Encouraging children and adolescents to be more active

Well evaluated complex interventions are still needed

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Physically active children and adolescents are at reduced risk of developing risk factors for cardiovascular disease,[1] and they are likely to have enhanced mental and emotional wellbeing.[2] However, as with other developed countries, in the United Kingdom, three out of 10 boys and four out of 10 girls are estimated not to take the recommended 60 minutes each day of moderate to vigorous intensity physical activity.[3] This is important, because in 2003, 28% of children in the UK were estimated to be overweight or obese.[4]

In this week's *BMJ*, Van Sluijs and colleagues report a systematic review of interventions to promote physical activity in children and adolescents.[5] The review found weak or inconclusive evidence for the effectiveness of strategies to promote children's physical activity. It confirmed lessons from tobacco control[6]—that at least in adolescents the most effective interventions have many components and are undertaken in multiple settings (school, home, and community).

Randomised controlled trials that focus mainly on education are not sufficient to change behaviour and sustain such changes. This is irrespective of whether interventions target children, adolescents, or parents; low or high socioeconomic groups; or whether they are conducted at school or in the community. Effective interventions are generally those that educate as well as facilitate physical activity by providing opportunities and supportive environments at school, at home, and in the community.

Close examination of the review's findings[5] suggests that it is not all "doom and gloom," however. More than two thirds of the interventions had a positive effect, and just under half had a significant effect. This is despite the use of, at times, crude self reporting or proxy reporting of physical activity.

A recent narrative review of physical activity interventions in children and adolescents found that 64% of studies (n=25) that used an objective measure of physical activity reported significant effects compared with only 38% of studies (n=66) that used survey measures.[7] This highlights the need to incorporate valid and responsive (sensitive to change) objective measures of physical activity in intervention trials, particularly in studies of children.

Van Sluijs and colleagues' review also highlights the importance of incorporating a thorough evaluation of the intervention process, which should include measures of fidelity, dose (delivered and received), reach, recruitment, and context. Without this information, it is difficult to determine why an intervention succeeded or failed.

The review[5] identifies many gaps in our knowledge about the most effective strategies for promoting physical activity in young people. The authors question whether it is worth pursuing interventions that target boys and girls separately, ethnic minority populations, or those that attempt to change the environment or are delivered via the family or community settings. However, most of the interventions reviewed provided education alone, and these interventions are seldom effective. Moreover, few intervention studies have examined the moderating effects of sex, socioeconomic status, or other potentially important factors. Only five studies reviewed focused on environmental interventions. The mediators of change in physical activity behaviour are also rarely assessed or even targeted in interventions to promote physical activity in children. Overall, most interventions reviewed were delivered in schools—very few in other settings—and most involved only education. This suggests that at this stage, there is a lack of available evidence upon which to draw conclusions rather than evidence of a lack of efficacy for interventions targeting subgroups or conducted in various settings.

Future interventions must include parents and families. The review[5] confirms findings from previous reviews[7]—that school based interventions that involve families are more likely to be effective than those that do not. Parents are the gatekeepers of children's physical activity and facilitate adolescents' physical activity by providing transport to recreational activities.[8] They also have an important influence on children's sedentary behaviours.[9] Hence, more interventions delivered in the family setting to promote young people's physical activity are needed.

Several potentially important physical activity behaviours were not explored in the review. Encouraging active transport is one way to increase overall levels of physical activity.[10] This approach also has potential environmental and social benefits. About 20% of all car journeys during the weekday morning rush hour in the UK are thought to be short journeys undertaken by parents taking children to school.[11] Children's independent mobility is greatly influenced by traffic and parents' real and perceived concerns about safety. Thus, creating environments that support local walking and cycling is a priority. More research is needed for a better understanding of the social and physical environmental determinants of young people's active transport.

There has been considerable debate about the limitations of randomised controlled trial designs in complex interventions[12] and for complex behaviours.

Some people argue that randomised controlled trials of interventions undertaken in microsettings have little relevance for practitioners who need to deliver population-wide effects.[6] This view was partly supported by van Sluijs and colleagues' review,[5] which found multicomponent interventions more effective in adolescents. Thus, despite the methodological challenges posed, more trials of complex interventions are needed.

Importantly, the interventions themselves need to be subjected to the same level of scrutiny as the study design when assessed for funding and publication, and in systematic reviews. Reviewers need to consider whether the proposed "dose" of intervention is sufficient to produce an effect and how fidelity with the proposed protocol will be (or was) assessed (for example, process evaluation). They also need to consider whether adequate formative research was undertaken or proposed, to ensure that the intervention is suited to the target group and the setting, whether the intervention is based on theory, and whether it included efforts to create a supportive physical or social environment (or both). All of these factors will contribute to the effectiveness of interventions.

In the wake of the obesity epidemic, promising multicomponent interventions need to be disseminated, while the evidence base continues to be built. High quality adequately funded evaluation of programmes based on best practice principles is also needed. Given the complexities involved, partnerships between academics and practitioners are essential.

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Occlusion therapy for amblyopia

Electronic monitoring of compliance shows that prescribing longer periods of occlusion is not always better

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Amblyopia affects about 3-5% of the population. Occlusion therapy using an eye patch to cover the non-amblyopic eye for a couple of hours each day has been the principal means of treatment. The sensitive period in which vision loss can develop and be recovered is generally up to 6 years of age.[1] In many European countries, population based screening and treatment by orthoptists has reduced the proportion of people with untreated or insufficiently treated amblyopia to about 1% of the population.[2 3]

The effectiveness of screening and treatment for amblyopia in the United Kingdom has been questioned because of insufficient evidence from randomised controlled trials,[4] and an effort is now being made to assess its effectiveness and cost. In this week's *BMJ*, a randomised controlled trial by Stewart and colleagues compares the effect of prescribing six or 12 hours of occlusion each day in 97 children with amblyopia associated with strabismus, anisometropia, or both.[5] It is the first randomised controlled trial to investigate the relation between the duration of occlusion and visual acuity, and so it greatly contributes to our understanding of the effectiveness of occlusion therapy.

The potential costs that screening and treatment could save in cases where vision in the better eye is lost can be calculated: when amblyopia is insufficiently treated, the duration of bilateral visual impairment (visual acuity 6/12 or less—not being able to read) in later life is 0.6 years longer than in people without amblyopia (average of 1.3 *v* 0.7 years).[6] For example, if 1% of the Dutch population had insufficiently treated amblyopia, 1800 people would be at risk each year for bilateral visual impairment. If a visually impaired person costs society €5000 (£3500; $7000), a conservative estimate, a minimum of €5.4m could be saved annually in the Netherlands. Adding to this, the remaining patients with insufficiently treated amblyopia, who do not lose vision in their better eye, have slightly reduced quality of life.[7]

The main cause of insufficiently treated amblyopia is poor compliance.[8 9] Electronic monitoring of compliance with occlusion therapy is now possible with the occlusion dose monitor.[10] Previous studies using this monitor found that compliance averaged 50%,[8] even though parents knew that compliance was being monitored. Median compliance is 70%, but a considerable number of children do not occlude at all. The most important non-clinical predictor for poor compliance

is poor fluency in the national language. This can be remedied by giving information aimed primarily at the child.[11]

Few guidelines exist when prescribing occlusion therapy. Age, visual acuity, and, to a lesser extent, the cause of amblyopia (strabismus, or anisometropia, or both) seem to be important determinants when prescribing a certain number of hours. Electronic monitoring now allows a precise assessment of the relation between the duration of occlusion and the increase in visual acuity.

The study by Stewart and colleagues found no significantly different increase in visual acuity between children who were prescribed six hours of occlusion each day and those who were prescribed 12 hours. The beneficial effect of wearing glasses was analysed separately. Surprisingly, however, the six hour group had occluded on average 4 hours a day (standard deviation 1.7) and the 12 hour group on average 6 hours a day (4.1). The study confirmed that older children need more hours of occlusion each day—common knowledge among orthoptists.[8] Children younger than 4 years needed less occlusion (less than three hours a day) than children older than 6 (who needed three to six hours). Occluding for six hours or more each day marginally improved acuity, even in older children. A greater number of occlusion hours hastened the response but did not improve the final outcome.

Although the study was a randomised controlled trial, it was analysed on an "as treated" basis, which relates the outcome to the occlusion time actually received. However, poor initial visual acuity is the most important clinical predictor for poor treatment outcome. One reason for this is that children are less likely to accept the patch when visual acuity is low.

So what do these results mean for clinical practice? As Stewart and colleagues suggest, when evaluating compliance or a dose-response relation, compliance should be monitored electronically. Relying on patients' reports or diaries is not good enough. Their results also show that the perceived hardship of wearing a patch for 12 hours a day, imposed on the child and his or her parents, has a negative effect on compliance. Orthoptists and ophthalmologists are becoming increasingly aware that when compliance is faltering it may be better to prescribe fewer hours of occlusion if it means that their instructions are actually carried out.

All references are on bmj.com

Mental health in disaster settings

New humanitarian guidelines include the needs of people with severe mental disorders

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Guidelines on mental health and psychosocial support in emergency settings were launched in Geneva last week by the Inter-Agency Standing Committee (IASC).[1] They will provide guidance on protecting and promoting the mental and social wellbeing of all people affected by emergencies created by conflict or natural disasters. Among the many topics covered, the guidelines also give special attention to people with severe mental disorders in the community.

Mental disorders account for four of the 10 leading causes of disability worldwide.[2] Yet mental health is one of the most under-resourced specialties, and no country meets its mental health needs even when no emergency exists.[3] In emergencies, the proportion of people with severe mental disorders (such as psychosis or severely disabling moods, anxiety, and stress related disorders) is projected to be about 1% higher than the estimated baseline of 2-3%.[4] In a large emergency this can amount to thousands of people.

People with severe pre-existing mental disorders are particularly vulnerable.[5 6] A pre-existing disorder may be exacerbated by stressful events, by disrupted supplies of drugs, and by the lack of social support that previously sustained these people. Established traditional means of care, such as those provided by local spiritual healers, may not function. Patients in institutional care may be abandoned by the staff and the institution itself may be targeted, taken over, or destroyed. People with severe mental disorders may not understand the risk of remaining in their surroundings, or they may be abandoned by their families and communities. If they can be persuaded to escape, they may be chained, stoned, and exposed to life threatening situations in refugee camps. They are also without adequate care and protection because of a lack of drugs and trained staff. Stigma may cause families to hide a family member who is mentally ill, so the person is unable to speak for themself.

Community interventions for people with severe mental disorders in emergencies include assessing existing services and identifying those in need; building a relationship with healers and facilitating the use of supportive traditional healing methods where appropriate; ensuring sustainable supplies of psychotropic drugs; initiating rapid training and ongoing supervision for emergency primary healthcare staff; and establishing an accessible advertised service while avoiding the creation of parallel mental health services focused on specific diagnoses (such as post-traumatic stress disorder) or on narrow groups (such as widows). The service should provide basic biological and psychosocial interventions to relieve symptoms and restore function; educate and support existing carers; work with local community structures and groups to enable protection of people who are severely disabled by mental disorder; plan for the return home of any

displaced people; and collaborate with existing health services and authorities to create sustainable care.

These recommendations are described in one of the guidelines' 25 action sheets that describe the minimum interventions needed in numerous sectors during an emergency. The range of topics covered shows that mental health and psychosocial support in emergencies should be considered when providing education, water, shelter, food, and community support, as well as health care.

The guidelines were developed by a task force of representatives from 27 international governmental and non-governmental organisations, who consulted with experts from more than 100 non-governmental organisations, academic institutions, and professional organisations in English, French, Arabic, and Spanish.

The guidelines represent the first attempt at a global consensus on recommended practices by aid agencies. This is an advance from 1998, when the inability to achieve consensus meant that mental health was excluded from the first edition of the Sphere minimum standards for humanitarian response. (A brief standard on mental and social health was included in the last edition of Sphere.[7])

The guidelines include underlying core principles emphasising an approach that protects the human rights of all affected persons, treats them with equity, maximises their participation in the emergency response, emphasises building on local capacities, and takes the principle of "do no harm" as a point of departure. This is particularly important given the continuing limited quantitative evidence base for many of the mental health interventions introduced in disaster settings.[8 9]

The guidelines recognise that populations living through conflict and disaster are initially helped most by social interventions that deal with their basic needs, re-establish social networks, and allow them to restart their lives. These interventions should also incorporate humane, culturally appropriate supports for specific subpopulations, including protection and clinical care of people with severe mental illness. This holistic approach requires an integrated, multisectoral response, in contrast to the fragmentation of care that has characterised many emergencies in the past.[10] The challenge for agencies in the field is to work collaboratively to unite the different sectors involved in mental health and psychosocial support.

All references are on bmj.com

Reform of the coroner system and death certification

Legislation is expected next month

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Last year, the UK government published a draft bill to reform the coroner system in England and Wales.[1] The intention is to bring coroner reform legislation to parliament next month.

The draft bill proposed fewer and larger coroner districts, led by full time legally qualified coroners. A new office of chief coroner would improve consistency of practice between local coroners and deal with appeals. There would be a new emphasis on prompt and sensitive service to bereaved families, and both nationally and locally the new service would have its own medical advice.

In 2006, Baker and Cordner wrote an editorial in the *BMJ* on the government's approach.[2] They criticised the decision to leave responsibility for the appointment and support of coroners with local authorities and the failure to tackle reform of death certification, as recommended by both the Home Office review and the Shipman Inquiry.[3 4] These criticisms and others were made in a well researched and strongly argued report from the Parliamentary Select Committee on Constitutional Affairs.[5]

There are no indications of a government rethink on the continuing role of local authorities in the coroner service, but a recent consultation document from the Department of Health outlines important changes in death certification now proposed for England and Wales.[6] A uniform certification process would be introduced for all deaths, which would abolish the extra forms and processes currently needed for cremation. A new post of medical examiner would also be introduced. These examiners would be attached to the clinical governance teams of primary healthcare trusts and would scrutinise all deaths after the completion of a medical certificate of the cause of death by the treating doctor.

The medical examiner would have the power to authorise disposal of the body without waiting for registration of the death. Certification by single doctors in burial cases would cease, as would payment of private fees to doctors for the cremation certificates; instead, a fee would be payable in all cases to the medical examiner service. Medical referees at crematoriums would be abolished.

Medical examiners would be doctors with at least five years' full registration. No specialist background would be required—they would not need to be pathologists and perform autopsies as medical examiners in North America do. Before counter-certifying a death and authorising disposal of the body they would talk to the first certifier and see relevant parts of the care record.

They would train local doctors in death certification, audit local standards of death certification, and use information from the medical certificates of the cause of death to analyse local mortality trends. They might be part time, and might be co-located with

coroners to ensure proper liaison with them.

According to local preference they might also provide general medical advice to local coroners, and there might be a "professional line of accountability" between local medical examiners and the new national medical adviser to the chief coroner. They themselves would receive special training, the details of which are still to be worked out.

No substantial change seems envisaged in the medical certificate of the cause of death. Referrals to the coroner would usually be made by the treating doctor, but they could be made by the medical examiner. A separate consultation document from the Ministry of Justice proposing a new statutory duty on doctors and others to report deaths to the coroner proposes dropping the existing requirement that the certifying doctor should have seen the patient no more than 14 days before the death, or should view the body.[7]

Still absent from the government's proposals to date is anything on verifying the fact and recording the circumstances of death. No follow-up has been announced to recommendations by the Shipman Inquiry and the Home Office review that death should be verified in all cases by properly accredited and suitably skilled personnel, not necessarily doctors, who would also see the body.

Doctors and the public are unlikely to be happy with a process that—as described so far—would allow people to be buried or cremated without being seen in the final stage of life or after death by a doctor or other qualified health worker, and with no professional verification that the person is actually dead. And it is strange that responsibility for this aspect of the new system seems to lie with the Ministry of Justice rather than the health departments.

Another matter likely to prompt debate is the medical examiner's closeness to the National Health Service (NHS). A crucial defect in the present system is the lack of any independent means of ensuring that deaths that should be reported to the coroner are reported. The new medical examiners could fulfil this role. However, their close links to the NHS—in which most people receive their final care—may undermine perceptions of the post's independence.

The Department of Health's emphasis on the need for links between the new death certification process and public health analysis and NHS quality control makes sense, but the government should explore ways of providing reassurance about the medical examiner's independence. These could include medical examiners being appointed jointly by the coroner (or supporting local authority) and the NHS, and explicitly requiring in the legislation that all the medical examiner's casework responsibilities should be performed independently of any public authority.

In many respects the government's reform package has sensible aims, which doctors and all informed opinion would support—modernising the ancient and long neglected coroner system, abolishing single doctor certification in burial cases and the elaborate extra process for cremations, introducing monitoring and support for the death certification process, and improving links between death regulation and public health analysis. It is now seven years since Harold Shipman's conviction for the multiple murder of patients and four years since the two reform reports commissioned in its wake. With much important detail still to settle, legislation to enact, and implementation to deliver, no one can accuse the government of excessive haste.

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Diagnosing left ventricular hypertrophy in arterial hypertension

ECG has low sensitivity so further tests are needed to detect organ damage

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Arterial hypertension is an important public health challenge—it affects almost one third of the adult population in economically developed countries and is a major contributor of cardiovascular mortality and morbidity. The management of primary hypertension is based on three important principles—diagnosis, treatment, and identifying organ disease and indicators of subclinical organ damage.

In this week's *BMJ*, a systematic review by Pewsner and colleagues assesses the accuracy of electrocardiography in screening for left ventricular hypertrophy in people with hypertension.[1] It finds that electrocardiography has a low sensitivity for detecting left ventricular hypertrophy compared with echocardiography.

Treatment aims for a target blood pressure below 140/90 mm Hg in the general population[2] and below 130/80 mm Hg in patients with diabetes and renal dysfunction. A target of ≤130/80 mm Hg should also be considered in patients with cerebrovascular disease, cardiac disease, peripheral artery disease, and advanced retinopathy. Such a target is also advisable when evidence of organ damage is present, because even high-normal blood pressure values increase the risk of complications. Clinical history, clinical examination, and laboratory investigation detect a large proportion of patients who are at high risk. In these patients, intensive modification of risk factors and tight control of blood pressure is needed, but no other routine screening test is

indicated because the severity of the condition is already established.

Most people with hypertension are not in the high risk categories for left ventricular hypertrophy, but doctors should search for indicators of subclinical organ damage in these patients to identify those at higher risk. For example, electrocardiography and evaluation of microalbuminaemia are recommended in all patients with hypertension. About 30% of unselected people with hypertension have microalbuminuria—one of the strongest risk markers for complications in untreated hypertension.[3 4] A low ankle brachial blood pressure index, although less common, is easy to measure; it indicates advanced atherosclerosis and is also a strong risk marker for complications.[5 6]

Doctors can request other potentially useful tests, but these are rarely used in clinical practice as they can be expensive, time consuming, and no randomised trials have convincingly shown that they are useful and cost effective. Examples include ultrasound of the carotids[7 8] or calcium score index of the coronary artery assessed by means of computed tomography, both of which can detect atherosclerosis[9]; or ambulatory electrocardiography, which detects patients with silent ischaemia or increased ventricular ectopic activity, both of which are associated with poor prognosis.[10]

The systematic review by Pewsner and colleagues[1] establishes that electrocardiography cannot rule out left ventricular hypertrophy. None the less, left ventricular hypertrophy assessed by electrocardiography remains a specific sign of organ damage and a marker of increased risk, and it should prompt clinicians to implement a more aggressive course of risk management. The electrocardiographical results may also indicate atrial fibrillation and ischaemic heart disease. Unfortunately, the sensitivity and specificity of electrocardiography is low if interpreted by non-experts, and efforts should be made to arrange expert evaluation of electrocardiograms in general practice.

The review shows that absence of left ventricular hypertrophy on electrocardiography modifies the pre-test probability of left ventricular hypertrophy diagnosed on echocardiography from 33% to 31%, regardless of which electrocardiography criteria are used to detect hypertrophy. This apparently low yield raises the question of whether echocardiography should be part of a comprehensive assessment of cardiovascular risk in people with hypertension.

About 17% of the population may have increased left ventricular mass by echocardiography, in contrast to just 2-3% with electrocardiography. Left ventricular hypertrophy measured by echocardiography offers prognostic information beyond that provided by the evaluation of traditional cardiovascular risk factors, including electrocardiography.[11 12] But in clinical practice it may be difficult to measure left ventricular mass in some patients because of poor image quality, an interobserver variation of 15%, and because echocardiography is not routinely recommended.[2]

Echocardiography is always indicated when doctors suspect cardiac dysfunction or structural abnormality on the basis of the patient's history, electrocardiographic results, and previous diagnoses. In uncomplicated hypertension, echocardiography is comparable to the tests already mentioned for diagnosing organ damage. These tests should be considered in patients otherwise at low risk of cardiovascular disease to determine the treatment target and intensity of risk modification needed. Local tradition and expertise may determine which of the recommended tests to use.

When organ damage is detected it should prompt clinicians to be more aggressive in reaching the target blood pressure and encourage their patients to be more compliant. Doctors should explain to their patients that hypertension has already harmed their organs and optimal treatment can slow down or stop progression.

The presence of left ventricular hypertrophy may also affect the choice of drug. Inhibitors of the renin-angiotensin-aldosterone system, calcium antagonists (amlodipine, felodipine), and probably aldosterone antagonists will reduce left ventricular mass more than other types of drugs.[2]

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