

The EU work plan for sport is the most important document of the European sport strategy. The first plan was adopted by the Council in 2011 and the second in 2014. The 2014-2017 program contained three priorities: the integrity of sport, its economic dimension and the relationship between sport and society. To address these priority issues, the MSs and the Commission have set up five expert groups in the following areas: match-fixing, good governance, the economic dimension of sport, healthy physical activity (HEPA) and human resource development in sport.

On 23 May 2017, the Education, Youth, Culture and Sport Council in the sport session adopted the new EU work plan for sport (2017-2020). Under this plan, the Commission organized a forum of experts who discussed the general objectives previously analysed in the 2014-2017 program:

- integrity of sport, in particular promoting good governance including the safeguarding of minors, the specificity of sport, combating corruption and match fixing, as well as fighting doping;
- the economic dimension of sport, in particular innovation in sport, and sport and the digital single market;
- sport and society, in particular social inclusion, the role of coaches, education in and through sport, sport and health, sport and environment and sport and media, as well as sport diplomacy.

Although this Plan focuses more on strictly sports issues, it is worth highlighting that there is always a part dedicated to the health aspects of the practice of sport exercise.

Health 2020

"Health 2020" is a European policy model developed by the WHO through a long two-year consultation process and was adopted by the 53 MSs of the Region during the Sixty-second session of the Regional Committee for Europe of the WHO in September 2012 [63].

It is an important reference tool for implementing national, regional and local policies that are in harmony and in synergy, taking into account the specificities of the territories and social contexts.

Health 2020 "significantly improve the health and well-being of populations, reduce health inequalities,

strengthen public health and ensure people-centered health systems that are universal, equitable, sustainable and of high quality".

The document focuses on the main health problems and identifies four priority areas of political action:1. Investing in health through a life-course approach and empowering people; 2. Tackling the Region's major health challenges of non-communicable and communicable diseases; 3. Strengthening people-centered health systems, public health capacity and emergency preparedness, surveillance and response; 4. Creating resilient communities and supportive environments.

As part of the primary prevention of diseases, efforts in PA promotion through targeted interventions instead of mass-media campaigns has been highlighted in this document. Environmental measures such as changes in the transport system and the wider environment can be put in place to promote PA: where there are public green spaces and forests, people use them to walk, play, and cycle, turning PA into an integral part of their daily lives.

Physical activity strategy for the WHO European Region 2016-2025

This PA strategy was developed following the global goals set by the WHO Global Action Plan for the Prevention and Control of NCDs 2013-2020 [57].

The strategy is based on PA as a driving factor for the health and wellbeing of the European Region, with particular attention to the incidence of NCDs associated with insufficient levels of PA and sedentary behavior [58]. It covers all forms of PA practicable in the course of life.

The PA strategy aims to encourage governments and stakeholders to work to increase the levels of PA practiced by all citizens of the European Region. Obtaining a relative 10% reduction in the prevalence of insufficient PA by 2025 is one of the nine global goals. Indeed, increasing PA levels is an important factor to obtain a relative 25% reduction in early mortality due to cardiovascular diseases, tumors, diabetes or chronic respiratory diseases, to obtain a relative 25% reduction in the prevalence of hypertension, and to stop the increase in diabetes and obesity.

The second part of the document is dedicated to the priority areas, objectives and intervention tools that "MSs should consider developing or expanding, according to national context, strategies and action plans to promote PA". A special reference is given to the need to work together: "MSs should promote alliances between government, the media, civil society organizations and other stakeholders, including, but not limited to, public health and sports organizations and others, in order to promote physical activity for health across the life course" [58].

WHO global action plan on physical activity 2018-2030: more active people for a healthier world

Recently, the "WHO global action plan on physical activity 2018-2030: more active people for a healthier world" has been published [3]. The aim of this document is to ensure that all people have access to diverse opportunities to be physically active in their daily lives in a safe and enabling environment, resulting in an improvement of individual and community health and contributing to the social, cultural and economic development of all nations. The main target is to reduce a 15% of physical inactivity relative amount by 2030, using a baseline of 2016, in both adults and adolescents.

The document deals with various topics, divided into four main objectives to be pursued:

- create active societies: enhancing the knowledge and the understanding of, and appreciation for, the multiple benefits of regular PA and structured exercise, with the aim to create positive social norms and attitudes in all of society;
- create active environment: having equitable access to safe places and spaces in cities and communities dedicated to regular PA, by policy action addressing the need to create supportive spaces and places that promote and safeguard the rights of all people;
- create active people: helping people of all ages and abilities – individuals, families and communities – to engage in regular PA, outlining the multiple settings to increase programs and opportunities;
- create active systems: increasing PA and reducing sedentary behavior through policy actions that outline the investments needed to strengthen the systems necessary to implement effective international, national and subnational action. These actions address governance, leadership, multisectoral partnerships, workforce capabilities, advocacy, information systems and financing mechanisms across all relevant sectors.

This document also describes 20 evidence-based policy actions, recommended to achieve these four objectives. For example, to increase knowledge and skills related to the roles of professionals, it has been proposed to strengthen pre- and in-service training, within and outside the health sector, creating inclusive, equitable opportunities for an active society regarding transport, urban planning, education, tourism and recreation, sports and fitness.

The priorities to create an active environment are aimed to improve the integration of urban and transport planning policies (walking and cycling network infrastructures), as well as the access to good-quality public and green open spaces, green networks, recreational spaces and sports amenities by all people.

The societies and environmental modification will lead to the creation of active people, by strengthen provision of good-quality physical education and more positive experiences and opportunities for active recreation and sports. Moreover, the goal of future society is the implementation of systems of patient assessment and counseling on increasing PA and reducing sedentary behavior, as well as the establishment of prescription of structured exercise in health care services for patients with a history of cancer, diabetes and cardiovascular diseases [64-67].

Finally, this document underlines the importance of policy frameworks, leadership and governance systems, at the national and subnational levels, to support implementation of actions aimed at increasing PA and reducing sedentary behaviors at a multisectoral level. In the Appendix 2, the recommended specific roles for the WHO Secretariat, WHO MSs and other stakeholders to support implementation are outlined for each action.

CONCLUSIONS

It is well known that PA is a powerful tool for the prevention of non-communicable diseases, through reduction of main risk factors, and the support and improvement of psycho-physical well-being and quality of life.

International recommendations about PA for health [2], taken up by the Action Plan for the Prevention and Control of Noncommunicable Diseases in the WHO European Region 2016-2025, are an important reference point for each MS. PA recommended levels can be easily obtained in everyday life (at school, at home, at recreational and working environments). However, in order to support change, increasing levels of physical activity in the population demands a multisectoral and multidisciplinary approach. This issue has been recently enphasized by the WHO Regional Office for Europe [68], which recognized the importance of multisectoral and intersectoral actions for improved health and well-being for all. This kind of collaboration should involve different figures, at national, regional and local levels, without forgetting international networks (i.e. WHO European Healthy Cities Network and the Regions for Health Network): policy-makers, civil society, the health sector, media, etc. Moreover, the WHO also gave practical indications, as town planning to ensure accessible and safe walking and cycling, active transport, intervention in workplaces and schools, providing advice or counsel in primary care, creating social networks to encourage PA [2].

Other supporting activities for PA promotion include regulations and strategies to modify living environments, to assign specific economic funding, to activate useful collaborations.

Such strategies and health policies not only respond to the need of reducing the burden of disease of non-communicable diseases, but also contribute to reducing sanitary costs. Indeed, an increase in people PA levels could remarkably reduce costs for the National Health Services.

It is therefore necessary to include prevention strategies based on the practice of PA in governmental interventions made by the global, European, state and local organizations. All these levels must operate in a concerted and cooperative manner: only in this way interventions can be made effective and have real benefits for people's health.

Thanks to strategies promoted and financed by these bodies, it is possible to render the population increasingly aware of the fact that an active lifestyle improves the quality of life and favours the achievement of a state of complete well-being. At the population level, some activities may help to make healthy choices easy choices, like educational of information initiatives to increase people consciousness of benefits deriving from PA and to motivate at a more active lifestyle.

In this context, in the last decade, new technologies received increasing attention as a tool for physical activity promotion, including the interactive exercise-based video games (or "exergames") that could promote physical activity providing enjoyable exercise opportunities for children and young adults [69]. The exergames have also been proposed to improve rehabilitation adherence in individuals with acute or chronic illness, or with physical or developmental impairment [70]. Moreover, in older people, technology-based exercise interventions revealed good adherence and several advantages over traditional exercise programs, offering a more enjoyable and stimulating exercise experience, and may provide a sustainable means of promoting physical activity and preventing falls [71].

In this way, people will be capable to acquire the ability to increase and improve control over their health.

Author's contribution statement

All Authors contributed to study conception and design. Mauro De Santi, Debora Contisciani, Giulia Baldelli and Giulia Amagliani co-wrote the paper. Giorgio Brandi and Giuditta Fiorella Schiavano provided critical revision of the article and final approval of the version to publish.

Conflict of interest statement

The Authors of the manuscript declare that they do not have any conflicts of interest.

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