

Editorial

Physical activity and health – continuing focus of interest for epidemiologic research

Physical inactivity is associated with an increased incidence of coronary heart disease and, while recognising the problem of self-selection and the influence of other risk factors, analysis of surveys shows that exercise offers protection against coronary heart disease. Regular exercise can produce elevation of HDL-cholesterol, decreases of VLDL and triglycerides, increased fibrinolysis, improved glucose tolerance and a reduction in arterial blood pressure. A consensus does not yet exist as to whether there is a graded benefit with increasing levels of exercise or whether a critical amount of activity is required before benefit is produced. Proposed thresholds include a leisure-time physical activity level of 2000 kcal/wk (e.g. 5 hours very brisk walking) or twice weekly vigorous aerobic activity involving peaks of energy expenditure of around 420 kcal/h. In the treatment of cardiovascular disease, benefit may result from the reduction in heart rate and hence of myocardial oxygen demand for a given level of activity following the training effect of regular exercise.

While excessive or inappropriate exercise may cause tissue injury or permanent damage, there are many benefits from physical activity on the musculo-skeletal system. Muscle becomes stronger and more resistant to fatigue; ligaments and tendons and their attachments are strengthened; bone becomes stronger and the nutrition of articular cartilage is improved. Physical inactivity is one of the factors in the development of osteoporosis. Physical activity increases bone metabolism and bone mass before and after the menopause with a resultant delay in reaching the “fracture threshold”.

Insulin sensitivity increases with exercise and glucose tolerance in normal people correlates with their level of physical activity. Exercise improves blood glucose in non-insulin-dependent diabetics. In obesity, the place of exercise is secondary to dietary management. Moderately obese women, children and adolescents have been shown to lose more weight when undertaking an aerobic exercise program and dietary restriction than control groups using dietary restriction alone. Regular exercise has a mood elevating effect and can help patients with mild depression and anxiety, even though the exact biochemical mechanisms occurring in the brain and producing the psychological changes related to exercise are unknown. In conclusion, there is substantial evidence that regular aerobic exercise such as walking, jogging, cross-country skiing, biking,

dancing or swimming is beneficial to general physical and psychological health^{1, 2}.

Despite this unequivocal evidence for a health promoting effect of regular physical activity, epidemiological research on physical activity encounters at least three issues that merit further study. Several articles published recently in our journal underscore this need for more information. First, given the lack of a standardized method for the assessment of physical activity in epidemiologic studies, the question of validity of the different survey instruments is a source of continuing concern. In this vein, Stender and her collaborators³ have evaluated the validity of two commonly used four-level multiple choice questions on leisure-time as well as occupational physical activity. Using a 7-day activity diary as reference method (which itself is an assumption that may be discussed), they found that of the two „popular“ multiple choice questions the one on occupational physical activity probably gives a satisfactory classification of subjects into their “real” activity group, while this was not true for the leisure-time exercise question. As a consequence, Stender et al. propose to concentrate on occupational activity when relations between the level of physical exercise and risk of disease are analyzed in affluent men at upper middle-age. This study is also a nice illustration how one can investigate very specific epidemiologic questions in the framework of a major project, in this case the Augsburg/Munich Center of the WHO MONICA Project.

Second, given the relevance of regular physical activity and exercise as a health promoting behaviour, population-wide levels of physical activity, its determinants and its changes over time merit our attention, on an international, national and even local level. Two papers from Scotland in the journal are devoted to this issue^{4, 5}. In their first study, Uitenbroek and McQueen⁴ demonstrated that in London, Glasgow and Edinburgh levels of leisure-time physical activity are generally low, with only approximately one quarter of the adults being appropriately active from the disease prevention point-of-view. These workers also identified correlates of low levels of exercise, such as lower occupational category, older age and female gender. In the second article, published in this issue of the journal, Uitenbroek and McQueen⁵ extend their findings by examining physical activity trends at leisure between 1987 and 1991 in Scotland. An

interesting conclusion is that during this period the proportion of sedentary individuals has decreased. Remarkably, this observation had to be “adjusted” for the substantial confounding effect of a change in question wording during the survey period. Uitenbroek and McQueen convincingly demonstrate how “true” changes in the dependent variable of interest, population-wide physical activity levels, and measurement artifacts can be disentangled with the help of adequate statistical modelling.

A third issue of current research into exercise epidemiology is the interventional aspect, i.e. the question how currently low levels of leisure-time physical activity in affluent societies could be raised. Plainly, this is a difficult problem. Traditionally, it is American and Canadian authors who have been “frontrunners” in research on exercise initiation and adherence^{6, 7}, with relatively modest contributions from European workers. However, even simple studies can be valuable and informative, as the example of a recent telephone survey in a Swiss city showed⁸. Respondents were questioned on their personal reasons for participation, or nonparticipation, in regular exercise. For example, lack of time, lack of interest and diseases/disability turned out to be the three most important reasons for nonparticipation, while lack of adequate sports facilities was no important reason at all.

Plainly, much remains to be learned both on a valid assessment and monitoring of health-relevant levels of physical activity in populations as well as on its psychosocial determinants. On the other hand, the

potential of regular exercise to enhance health and life quality is so impressive that the challenge should be accepted.

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