

資料 1

身体活動のトロント憲章日本語版：世界規模での行動の呼びかけ



The Toronto Charter for Physical Activity: A Global Call for Action

Physical activity promotes wellbeing, physical and mental health, prevents disease, improves social connectedness and quality of life, provides economic benefits and contributes to environmental sustainability. Communities that support health enhancing physical activity, in a variety of accessible and affordable ways, across different settings and throughout life, can achieve many of these benefits. The Toronto Charter for Physical Activity outlines four actions based upon nine guiding principles and is a call for all countries, regions and communities to strive for greater political and social commitment to support health enhancing physical activity for all.

Why a Charter on physical activity?

The Toronto Charter for Physical Activity is a call for action and an advocacy tool to create sustainable opportunities for physically active lifestyles for all. Organisations and individuals interested in promoting physical activity can use this Charter to influence and unite decision makers, at national, regional and local levels, to achieve a shared goal. These organisations include health, transport, environment, sport and recreation, education, urban design and planning as well as government, civil society and the private sector.

Physical activity – a powerful investment in people, health, the economy and sustainability

Throughout the world, technology, urbanisation, increasingly sedentary work environments and automobile-focused community design have engineered much physical activity out of daily life. Busy lifestyles, competing priorities, changing family structures and lack of social connectedness may also be contributing to inactivity. Opportunities for physical activity continue to decline while the prevalence of sedentary lifestyles is increasing in most countries, resulting in major negative health, social and economic consequences.

For health, physical inactivity is the fourth leading cause of chronic disease mortality such as heart disease, stroke, diabetes, cancers; contributing to over three million preventable deaths annually worldwide. Physical inactivity also contributes to the increasing level of childhood and adult obesity. Physical activity can benefit people of all ages. It leads to healthy growth and social development in children and reduces risk of chronic disease and improved mental health in adults. It is never too late to start physical activity. For older adults the benefits include functional independence, less risk of falls and fractures and protection from age related diseases.



身体活動のトロント憲章

世界規模での行動の呼びかけ

身体活動は、人々の幸福、身体的・精神的健康の増進、疾病予防に役立ち、社会のつながりを深め、生活の質を改善し、さらには、経済的利益をもたらし、環境の保全にも役立つ。健康増進のための身体活動を、実行可能な方法で、様々な場面において、生涯を通じて支援することによって、地域はこれらの多くの恩恵を受けることができる。

身体活動のトロント憲章では、9つの指針に基づく4つの行動（対策）が示されている。本憲章は、すべての国や地域が、あらゆる人々の身体活動を支援する政治的、社会的な取り組みを強めるように求めるものである。

なぜ、身体活動に関する憲章か？

身体活動のトロント憲章は、「行動の呼びかけ」であると同時に、全ての人々が活動的なライフスタイルをおくることができる機会を作り出すための「支援ツール」である。身体活動の推進を行う組織や個人は、共通の目標達成のために、国や地域の政策決定者に影響を与え、彼らの結びつきを強めるためにこの憲章を利用することができる。このような組織には、健康、交通、環境、スポーツ・レクリエーション、教育、都市計画・都市設計ならびに政府、市民団体、民間部門も含まれる。

身体活動－人々、健康、経済、持続可能性への強力な投資

世界中で起こっている、技術革新、都市化、デスクワーク中心の職場環境の増加、車社会を想定した都市計画は、人々の日常生活から身体活動を奪っている。多忙なライフスタイル、競争社会、家族構成の変化、社会的つながりの希薄化も、不活動を助長していると考えられる。ほとんどの国において、身体活動の機会が減少し続ける一方で、座位中心のライフスタイルを送る者の割合が増え続けており、その結果、健康面、社会面、経済面で好ましくない変化が起こっている。

健康に関しては、身体不活動は、心疾患、脳卒中、糖尿病、がんなどの慢性疾患による死亡原因の第4位となっており、不活動のために世界中で毎年300万人以上の予防できるはずの命が奪われている。身体不活動は、子どもおよび成人の肥満増加の原因にもなっている。身体活動はあらゆる年齢層の人々にとって有益である。子どもにとっては身体的および社会的発達に役立ち、成人では、慢性疾患のリスク軽減と精神的健康の増進につながる。身体活動を始めるのに遅すぎるということはない。高齢者が享受する恩恵としては、機能的自立、転倒・骨折リスクの低減、加齢に伴う疾病の予防などがある。

For sustainable development, promoting active modes of travel such as walking, cycling and public transport can reduce harmful air pollution and greenhouse gas emissions, which are also known to negatively impact health. Urban planning, design and redevelopment that aim to reduce dependence on motor vehicles can also contribute to increased physical activity, particularly in those developing countries experiencing rapid urbanisation and growth. Increasing investment in active travel provides more equitable mobility options.

For the economy, physical inactivity contributes substantially to direct and indirect health care costs and has a significant impact on productivity and healthy life-years. Policies and actions that increase participation in physical activity are a powerful investment in preventing chronic diseases and improving health, social connectedness and quality of life as well as providing benefits for economic and sustainable development of countries throughout the world.

Guiding principles for a population based approach to physical activity

Countries and organisations working towards increasing participation in physical activity are encouraged to adopt the following guiding principles. These principles are consistent with the Non Communicable Disease Action Plan (2008) and the Global Strategy on Diet, Physical Activity and Health (2004) of the World Health Organisation as well as other international health promotion charters. To increase physical activity and decrease sedentary behaviour, countries and organisations are encouraged to:

1. Adopt evidence based strategies that target the whole population as well as specific population sub groups, particularly those facing the greatest barriers;
2. Embrace an equity approach aimed at reducing social and health inequalities and disparities of access to physical activity;
3. Address the environmental, social and individual determinants of physical inactivity;
4. Implement sustainable actions in partnership at national, regional and local levels and across multiple sectors to achieve greatest impact;
5. Build capacity and support training in research, practice, policy, evaluation and surveillance;
6. Use a life-course approach by addressing the needs of children, families, adults and older adults;
7. Advocate to decision makers and the general community for an increase in political commitment to and resources for physical activity;
8. Ensure cultural sensitivity and adapt strategies to accommodate varying 'local realities', contexts and resources;
9. Facilitate healthy personal choices by making the physically active choice the easy choice.



持続的発展が可能な社会の実現に関しては、歩行、自転車、公共交通などの活動的な移動手段を推進することで、健康にも悪影響を及ぼす大気汚染や温室効果ガスの排出を削減することができる。車に依存しない生活を目指した都市計画・都市設計、再開発は、身体活動の推進に役立つ。特に、急速な都市化および成長が進行中の開発途上国においてはなおさら重要である。活動的な移動手段への投資を増やすことで、より公平な（交通弱者にとっても）移動手段の選択肢を提供することができる。

経済に関しては、身体不活動が直接的、間接的な医療費増大の大きな原因となっており、生産性や健康寿命に重大な影響を与えている。身体活動の推進を促す政策や対策は、慢性疾患の予防、健康増進、社会のつながり、生活の質の改善のみならず、世界中の国において経済発展、持続可能な社会発展をもたらす強力な投資となる。

全ての人々を対象とした身体活動推進の指針 (9つの指針)

身体活動の推進に取り組もうとしている国および組織では、以下の指針を用いることが推奨される。これらの指針は、WHOの「Non Communicable Disease Action Plan (2008)」・「Global Strategy on Diet, Physical Activity and Health of World Health Organization (2004)」ならびにその他の国際的な健康増進に関する憲章とも内容が一致している。身体活動を推進し、座位行動（座っている時間）を減少させるために、各国および関連する組織には以下を推奨する。

1. 全人口および特定の集団（女性、高齢者、子ども、障がい者、勤労者など）、特に身体活動を行うことに大きな障壁を有する人々に対して、科学的根拠に基づいた戦略を用いる。
2. 社会的な不平等、健康の不平等、身体活動機会の不均等を減少させるような平等の戦略を用いる。
3. 身体不活動の環境的、社会的、個人的な規定要因の改善に取り組む。
4. 効果を最大にするために、持続可能な対策を、国や地域の各レベルで複数部門の連携を通じて実施する。
5. 研究、実践、政策、評価、調査のための能力を高め（キャパシティ・ビルディング）、トレーニングを支援する。
6. 子ども、家族、成人、高齢者のニーズに対応した、生涯を通じたアプローチを行う。
7. 身体活動に関する政治的取り組みを強化し、資源を増大するように、政策決定者や社会一般に対して政策提言・支援活動（アドボカシー）を行う。
8. 文化的差異に配慮し、多様な地域の現状、背景、資源に応じた戦略を採用する。
9. 身体活動を行うという選択が容易にできるようにすることで、個人が健康な選択をすることを促進する。



A framework for action

This Charter calls for concerted action across four key areas. This action should involve governments, civil society, academic institutions, professional associations, the private sector, and other organisations within and outside the health sector, as well as communities themselves. These four action areas are distinct, yet complementary, building blocks for successful population change.

1. IMPLEMENT A NATIONAL POLICY AND ACTION PLAN

A national policy and action plan provides direction, support and coordination of the many sectors involved. It also assists in focusing resources as well as providing accountability. A national policy and action plan is a significant indicator of political commitment. However, the absence of a national policy should not delay the efforts of state, provincial or municipal organisations to enhance physical activity in their jurisdictions. Policy and action plans should:

- Gain input from a broad constituency of relevant stakeholders;
- Identify clear leadership for physical activity, which may come from any government sector, other relevant non government agencies or from a cross sector collaboration;
- Describe the roles and actions that government, not-for-profit, volunteer and private sector organisations at national, regional and local levels should take to implement the plan and promote physical activity;
- Provide an implementation plan that defines accountability, timelines and funding;
- Include combinations of different strategies to influence individual, social, cultural and built environment factors that will inform, motivate and support individuals and communities to be active, in ways that are safe and enjoyable;
- Adopt evidence based guidelines on physical activity and health.

2. INTRODUCE POLICIES THAT SUPPORT PHYSICAL ACTIVITY

A supportive policy framework and regulatory environment are required to achieve sustainable changes in government and society. Policies that support health enhancing physical activity are needed at national, regional and local levels. Examples of supportive policy and regulations include:

- Clear national policy with objectives for increasing physical activity that state by how much and by when. All sectors can share common goal(s) and identify their contribution;
- Urban and rural planning policies and design guidelines that support walking, cycling, public transport, sport and recreation with a particular focus on equitable access and safety;
- Fiscal policies such as subsidies, incentives and tax deductions that may support participation in physical activity or taxation to reduce obstacles. For example, tax incentives on physical activity equipment or club membership;
- Workplace policies that support infrastructure and programs for physical activity and promote active transport to and from work;



行動の枠組み

この憲章は、以下の4領域にわたって連携した行動（対策）を取るよう求める。行動に関わるのは、政府・自治体、市民団体、研究機関、専門家組織、民間団体、その他の健康に関係した、あるいは健康とは直接には関係しない組織である。また、地域社会（コミュニティ）自らが関わるべきである。以下の4つの行動は、明確に区別されるが、補完的に機能して、全ての人々の身体活動推進のための構成要素として働く。

1. 国家政策、行動計画の策定と実行

国家政策と行動計画を策定することにより、関連する部門に対して進むべき方向性が提示され、支援が提供され、相互の協調が促される。また、資源の効果的な利用を助け、責任の所在が明確になる。国家政策と行動計画が策定されていることは、政治的取り組みの程度を示す重要な指標である。しかしながら、国家政策がないことで、地方自治体レベルにおける身体活動推進の取り組みが遅れてはならない。政策や行動計画は以下のようなものでなくてはならない。

- 広い範囲の関係者（ステークホルダー）の意見を取り入れている。
- 身体活動の推進について誰がリーダーシップをとるのかを明確にしている。それは、政府・地方自治体かもしれないし、関連する非政府組織、あるいは複数の組織の協力かもしれない。
- 国、地域のレベルにおいて、政府、非営利組織、ボランティア、民間団体が、どのような役割を担い、計画を実行するのかを示している。
- 責任の所在、スケジュール、資金源を明確にした実施計画を示している。
- さまざまな戦略を組み合わせている。さまざまな戦略とは、個人的、社会的、文化的、物理的環境要因に影響を及ぼすもので、安全でかつ楽しめるやり方によって、個人と地域に対して、情報提供、動機づけ、行動変容支援を行うものである。
- 科学的根拠に基づいた「身体活動と健康」のガイドラインを採用している。

2. 身体活動を支援する施策の導入

政府や社会において持続可能な変化を達成するためには、施策の枠組みと規制が必要である。身体活動を支援する施策は、国および地域レベルで必要である。施策と規制の例を以下に示す：

- 身体活動を「どのくらい」、「いつまでに」増加させるかという目標を伴った明確な国家施策。全部門が目標を共有し、自らの役割を明確にする。
- 歩行、自転車、公共交通の利用、スポーツ・レクリエーションを支援する都市計画・都市設計の方針および指針。これらは特に公平なアクセスと安全性に配慮する必要がある。
- 身体活動の参加を推進するための補助金、インセンティブ、課税軽減といった財政政策。たとえば、身体活動施設やクラブ会員資格に関する税制上の優遇措置。
- 身体活動推進のためのインフラおよびプログラムを支援し、活動的な通勤を推進する職場政策。



- Education policies that support high quality compulsory physical education, active travel to school, physical activity during the school day and healthy school environments;
- Sport and recreation policy and funding systems that prioritise increased community participation by all members of the community;
- Advocacy to engage the media to promote increased political commitment to physical activity. For example, 'Report Cards' or civil society reports on the implementation of physical activity action to increase accountability;
- Mass communication and social marketing campaigns to increase community and stakeholder support for physical activity action.

3. REORIENT SERVICES AND FUNDING TO PRIORITISE PHYSICAL ACTIVITY

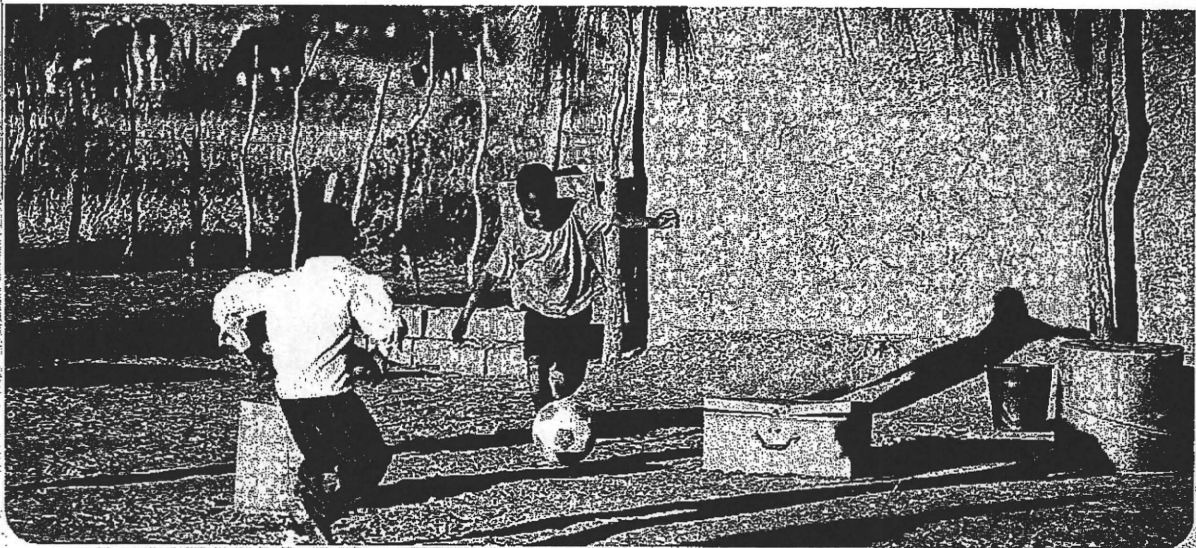
In most countries, successful action to promote physical activity will require a reorientation of priorities in favour of health enhancing physical activity. Reorienting services and funding systems can deliver multiple benefits including better health, cleaner air, reduced traffic congestion, cost saving and greater social connectedness. Examples of actions underway in many countries include:

In education:

- Education systems that prioritise high-quality compulsory physical education curriculum with an emphasis on non competitive sports in schools and enhancing physical education training for all teachers;
- Physical activity programs that focus on a range of activities that maximise participation regardless of skill level and that focus on enjoyment;
- Opportunity for students to be active during class, in breaks, at lunch time and after school.

In transportation and planning:

- Transport policies and services, that prioritise and fund, walking, cycling and public transit infrastructure;
- Building codes that encourage or support physical activity;
- Trails in national parks and preserved areas to increase access.



- 質の高い体育授業の必修化、活動的な通学、学校内の身体活動、健康的な学校環境を支援する教育政策。
- 地域住民全員が参加できることに重点を置いたスポーツ・レクリエーション政策と財源システム。
- 身体活動への政治的関与（コミットメント）を促進させるようにマスコミに働きかけること。例えば、説明責任を増すための、身体活動推進対策の実施状況に関する評価表や市民団体による報告書。
- 地域や関係者の身体活動支援を促すマスメディアおよびソーシャルマーケティングキャンペーン。

3. 身体活動に重点を置いたサービスと財源の新たな方向づけ

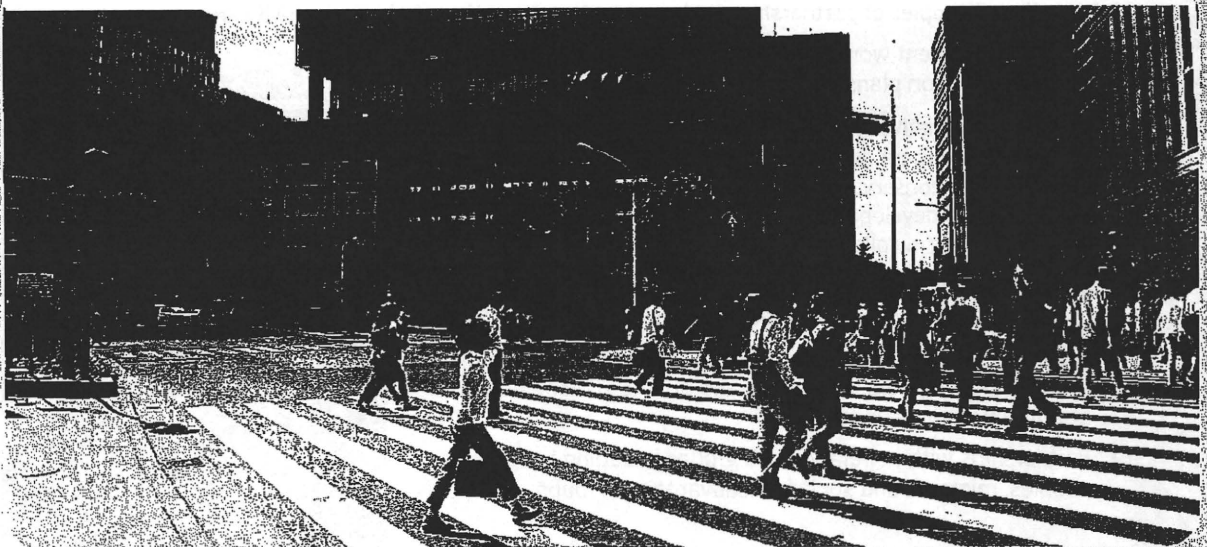
多くの国で、身体活動を推進するための対策を成功させるには、健康増進のための身体活動を支援するような優先順位の再設定が必要である。サービスや財源システムの方向づけを変えることにより、健康増進、きれいな空気、交通渋滞緩和、コスト削減、社会的つながりの強化などのいくつもの恩恵がもたらされる。多くの国で進行中の対策の例として、以下のようなものがある：

教育：

- 非競争スポーツを重視した質の高い必修体育や、すべての教師に対して体育授業のトレーニングを行うことに重点を置いた教育システム
- 技能のレベルに関係なく皆が参加できる、楽しさに焦点を当てた幅広い身体活動のプログラム
- 授業中、休み時間、昼休み、放課後に生徒が活動的になるための機会

交通計画：

- 歩行、自転車、公共交通のインフラに優先的に財源を投入する交通施策とサービス
- 身体活動を奨励し、支援する建築基準
- 国立公園や保護地区の利用を促進する遊歩道・自転車道の設置



In planning and environment:

- Evidence based urban design that support walking, cycling and recreational physical activity;
- Urban design that provides opportunities for sport, recreation and physical activity by increasing access to public space where people of all ages and abilities can be physically active in urban and rural settings.

In workplace:

- Workplace programs that encourage and support employees and their families to lead active lifestyles;
- Facilities that encourage participation in physical activity;
- Incentives for active commuting to work or by public transport rather than by car.

In sport, parks and recreation:

- Mass participation and sports for all, including those least likely to participate;
- Infrastructure for recreational activities across the life-course;
- Opportunities for individuals with disabilities to be physically active;
- Building capacity among those who deliver sport through increased training on physical activity.

In health:

- Greater priority and resourcing of prevention and health promotion including physical activity;
- Screening of patients/clients for levels of physical activity at every primary care consultation, and provision of brief, structured counselling and referral to community programs for insufficiently active patients;
- For patients with diseases/conditions such as diabetes, cardiovascular disease, some cancers or arthritis, screening by health and exercise professionals for contraindications and advice on physical activity as part of treatment, management and review plans.

4. DEVELOP PARTNERSHIPS FOR ACTION

Actions aimed at increasing population-wide participation in physical activity should be planned and implemented through partnerships and collaborations involving different sectors, and communities themselves, at national, regional and local levels. Successful partnerships are developed by identifying common values and program activities and by sharing responsibilities, accountabilities and information. Examples of partnerships that support the promotion of physical activity are:

- Cross-government working groups at all relevant levels to implement action plans;
- Community initiatives involving different government departments and non government agencies (for example: transport, urban planning, arts, conservation, economic development, environmental development, education, sport and recreation, and health) working in collaboration and sharing resources;
- Coalitions of non government organisations formed to advocate to governments for the promotion of physical activity;
- National, regional or local partnership forums with key agencies from multiple sectors, and public and private stakeholders to promote programs and policies;
- Partnerships with population sub groups including indigenous peoples, migrants and socially disadvantaged groups.



都市計画と環境：

- 科学的根拠に基づく歩行、自転車、余暇身体活動を支援する都市設計
- あらゆる人（年齢や障がいの有無にかかわらず）が身体活動できる場所へのアクセスを高め、スポーツ、レクリエーション、身体活動の機会を提供するような都市設計

職場：

- 従業員やその家族が活動的なライフスタイルを送ることを奨励、支援する職場プログラム
- 身体活動への参加を推進する施設
- 活動的な通勤、または車ではなく公共交通による通勤のためのインセンティブ

スポーツ、公園、レクリエーション：

- 参加しそうな人々を含めて、多くの人々が参加するみんなのためのスポーツ
- 幅広い年齢層が使えるレクリエーションのためのインフラ
- 障がい者が活動的になれる機会
- スポーツ指導者に対して、身体活動に関するトレーニングを行い、能力を高めること

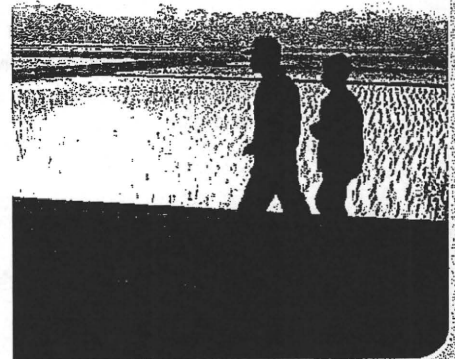
健康：

- 疾病予防と健康増進（身体活動を含む）の優先順位を高め、資源を整備すること
- プライマリケアにおける患者を対象に身体活動レベルのスクリーニングを実施し、身体活動が不足している患者に対して簡便で構造化されたカウンセリングを提供したり、地域プログラムを紹介したりすること
- 糖尿病、循環器疾患、一部のがん、関節炎などの疾病を有する患者について、医療従事者および運動指導者による身体活動禁忌（適否）のスクリーニング、疾病治療・管理の一部として実施する身体活動に関する助言を行うこと

4. 対策のためのパートナーシップの構築

国民全体の身体活動推進を目的とした対策は、国と地域レベルで、様々な部門と地域社会を取りこんだ形で、またパートナーシップと協力関係を構築する形で、計画され実行されるべきである。良好なパートナーシップは、共通の価値観とプログラム活動を見出し、果たすべき役割、責任および情報を共有することによって構築される。身体活動推進を支援するパートナーシップの例は以下のとおりである。

- 行動計画の実行を目的としたすべてのレベルにおける政府内ワーキンググループ
- さまざまな政府部門と非政府機関（たとえば、交通、都市計画、芸術、保全、経済開発、環境開発、教育、スポーツ・レクリエーション、健康）が協力し、資源を共有する地域での取り組み
- 身体活動促進を政府・自治体に呼びかけるために結成された非政府組織（NGO）の連携
- プログラムや政策を推進するための、多分野の公共・民間の主要機関の関係者による全国、地方レベルでの情報交換の場
- 先住民、移民、社会的弱者などの特定集団との連携



A call to action

A strong body of science supports the benefits of physical activity for health, the economy and the environment. To achieve a greater commitment to increasing physical activity around the world there is an urgent need for clear direction and strong advocacy. The *Toronto Charter for Physical Activity* outlines four actions based upon nine guiding principles. Implementation of the Toronto Charter will provide a solid foundation and direction for health enhancing physical activity in all countries.

We encourage all interested stakeholders to support the adoption and implementation of the *Toronto Charter for Physical Activity* and to engage in one or more of the following actions:

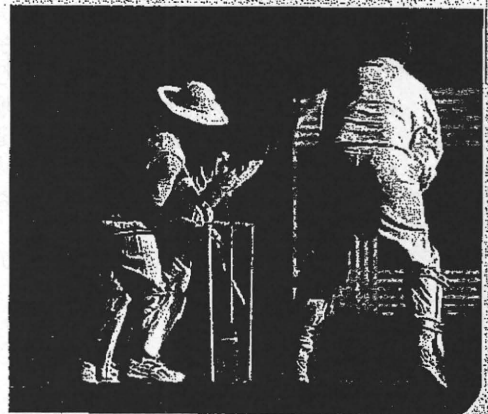
1. Show your agreement with the four areas for action and nine guiding principles by registering your support of the *Toronto Charter for Physical Activity*;
2. Send a copy of the *Toronto Charter for Physical Activity* to at least five of your colleagues and encourage them to do the same;
3. Meet with decision makers in different sectors to discuss how national plans and policy action following the guiding principles of the *Toronto Charter for Physical Activity* might positively influence action across sectors;
4. Mobilise networks and partnerships all sectors to support and implement the Toronto Charter.

In turn, members of the Global Advocacy Council for Physical Activity commit to the following actions:

- Translate the final version of the *Toronto Charter for Physical Activity* into French, Spanish and possibly other languages;
- Disseminate the final version of the *Toronto Charter for Physical Activity* widely;
- Work with physical activity networks and other stakeholder organisations to further mobilise governments and decision makers throughout the world to increase commitment towards the promotion of health enhancing physical activity;
- Continue to partner with other groups and organisations in order to advocate for health enhancing physical activity throughout the world.

For links to supporting resources and to directly forward the Toronto Charter for Physical Activity to colleagues please visit:
www.globalpa.org.uk

Global Advocacy Council for Physical Activity,
International Society for Physical Activity and Health.
The *Toronto Charter for Physical Activity: A Global Call to Action*.
www.globalpa.org.uk.
May 20, 2010.



行動の呼びかけ

身体活動の健康、経済、環境に対する恩恵は、強い科学的根拠に裏づけられている。世界中で身体活動推進のための取り組みを拡大するために、明確な方向づけと力強い呼びかけ（アドボカシー）が急務である。身体活動のトロント憲章は、9つの指針（guiding principle）に基づく4つの行動（対策）の概要を示している。トロント憲章を実行することで、あらゆる国における健康増進のための身体活動についての確固とした基盤と方向性を得ることができる。

興味・関心のある全ての関係者は、**身体活動のトロント憲章の採用と実行を後押しし**、以下の行動の中から一つ以上の行動を行っていただきたい。

1. 身体活動のトロント憲章への支持を表明し、4つの行動と9つの指針に同意を示す。
2. 身体活動のトロント憲章のコピーを少なくとも5人の同僚に送付し、同様に支持してもらうよう依頼する。
3. 様々な部門の政策決定者と会い、**身体活動のトロント憲章の原則に基づく国家計画や政策活動が、諸部門の活動に好影響を与えることを伝える。**
4. トロント憲章を支持し、実行するために、あらゆる部門のネットワークとパートナーシップを活用する。

「**Global Advocacy Council for Physical Activity**（注）」のメンバーは以下の行動に取り組んでいる。

- 身体活動のトロント憲章をフランス語、スペイン語のほか、可能な限り他の言語に翻訳する。
- 身体活動のトロント憲章を広く普及する。
- 身体活動推進ネットワークおよびその他の関係者組織と協働して、健康増進のための身体活動を推進するための取り組みの強化に向けて、世界中の政府と政策決定者に働きかける。
- 世界中で健康増進のための身体活動を支援するために、他の団体や組織との連携を継続する。

（注）Global Advocacy Council for Physical ActivityはInternational Society of Physical Activity and Healthに設置された協議会の一つです。

身体活動のトロント憲章および関連する情報源へのリンクは

www.globalpa.org.uk
を参照して下さい。

引用: Global Advocacy Council for Physical Activity, International Society for Physical Activity and Health. The Toronto Charter for Physical Activity: A Global Call to Action. www.globalpa.org.uk. May 20 2010.



Article

Perceived Environmental Factors Associated with Physical Activity among Normal-weight and Overweight Japanese Men

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Received: 26 January 2011; in revised form: 3 March 2011 / Accepted: 22 March 2011 /

Published: 28 March 2011

Abstract: Although it is crucial to examine the environmental correlates of physical activity (PA) for developing more effective interventions for overweight populations, limited studies have investigated differences in the environmental correlates on body mass index (BMI). The purpose of the present study was to examine the perceived environmental correlates of PA among normal-weight and overweight Japanese men. Data were analyzed for 1,420 men (aged 44.4 ± 8.3 years), who responded to an internet-based cross-sectional survey of answering the short version of the International Physical Activity Questionnaire and its Environment Module. Binary logistic regression analyses were utilized to examine the environmental factors associated with meeting the PA recommendation (150 minutes/week) between the normal-weight and overweight men. After adjusting for socio-demographic variables, common and different environmental

correlates of PA were observed among normal-weight and overweight men. Furthermore, significant interactions regarding PA were observed between BMI status and two environmental correlates: access to public transportation ($P = 0.03$) and crime safety during the day ($P = 0.01$). The results indicated that BMI status is a potential moderator between perceived environmental factors and PA and suggested that different environmental intervention approaches should be developed for overweight populations.

Keywords: BMI; overweight; moderator; perceived environment; walking; moderate-to-vigorous physical activity; physical activity recommendation; Japan

1. Introduction

Overweight and obesity are associated with an increased risk of morbidity from chronic diseases, as well as with higher health-care costs and lower quality of life [1-4]. An increasing prevalence of obesity has been reported in Western countries, and in those countries, the groups with higher risk of obesity varied by age, gender, and race/ethnicity [5-7]. Compared to the U.S. (where the prevalence of obesity is approximately 30%), the prevalence of obesity in Japan is much lower (approximately 3%) and has changed little during the last 40 years [8,9]. However, more recently, the prevalence of overweight adults in Japan has grown to 28.6% in men and 20.6% in women, and men aged 40–49 years had the highest percentage (35.9%) [10]. Therefore, with regard to the obesity epidemic, identifying effective, population-based strategies for preventing weight gain would be a public health priority, not only in Western countries, but also in Japan.

Numerous longitudinal and cross-sectional studies have shown that engaging in physical activity (PA) is beneficial for the prevention of obesity and overweight [11-16]. Based on these findings, the World Health Organization has recommended engaging almost daily in at least 30 minutes of moderate-intensity PA for the prevention of obesity and other chronic diseases [5,17]. Despite such a benefit, overweight and obese individuals spent less time on PA and were less likely than normal-weight individuals to meet the minimum recommended level of PA [moderate-to-vigorous PA (MVPA) at least 30 minutes per day, 5 or more days per week; ≥ 150 minutes per week] [12-16]. Therefore, developing effective strategies to promote PA to overweight and obese subgroups is needed to prevent further increases in the obesity rate among populations.

A better understanding of factors associated with PA is critical in designing relevant policies and effective interventions. From an ecological perspective, the manipulation of environmental attributes would be expected to provide a long-term impact on the PA of an associated population [18,19]. In this context, the association between environmental factors and PA behaviors has been reported in many countries [20]. However, many of these previous studies have been conducted in general populations [20,21]. Recent studies have suggested that environmental factors associated with PA differ between socio-demographic subgroups, such as men and women [22,23], older and younger adults [24], African-American and white adults [25], and driving and non-driving rural women [26]. In addition to these differences, BMI status has been also suggested as a potential moderator for the correlates of PA [27]. It is important to examine the factors associated with engaging in PA in the

overweight subgroup to develop more tailored intervention strategies. However, to date only a Portuguese study has examined the environmental dimensions associated with meeting the PA recommendation among overweight/obese women [22], although previous studies have consistently observed gender differences in environmental correlates [22,28]. Thus, the present study examined the differences in perceived environmental factors associated with PA among normal-weight and overweight Japanese men.

2. Methods

2.1. Participants

An internet-based cross-sectional survey was conducted in January 2009 by a Japanese internet research service organization, which listed approximately 264,000 voluntarily registered subjects across Japan and their detailed socio-demographic attributes. Thus, the organization could access data from the targeted group on the basis of the requirements of each survey. In the current study, the sample size and personal attributes of the targeted group was set as follows: (1) approximately 3,000 adults aged between 30 and 59 years. (2) 500 men and 500 women in each age group (aged 30–39, 40–49, and 50–59 years). A total of 9,418 potential respondents, aged 30–59 years, were randomly selected from the database and invited to attend this internet-based survey via email (final respondents: 3,000 adults; response rate: 31.9%). The email invitations included the URL for access to this survey, and the potential respondents could log in using their own ID and password to answer the questionnaire voluntarily. The present study received prior approval from the Ethics Committee of the Faculty of Sports Sciences, Waseda University, Japan.

2.2. Measures

BMI: Self-reported height and weight were used to calculate the body mass index (BMI; body weight in kilograms divided by the square of height in meters). The participants were classified as normal-weight men (BMI < 25) and overweight men (BMI ≥ 25) in the present study.

Physical activity: Physical activity was measured by the self-administered, short version of the International Physical Activity Questionnaire (IPAQ-SV), which was recommended for the national prevalence studies [29]. IPAQ-SV, which includes seven items, was used to measure the frequency and duration of vigorous-intensity PA, moderate-intensity PA, and walking level for young and middle-aged adults (15–69 years). The test-retest reliability ($r = 0.72–0.93$) and criterion validity ($r = 0.39$) of the Japanese version of the IPAQ-SV are good and acceptable [30]. The total minutes of each PA category in a week were first computed. In the present study, two independent variables, the total minutes of walking and MVPA (excluding walking), were calculated. MVPA (excluding walking) was computed by summing the minutes per week of moderate- and vigorous-intensity PA time in the IPAQ-SV. Both walking and MVPA excluding walking were dichotomized at 150 minutes or more per week according to the public health PA recommendation [31]. In each variable, the respondents could be categorized into two groups: either meeting the recommended level or not.

Perceived environmental factors: The Japanese version of the International Physical Activity Questionnaire-Environmental Module (IPAQ-E) was utilized to measure the perceived environmental

factors associated with PA. The IPAQ-E questionnaire was originally developed by the International Physical Activity Prevalence Study (IPS), has been used in several countries, and has shown good reliability [18,32-34]. This self-administered questionnaire consists of three sets of items, which include seven core items, four recommended items, and six optional items [35]. In this study, all 17 items were included using a 4-point Likert scale (strongly agree, somewhat agree, somewhat disagree, and strongly disagree), with the exception of the following two questions: (1) *What is the main type of housing in your neighborhood?* For this question, the five options were detached single-family housing; apartments with 2–3 stories; mix of single-family housing and apartments with 2–3 stories; condos with 4–12 stories; and condos with >13 stories. (2) *How many household cars or auto bikes are there at your household?* This question was open ended.

For the analyses, similar to previous studies [18,36], the 17 environmental variables were converted into binary items. Residential density was divided into “detached single-family housing” and “others”, and having household car or auto bikes was classified into “0” and “>0”. Other items were categorized as “agree” (strongly agree and somewhat agree) and “disagree” (somewhat disagree and strongly disagree).

Socio-demographic variables: In the present study, socio-demographic correlates included gender, age, marital status, educational level, household income, and employment status. Age was categorized as 30–39, 40–49, and 50–59 years. Marital status was classified into married and unmarried. Educational level was divided into three categories: less than high school graduate, junior college graduate or equivalent, and college graduate or higher. Household income was categorized as less than 5 million yen, 5–10 million yen, and >10 million yen. Employment status was classified into full-time job and not full-time job.

2.3. Statistical Analyses

The data were analyzed from 1,420 men who provided complete information for study variables. All analyses were stratified by BMI. Forced-entry adjusted logistic regression for gender, age, marital status, educational level, household income, and employment status was conducted to examine the association between environmental factors and meeting the PA recommendation. Adjusted odd ratios (ORs) and 95% confidence intervals (CI) were calculated for each variable. Likelihood ratio tests were used to compare models with or without interaction terms between environmental variables and BMI status. Inferential statistics were performed using SPSS 15.0, and the level of significance was set at $p < 0.05$.

3. Results

3.1. The Characteristics of the Participants

Table 1 presents the basic characteristics of the participants (mean age was 44.4 ± 8.3 years). Of all respondents, 31.1% were overweight, 70.4% were married, 64.4% had an education level of 4-year college/graduate school, 92.0% had full-time jobs, and 49.7% had a household income between 5,000,000 yen and 10,000,000 yen. The prevalence of achieving the PA recommendation (the sum of walking and other MVPA times) was 57.4% in the present study.

Table 1. Basic characteristics of all respondents stratified by normal-weight and overweight men.

	Total sample N = 1,420		Normal weight N = 979 (68.9%)		Overweight N = 441 (31.1%)		X ²	p
	N	%	N	%	N	%		
Age group							3.43	0.18
30–39	475	33.4	338	34.5	137	31.1		
40–49	474	33.4	312	31.9	162	36.7		
50–59	471	33.2	329	33.6	142	32.2		
Mean age (± SD)	44.4 ± 8.3							
Marital status							0.03	0.86
Married	1,000	70.4	688	70.3	312	70.7		
Unmarried	420	29.6	291	29.7	129	29.3		
Educational level							2.04	0.36
Junior high/high school	330	23.2	219	22.4	111	25.2		
2-year college	176	12.4	118	12.1	58	13.2		
4-year college/ graduate school	914	64.4	642	65.5	272	61.6		
Job status							0.09	0.77
full-time job	1,306	92.0	899	91.8	407	92.3		
not full-time job	114	8.0	80	8.2	34	7.7		
Household income							2.46	0.65
<5,000,000 yen	488	34.4	343	35.0	145	32.9		
<10,000,000 yen	706	49.7	481	49.1	225	51.0		
>10,000,000 yen	226	15.9	155	15.9	71	16.1		

SD = standard deviation.

3.2. Perceived Environmental Factors Associated with Walking and MVPA (Excluding Walking) among Men

Table 2 shows the results of the adjusted logistic regression analysis in walking and MVPA (excluding walking) among normal-weight and overweight men. Ten significant environmental correlates of walking in normal-weight men and three in overweight men were observed. For normal-weight men, good access to shops (OR = 1.61; 95% CI: 1.24–2.10), good access to public transport (OR = 2.30; 95% CI: 1.57–3.38), good access to recreational facilities (OR = 1.42; 95% CI: 1.09–1.84), seeing people being active (OR = 1.49; 95% CI: 1.15–1.94), aesthetics (OR = 1.74; 95% CI: 1.33–2.29), street connectivity (OR = 1.48; 95% CI: 1.11–1.98), good maintenance of sidewalks (OR = 1.49; 95% CI: 1.14–1.94), good maintenance of bike lanes (OR = 1.58; 95% CI: 1.22–2.04), and presence of destination (OR = 1.61; 95% CI: 1.24–2.10) were significantly associated with engaging in 150 minutes of walking per week. However, having household cars or auto bikes (OR = 0.60; 95% CI: 0.41–0.88) was inversely associated with walking in normal-weight men. For overweight men, environmental factors associated with engaging in 150 minutes of walking per week were good access to recreational facilities (OR = 1.75; 95% CI: 1.18–2.58) and presence of destination (OR = 1.63; 95% CI: 1.10–2.41). Furthermore, lack of

safety from crime during the day (OR = 0.48; 95% CI: 0.24–0.94) was negatively related to engagement in 150 minutes of walking per week.

Forced-entry, adjusted logistic regression analyses also indicated that connectivity of streets (OR = 1.45; 95% CI: 1.04–2.03) was a positive environmental factor associated with engaging in MVPA (excluding walking) for 150 minutes or more per week for normal-weight men. On the other hand, seeing people being active (OR = 2.27; CI: 1.38–3.75) was positively associated with engaging in MVPA (excluding walking) at the recommended level for overweight men.

Table 2. Adjusted model of perceived environmental factors associated with walking and MVPA (excluding walking) among normal-weight and overweight men.

	Normal weight (N = 979, 68.9%)				Overweight (N = 441, 31.1%)			
			Walking	MVPA (excluding walking)			Walking	MVPA (excluding walking)
	N	%	Adjusted OR (95% CI)	Adjusted OR (95% CI)	N	%	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Residential density								
High	432	44.1	1.15 (0.89–1.50)	0.77 (0.57–1.03)	180	40.8	1.39 (0.94–2.07)	0.80 (0.49–1.29)
Low	547	55.9	1.00	1.00	261	59.2	1.00	1.00
Access to shops								
Good	553	56.5	1.61 (1.24–2.10)*	1.21 (0.90–1.63)	256	58.0	1.15 (0.78–1.70)	1.31 (0.81–2.11)
Poor	426	43.5	1.00*	1.00	185	42.0	1.00	1.00
Access to public transport								
Good	817	83.5	2.30 (1.57–3.38)*	1.23 (0.82–1.84)	360	81.6	1.17 (0.71–1.91)	1.28 (0.69–2.37)
Poor	162	16.5	1.00*	1.00	81	18.4	1.00	1.00
Presence of sidewalks								
Yes	604	61.7	1.29 (0.98–1.68)	1.04 (0.77–1.40)	267	60.5	1.43 (0.96–2.12)	0.93 (0.58–1.49)
No	375	38.3	1.00	1.00	174	39.5	1.00	1.00
Presence of bike lanes								
Yes	242	24.7	1.12 (0.83–1.51)	1.09 (0.78–1.52)	127	28.8	1.30 (0.85–1.99)	0.74 (0.43–1.26)
No	737	75.3	1.00	1.00	314	71.2	1.00	1.00
Access to recreational facilities								
Good	482	49.2	1.42 (1.09–1.84)*	1.29 (0.96–1.72)	221	50.1	1.75 (1.18–2.58)*	1.54 (0.96–2.47)
Poor	497	50.8	1.00*	1.00	220	49.9	1.00*	1.00
Crime safety at night								
Not safe	237	24.2	0.87 (0.64–1.17)	1.07 (0.77–1.49)	116	26.3	0.80 (0.52–1.25)	1.17 (0.70–1.95)
Safe	742	75.8	1.00	1.00	325	73.7	1.00	1.00
Traffic safety								
Not safe	354	36.2	1.16 (0.89–1.51)	1.03 (0.77–1.39)	159	36.1	1.06 (0.71–1.58)	1.20 (0.74–1.93)
Safe	625	63.8	1.00	1.00	282	63.9	1.00	1.00
Seeing people being active								
Yes	535	54.6	1.49 (1.15–1.94)*	1.32 (0.98–1.77)	250	56.7	1.41 (0.95–2.09)	2.27 (1.38–3.75)**
No	444	45.4	1.00*	1.00	191	43.3	1.00	1.00**
Aesthetics								
Yes	351	35.9	1.74 (1.33–2.29)*	1.29 (0.96–1.74)	149	33.8	1.14 (0.76–1.71)	1.28 (0.79–2.07)
No	628	64.1	1.00*	1.00	292	66.2	1.00	1.00

Table 2. Cont.

	Normal weight (N = 979, 68.9%)				Overweight (N = 441, 31.1%)			
	N	%	Walking	MVPA (excluding walking)	N	%	Walking	MVPA (excluding walking)
			Adjusted OR (95% CI)	Adjusted OR (95% CI)			Adjusted OR (95% CI)	Adjusted OR (95% CI)
Connectivity of streets								
Yes	700	71.5	1.48 (1.11–1.98)*	1.45 (1.04–2.03)**	321	72.8	1.05 (0.68–1.62)	0.79 (0.48–1.32)
No	279	28.5	1.00*	1.00**	120	27.2	1.00	1.00
Maintenance of sidewalks								
Good	555	56.7	1.49 (1.14–1.94)*	1.10 (0.82–1.47)	256	58.0	1.11 (0.75–1.64)	0.82 (0.51–1.30)
Poor	424	43.3	1.00*	1.00	185	42.0	1.00	1.00
Maintenance of bike lanes								
Good	479	48.9	1.58 (1.22–2.04)*	1.14 (0.85–1.52)	216	49.0	1.01 (0.69–1.48)	0.90 (0.57–1.43)
Poor	500	51.1	1.00*	1.00	225	51.0	1.00	1.00
Traffic safety for bicyclists								
Not safe	427	43.6	0.96 (0.74–1.24)	0.89 (0.67–1.19)	192	43.5	1.16 (0.79–1.71)	0.92 (0.57–1.47)
Safe	552	56.4	1.00	1.00	249	56.5	1.00	1.00
Crime safety during the day								
Not safe	106	10.8	1.45 (0.96–2.18)	1.10 (0.69–1.74)	46	10.4	0.48 (0.24–0.94)*	0.88 (0.41–1.92)
Safe	873	89.2	1.00	1.00	395	89.6	1.00*	1.00
Presence of destination								
Yes	511	52.2	1.61 (1.24–2.10)*	1.12 (0.83–1.50)	247	56.0	1.63 (1.10–2.41)*	1.22 (0.76–1.96)
No	468	47.8	1.00*	1.00	194	44.0	1.00*	1.00
Household car or auto bikes								
One or more	845	86.3	0.60 (0.41–0.88)*	1.43 (0.91–2.26)	394	89.3	0.54 (0.28–1.02)	1.56 (0.66–3.69)
None	134	13.7	1.00*	1.00	47	10.7	1.00	1.00

Adjusted for age, marital status, educational level, household income, and employment status.

*, ** statistically significant ($p < 0.05$).

Furthermore, significant interactions regarding walking were observed between BMI status and 2 environmental correlates: access to public transport ($P = 0.03$) and crime safety during the day ($P = 0.01$) (Table 3).

Table 3. Significance of interactions between BMI status and environmental variables by binary logistic regression models.

	P value for interaction term with BMI status	
	Walking	MVPA (excluding walking)
	P value	P value
Residential density (High)	0.46	0.66
Access to shops (Good)	0.16	0.83
Access to public transport (Good)	0.03**	0.94
Presence of sidewalks (Yes)	0.75	0.60
Presence of bike lanes (Yes)	0.67	0.19
Access to recreational facilities (Good)	0.31	0.52