



Much more complex than 'just move more'.

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Introduction

The release of a government green paper entitled 'Prevention is better than cure' recognises that the UK spends £97 billion on treating disease and only £8 billion preventing it, making the case for a shift towards primary or community care and promoting a 21st century focus on prevention (1).

This coincides with the publication of an observational study in the Journal of the American College of Cardiology (JACC) in November 2018 reporting an inverse relationship between cardiorespiratory fitness (CRF) and all-cause, cardiovascular disease (CVD) and cancer mortality in an apparently healthy population suggesting that accurate quantification of CRF could have value as a 'vital sign' and contribute to individualised risk quantification (2).

Whether your political ideologies align with that of the government, or whether you believe that appropriate resources will be allocated to practicably endorse this plan, the notion is laudable with its basis grounded in the accepted wisdom that healthy lifestyle predicts CVD risk independent of risk conferred by genetic background (3).

These themes firmly re-focus the spotlight on primordial and primary prevention with emphasis on lifestyle modification, generating further insight and contemplation of this complex and challenging area of medicine, at populational, governmental and clinical levels.

An Overview of Contributing Evidence

It is widely established that lifestyle risk factors contribute significantly to cardiovascular risk with the INTERHEART case control study identifying nine risk factors (abnormal lipids, smoking, hypertension, diabetes, abdominal obesity, psychosocial factors, consumption of fruits, vegetables and alcohol and regular physical activity) accounting for > 90% of population-attributable risk in men and > 94% in women (4). Analyses of contemporary trials have reported correlation between the number of risk factors controlled and patient survival in their respective study populations, identifying incremental benefit with every risk factor under control (5, 6).

Take Home Messages

- Fitness levels in healthy people have been shown to correlate with all cause, CVD and cancer mortality.
- There is renewed political interest in funding preventative medicine.
- Multiple, complex interlinking psychosocial and behavioural factors impact on participation in physical activity.
- Medical interventions to increase physical activity are often ineffective.
- My opinion is that effective prevention begins with community involvement and requires a shift from the belief that healthy living begins with a medical intervention.

CRF relates to physical activity and is considered to reflect body functionality and overall health, quantifying individual functional capacity relating to the integration of human body function under stress conditions (7).

The study recently published in JACC by Imboden et al (2) examined the relationship between CRF and all-cause, cardiovascular and cancer mortality in an apparently healthy, self-referred population. All participants underwent cardio-pulmonary exercise testing (CPEX) testing (the gold standard for objective CRF measurement) to determine baseline CRF and results were categorised into low, moderate or high fitness based on percentiles derived from age and sex-specific reference values. CRF derived in this way was found to be inversely related to all cause, CVD and cancer mortality. Of importance, each metabolic equivalent incremental increase in CRF conferred a 11.6%, 16.1% and 14% reduction in mortality respectively. In analysis adjusted for gender, the relationship between CRF and all-cause mortality was unchanged. In men, the relationship between CRF and cancer was found to be non-significant and the correlation between CRF and CVD mortality significant. The inverse was found in women.

Cautions when interpreting these results derive from its observational nature, the possibility that higher mortality rates in the low-fitness arms may represent undiagnosed, asymptomatic chronic disease and the need to consider the many quantifiable and un-quantifiable variables associated with CRF levels which may confound the evaluation of causation in observational studies (7).

The results of this study correlate well with its one comparable predecessor, undertaken in a Nordic, male population, which demonstrated similar findings with a significant, inverse relationship between CRF and mortality in this specific population subset (8).

Though Imboden et al's (2) study demonstrates the usefulness of accurate CRF measurement on mortality and morbidity prediction, conclusive evidence from prospective, interventional studies relating increased physical activity with improved CRF and decreased mortality in healthy populations is wanting (7).

The authors suggestion, in line with the 2016 Scientific Statement from the American Heart Association (9), that CRF could be measured as a vital sign to improve the accuracy of patient risk assessment is controversial, particularly when considering its routine implementation in a resource-scarce environment such as the NHS. Examining the descriptive characteristics of the healthy cohort involved in the study (2) reveals correlation between fitness levels, BMI and waist circumference parameters for both sexes which are more easily and economically derived and could be used as surrogate markers for CRF.

Current Guidelines relating to Physical Activity and its Assessment

Though CRF has been recognised as a potentially stronger predictor of mortality than established risk factors (RFs), it is currently not assessed in routine clinical practice (7, 9).

In line with clinical practice, where most clinician's work deals with secondary prevention, the European Guidelines on Cardiovascular disease prevention (10) advocate for the most intensive lifestyle intervention and, where appropriate, medical therapies in those with established CVD. Whilst intensive secondary risk factor management is undoubtedly meritorious, perhaps those with the most to gain from high intensity RF management are in fact the primary prevention population at whom fewer resources and interventions are directed.

The evaluation of physical activity levels through self-reported enquiry is recommended by NICE as routine in those at high risk or with established CVD (11). Otherwise professional judgement at opportune moments is relied upon to identify those who are physically inactive. It is known that healthcare professionals comply poorly with advice to routinely assess patient's activity levels, with time-constraints limiting its identification and the obligation to deal with the problem once identified proving a further deterrent (12).

Even if physical inactivity is identified, there is a disconnect between recommendations for behavioural change and advice provided by clinicians (10). NICE guidelines for cardiovascular disease risk reduction endorse those at high risk or with CVD to undertake at least 150 minutes of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity in line with the Physical Activity Guidelines for adults (13). Those identified as physically inactive with a health condition or risk factor can be referred to exercise referral schemes if commissioning criteria are met. This is not recommended for those who are sedentary, but otherwise healthy.

Why is it so hard to increase physical activity levels amongst the general population?

Lifestyle habits are notoriously difficult for clinicians to influence with COURAGE and BARI 2D demonstrating that even with adequate resources, improving lifestyle risk factor control is challenging (5, 6). Though intervention in healthcare settings has been shown to increase physical activity at short term follow up, sustained change is difficult to achieve with typically less than half of those initiating the behaviour achieving maintenance (14).

Complicating the seemingly simple aim of increasing physical activity is its complex interaction with multiple psychosocial factors.

Physical activity statistics from 2015 reveal 67% and 55% of adult men and women achieving the recommended levels of activity in England with decreasing levels associated with increasing age (15). Physical activity levels have also been shown to relate to household income, with highest levels seen in men in higher earning households (15). Gender disparity is also evident with adult women engaging in less physical activity outside the workplace than their male counterparts, a balance the 2015 lottery-funded 'This Girl Can' campaign aimed to redress through promoting female participation and access to sport, highlighting fear of judgement as a significant barrier to participation (16).

Activity levels in children aged 5-15 years fell between 2008 and 2012 (15), which is of importance as childhood physical activity has been shown to influence adult activity levels (17) and self-reported depression in adulthood (18), a further risk factor for CAD (19).

Although this is by no means a comprehensive list of factors affecting individual participation, it highlights some of the barriers to increasing physical activity which physicians are unable to influence, perhaps explaining why healthcare-led interventions have proved largely ineffective.

Conclusion

Imboden et al's study provides a renewed focus on primary prevention, reporting quantifiable health gains with increased CRF. Whilst routine implementation of CPEX-derived CRF may not be practical in the NHS resource-limited climate, its assessment may prove valuable in individual cases, with surrogate markers utilised in the majority.

Governmental plans to invest in primary care aim to shift the focus towards preventative medicine. Though commendable, this may not achieve improved risk factor management when so many factors contributing to CVS risk are socially and behaviourally derived. In addition, the healthy target population for truly preventative risk management are unlikely to visit their primary care providers to engage with such risk assessment and reduction. To intervene on this population therefore requires change at community and populational levels with resources directed accordingly and a shift from believing that risk management and healthy living begins with medical intervention and assessment.

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