



Viewpoint

Sport for health: a call for action

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Abstract

In view of the global surge in obesity and non-communicable diseases, such as cardiovascular conditions, diabetes and cancer, there is an urgent need to promote population-level health. Globally, physical inactivity is a leading risk factor for non-communicable diseases and mortality and carries a considerable public health burden. The health benefits of physical activity are well established. Regular exercise of moderate intensity reduces the risk of chronic diseases and is an effective means of extending both lifespan and years lived in good health. Participation in sports therefore plays a key role in maintaining public health and reducing the burden of non-communicable diseases and the associated increase in the rate of premature deaths. Furthermore, physical activity and sport offer a promising avenue for the promotion of mental health across the lifespan. Appropriate lifestyle changes in regard to physical activity will eventually help shift the population distribution of risk and aid in preventing non-communicable diseases. Robust scientific evidence demonstrates that physical activity and sport can play an important role in assisting in the prevention and management of chronic diseases at the individual and population levels and in alleviating the economic and human cost of disease. The combined expertise of medicine, exercise science and sports should therefore guide the training of doctors, encouraging them to incorporate physical exercise into their daily practice. However, science can only enhance the common good if its significance is appreciated by policymakers and the public and its implementation leads to improvements in health. Those with power to implement change must act on the evidence provided by science.

Keywords: Sport; Exercise; Physical inactivity; Sedentary behaviour; Non-communicable diseases; Mental health; Prevention; Sustainable health care; Public health; Health in China.

运动促进健康：行动呼吁

鉴于全世界人口中患超重、肥胖和非传染性疾病（如心血管疾病、糖尿病和癌症）患者人数的增加，促进全民健康成为了当今社会迫切的需要。缺乏运动在全世界乃是导致患非传染性疾病及引起相关死亡的一个主要风险因素，由此引起的后果也对公共卫生造成了巨大负担。身体活动对健康的益处已经得到了充分的证实。定期进行中等强度的锻炼不仅可以降低患慢性病的风险，而且可以延长寿命和提升生活质量。故而参与体育活动在保护公众健康、减少非传染性疾病对公共卫生的负担和降低过早死亡率方面发挥着关键作用。除此以外，身体活动和运动可以促进人们在每个人生阶段中的心理健康。改善生活习惯，增加身体活动，将有助于改变人口中的风险分布，避免非传染性疾病的发生。总而言之，科学已证明，身体活动和运动在个人和全民层面的慢性病预防和治疗中发挥着重要作用，同时也能减轻与疾病相关的经济成本。在培养医生的过程中，应将医学和运动科学的专业知识充分融合，并且鼓励医生在日常工作中将体育锻炼纳入他们对病患的治疗方案中。科学只有在能影响政策制定者和社会公众，并且可以导致人民健康状况发生确切的改善时，才能为公共福利作出贡献。所以，有政治影响力并能人类社会带来变化的人，应该根据科研证据做出一些切实的行动。

1. Introduction

The influential Chinese educator and philosopher, Cai Yuanpei (1868-1940), took the view that human health depends not only on diet, but, importantly, also on physical exercise. According to Cai, sports can help people gain mastery over their physical and mental strength (Cai, 1980). Cai Yuanpei's thoughts may be remembered when addressing a current pandemic posing significant long-term health challenges to the entire world. This is the pandemic of physical inactivity.

2. Physical inactivity and non-communicable diseases

We have lived with the pandemic of physical inactivity and sedentary behaviour for many years. The main drivers of the change in physical activity are urbanisation, mechanisation and increased use of motorised transport in modern society. The pandemic of physical inactivity is closely related to the global increase in obesity and other non-communicable (or chronic) diseases, such as heart disease, stroke, type 2 diabetes, chronic respiratory disease and cancer. Lack of exercise is a primary cause of most chronic diseases and a major risk factor for global mortality (Anderson and Durstine, 2019; Booth et al., 2012). Physical inactivity accounts for up to 10% of deaths from non-communicable diseases worldwide (Lee et al., 2012), with an even higher proportion, of around 30%, from ischaemic heart disease (World Health Organisation, 2009). In total, 5.3 million deaths per year have been estimated to be due to inactive lifestyles (Lee et al., 2012).

In China, growing evidence demonstrates rising levels of sedentary behaviours, decreasing levels of physical activity and fitness as well as escalating levels of overweight (Tian et al., 2016; Zang and Ng, 2016). In 2011, more than 580 million Chinese adults were estimated to have at least one non-communicable disease, which accounted for more than 80% of China's 10.3 million annual deaths and 68.6% of the total disease burden (World Bank, 2011). In addition to morbidity and premature mortality, physical inactivity is responsible for a substantial economic burden (Ding et al., 2016). In China, for example, the economic costs of diseases linked to physical inactivity amounted to 6.7 billion US dollars in 2007, which comprised over 15% of the yearly medical and non-medical costs arising from the main non-communicable diseases (Zhang and Chaaban, 2013).

We are currently approaching a global crisis in chronic disease, with sedentary lifestyle as a leading cause. The impact of the physical inactivity pandemic in terms of impaired health, disability and economic cost will persist for many years to come. Escalating expenditure on medical treatments has become insupportable in many countries (Bloom et al., 2011). If we continue to rely primarily on the treatment of manifest diseases, the health resources worldwide will be insufficient to tackle the growing epidemic. These realities have resulted in a call for increased global public health efforts to expedite the promotion of physical activity and health (Kohl et al., 2012). Population-

wide primary prevention targeted at reducing sedentary behaviour and other risk factors should therefore be the overarching priority in the response to the current crisis.

Everyone would agree that avoiding chronic diseases through exercise, weight control or avoidance of tobacco is a better strategy than treating the results of unhealthy behaviour patterns (i.e. manifest diseases) with drugs or other means (Lange, 2021a,b). A combination of at least four healthy lifestyle factors, such as physical activity, healthy diet and avoidance of tobacco smoking or excessive alcohol intake, has been found to reduce the all-cause mortality risk by 66% (Loef and Walach, 2012). A large prospective cohort study of 0.5 million Chinese adults demonstrated that a substantial reduction in the burden of cardiovascular diseases, respiratory diseases and cancer could be achieved by a healthy lifestyle. Adherence to a healthy lifestyle pattern could have prevented almost 40% of total deaths during 10 years of follow-up (Zhu et al., 2019).

Insufficient physical activity, defined as less than 150 min of moderate-intensity or 75 min of vigorous-intensity aerobic physical activity per week or any equivalent combination of the two (including physical activity at home, at work, for transport and during leisure time), has been found to be a leading risk factor for non-communicable diseases, including cardiovascular disease, hypertension, type 2 diabetes as well as breast and colon cancer (Warburton and Bredin, 2016). A plethora of scientific studies involving millions of participants have provided overwhelming evidence that physical activity and exercise produce significant health benefits. Virtually everybody can benefit from an increase in physical activity. Regular exercise that meets or exceeds current international recommendations has been found to be associated with 20–30% risk reductions for a wide range of chronic medical conditions and premature death (Warburton and Bredin, 2016).

3. Physical inactivity and mental health

The benefits of a physically active lifestyle also include improvements in mental health, social well-being and quality of life (Warburton et al., 2010; World Health Organisation, 2010; Sallis et al., 2016; ISPAH, 2017; Lange et al., 2023b). Cross-sectional research has revealed that all types of exercise and sport are associated with a reduced mental health burden. For example, a cross-sectional assessment of more than 1.2 million adults in the United States found that people who exercised reported 1.49 (43.2%) fewer days of poor mental health in the past month than people who did not exercise, with all types of exercise and sport being associated with a reduced mental health burden (Chekroud et al., 2018). Based on prospective cohort studies objectively assessing the aerobic fitness of participants, preliminary results have demonstrated that individuals with low and medium cardiorespiratory fitness have an elevated risk of developing depression (Schuch et al., 2017). The large-scale disruptions to physical activity during the infectious coronavirus disease pandemic caused by the SARS-CoV-2 virus (COVID-19) have been found to be a leading

predictor of common mental disorders, comprising different types of depression and anxiety, while regular physical exercise was found to alleviate anxiety, sadness and depression during the pandemic (Lange, 2021a; Lange and Nakamura, 2020a,b; Lange et al., 2023b). Engaging in sports involving interaction with other people may improve social confidence and skills and thus promote positive interpersonal relationships and psychosocial development.

The available research findings make a robust case for exercise as a means of protecting and improving mental health, as well as physical health (Heijer et al., 2017; Lange, 2018a; Lange, 2018b; Lange, 2020; Lange et al., 2023b). For example, physical exercise and sports may become a viable measure in the prevention and treatment of depression (Lange et al., 2023a). In a meta-analysis adjusting for publication bias, large antidepressant effects of exercise on depression were found in comparison with non-active control conditions (Schuch et al., 2016). The effect was particularly high for studies including people with major depressive disorder.

4. Future directions

The adage that prevention is better than cure is particularly salient in consideration of the toll taken on society by chronic ill-health. Providing medical care only following the onset of disease is inadequate. Sustainable health care, involving the use of regular physical exercise to maintain fitness and health, is also required in the prevention of disease. Although evidence for the benefits of physical activity for health has been available for several decades, promotion to improve the health of individuals and populations has lagged behind.

Many countries have action plans seeking to promote physical activity, but the implementation of such policies leaves much to be desired (Kohl et al., 2012). Implementation of such plans requires bold leadership and full engagement across sectors. It is important that politicians look beyond the immediate electoral or financial consequences of policy decisions. In many countries, however, politics operates on a timescale governed by elections and media attention and fails to consider the greater timescale at which population health and its determinants can be expected to change. Many politicians worldwide focus primarily on re-election in the short term rather than on the long-term welfare of their voters. Governments should use their capacity to effect lasting and meaningful changes at population level. However, many seem unwilling to tackle the increasing prevalence of potentially preventable chronic diseases and to make much-needed policy decisions regarding physical inactivity (as well as smoking and sugar consumption). The implementation of health-for-all policies requires top-level government leadership. In China, this has been demonstrated, for example, through the combining of comprehensive efforts of the Chinese Ministries of Health, Education and Sports, with the key target of increasing the number of people engaging in regular physical exercise (General Office of the State Council, 2019).

To build a healthy nation, comprehensive health care should not provide medical services only after people have become ill but should support regular physical exercise and sports participation to actively maintain fitness and public health and prevent the development of chronic diseases. In China, a government-led “Healthy China 2030” initiative was launched in 2016 with a view to improving overall population health over the following 15 years (Xinhua News Agency, 2016; Tan et al., 2017). The “Healthy China 2030” initiative sets multiple public health goals, such as extending average life expectancy, reducing the premature death rate resulting from chronic diseases and increasing the proportion of people reaching the national fitness standard. Furthermore, in the years leading up to the Beijing Olympic Winter Games in 2022, the Chinese government devised a plan to utilise the Games to achieve a participation legacy. A policy was formulated setting the ambitious target of attracting more than 300 million people to a wide range of winter sport activities, many of which were new to the majority of Chinese people (Ainsworth and Sallis, 2022). For example, the policy entailed the construction of new winter sport facilities. In addition, a series of regulations were introduced to motivate people to participate in sport, to promote winter sports education and to bring healthier lifestyles to the general population. In consequence, China, a country with no tradition of winter sports, has seen a substantial growth in participation in snow and ice activities (Lange, 2022). In addition, the promotion of national fitness and sports as a lifestyle will help the development of the sports industry as part of supply-side reform (China Daily, 2017). The current Chinese health agenda, emphasising the role of preventive medicine, may generate innovative solutions and may set an example for public health systems worldwide.

While evidence of beneficial physical and mental health effects of exercise and sports is mounting, doctors, psychologists and other health practitioners are slow to consider exercise and seldom use it as a therapy tool. Since most physicians lack sufficient knowledge of the relationship between exercise and health, curricula integrating the combined expertise of medicine, exercise science and sports should guide the training of medical students and doctors, encouraging them to incorporate physical exercise into their daily practice. Furthermore, public places and facilities for sports utilisation in safe and clean environments need to be available to allow increasing levels of exercise to take place in multiple settings, such as neighbourhoods, schools and workplaces (Wu et al., 2017; China Daily, 2022). In addition, large-scale campaigns are required to educate the public on the effectiveness of exercise and sports in the prevention of chronic disease. Although it may appear to be a step back in Chinese history, regular use of bicycles as a means of transport has many advantages for human health (Schauder and Foley, 2015) and for a clean, sustainable environment. Public health efforts to increase participation in sports may also include school-based interventions (e.g. Ruhland and Lange, 2021) and the creation of urban built environments, transportation systems and green parks conducive to physical activity. In China, promoting a

healthy lifestyle and sports activities among the 300 million primary and secondary school students will contribute to the development of a healthy nation, thereby easing the pressure on public healthcare and hospitals in the future.

In 2009, an action plan for global promotion of physical activity, the Toronto Charter, was developed under the auspices of the Global Advocacy Council for Physical Activity (2010). Major principles of the Toronto Charter include the development of effective physical activity promotion strategies embracing a systems approach, adoption of evidence-based strategies targeting the entire population, addressing determinants of physical activity behaviour as well as the individual, social and environmental determinants of physical inactivity, implementation of sustainable actions with intersectoral collaboration, building capacity, supporting workforce training and developing infrastructure for research, practice, evaluation and surveillance, as well as advocacy to decision makers for sustained political commitment and an increase in resources for physical activity.

The focus of preventive strategies may be individuals at high risk for chronic disease or entire populations. For example, weight reduction campaigns to combat obesity could follow a high-risk approach and target overweight and obese people, in view of their elevated risk for non-communicable diseases. However, since disease risks are not categorical, but rather quantitative phenomena with a continuous distribution of the degree of risk, the introduction of population-wide prevention measures may shift the distribution of risk within large groups of people (see Figure 1), thereby possibly decreasing the burden of disease more profoundly than merely targeting individuals at high risk (Hofman and Vandembroucke, 1992; Lange, 2017). Therefore, to increase physical activity worldwide, a systems approach focusing on populations and the interactions between the correlates of physical inactivity should be used, rather than a behavioural science-based approach focusing on individuals. A systems approach to physical activity requires coordinated changes at the individual, cultural, social, environmental and policy levels (Kohl et al., 2012).

Tackling the threat of the physical inactivity pandemic is fundamental for the future of effective, affordable and sustainable health systems. In view of rapid population aging and limited medical resources worldwide, cost-effective population-wide lifestyle interventions appear to be a better response to the challenges posed by chronic diseases. We must consider not only the short-term costs of disease prevention, but also the long-term costs of an epidemic of chronic diseases. Policies to promote physical activity may largely pay for themselves through their reduction of future health care costs (Cecchini et al., 2010). Sustained social marketing campaigns to raise population awareness of the benefits of physical activity and to foster widespread community participation in sports may provide a key leverage point for public health measures attempting to improve mass fitness. Long-term gains from this approach may include an amelioration of the burden of non-communicable diseases as well as mental illness.

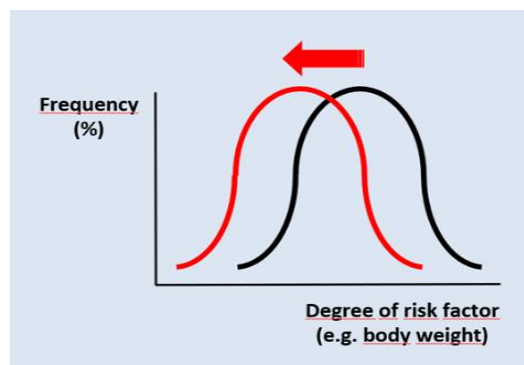


Figure 1. Shifting the distribution of risk factors by population-wide prevention measures

5. Conclusion

The focus of medical practice has long been on the alleviation and management of disease. The continuing advancement of science has significantly expanded the potential for effective medical care. However, there is a strong case, on grounds of both economic efficiency and increased societal well-being, for shifting resources from care and cure to prevention and health promotion. Health care focusing primarily on the treatment of effects rather than causes of ill health may be ultimately unaffordable. The prevention and delay of the onset of significant health problems should therefore become a major focus of scientific research and clinical practice.

The role of physical activity and sports in sustainable health care remains undervalued despite evidence of their protective effects and the burden posed by present levels of physical inactivity. Regular moderate intensity exercise reduces the risk of chronic diseases and is an effective means of extending both lifespan and years lived in good health. Engagement in sports therefore plays a key role in maintaining public health and reducing the burden of non-communicable diseases and the related rate of premature deaths. Furthermore, physical activity and sport offer a promising option for the promotion of mental health across the lifespan.

6. The bottom line

Robust scientific evidence demonstrates that physical activity and sport can play an important role in assisting in the prevention and management of chronic diseases at the individual and population levels and in alleviating the economic and human cost of disease. However, medical science is effective in enhancing the common good only if its significance is appreciated and acted upon by policymakers and the public with resultant improvements in health. Policymakers in a position to implement change must act on the evidence provided by science.

Conflict of interest

The author declared no conflict of interest.

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