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Hot topic in geriatric medicine

Healthy ageing: Evidence that improvement is possible at every age



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ABSTRACT

Fighting against risk factors for disability and dependency throughout the whole life process and – more specifically relevant to this paper – during the second part of life, needs to become a core focus of adult public health actions. In order to engage positive actions towards this goal, it is important to identify and target modifiable risk factors. One would imagine that it is always possible to positively modify “intermediate” risk factors, such as health habits (sedentary lifestyle and diet), health behaviours (alcohol consumption, smoking or other addictions. . .), as well as living and working conditions, and access to healthcare. However, the simplest interventions of all could target “proximal” risk factors that closely relate to disease and disability, such as hypertension, metabolic disorders (malnutrition and diabetes), mood and cognitive impairments, musculoskeletal disorders, inappropriate drug prescriptions and frailty. A careful review of the world literature allows to identify the most effective and efficient medical interventions allowing to prevent or delay these disabling clinical conditions and allow to reach the WHO goal of “healthy ageing”, which is developing and maintaining the functional ability that enables well-being in older age.

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“Prevention is not well understood, probably because its challenges are not well understood”

Jean-François Mattei

1. Introduction

One of the main challenges facing medicine in these early years of 21st century is the foreseen ageing of the world population [1], and more specifically, the increase in the number of years spent in disability [2]. These assertions are consolidated by the 1st World Health Organisation (WHO) global report devoted to ageing (2015), which defines healthy ageing as a “process of developing and maintaining the functional ability that enables well-being in older age” [3]. As stated by WHO general director Margaret Chan in the preface of the report, “healthy ageing is more than just the absence of disease; the maintenance of functional ability has the highest importance” [3].

The “healthy ageing” pathway corresponds to a lifelong process. After conception, the first and second parts of life appear to have the greatest influence on a person’s functional trajectory, which

has the potential at any time to become more or less positive. Building and maintaining intrinsic capacity, and living in functional independence within our own surroundings until the end of life is the most favourable outcome [3].

Fighting against risk factors for disability and dependency throughout the whole life process and – more specifically relevant to this paper – during the second part of life, needs to become a core focus of adult public health actions. In order to engage positive actions towards this goal, it is important to identify and target modifiable risk factors. Indeed, it is not yet possible to modify “non-controllable” risk factors, such as genetics, gender, ethnicity, intellectual quotient or family background [4]. It is also difficult (albeit not impossible) to hope to change “distal” risk factors, such as economic background, socio-cultural determinants, education, air pollution, or exposure to noise or the sun. One would imagine that it is always possible to positively modify “intermediate” risk factors, such as health habits (sedentary lifestyle and diet), health behaviours (alcohol consumption, smoking or other addictions. . .), as well as living and working conditions, and access to healthcare. However, the simplest interventions of all could target “proximal” risk factors that closely relate to disease and disability, such as hypertension, metabolic disorders (malnutrition and diabetes), mood and cognitive impairments, musculoskeletal disorders, inappropriate drug prescriptions and frailty [4].

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Given the functional focus of the 2015 WHO global report on ageing, it would appear essential to demonstrate that interventions focusing on lifelong health habits and behaviours, as well as on “proximal” risk factors during the second part of life could improve functional capacity or delay disability in old age.

2. Interventions focused on health habits and health behaviours

Interventions focussing on health habits and health behaviours are based on “health promotion”. This is a lifelong process that gives people the means to control and promote their own health. It is never too late to adopt new life habits, as shown below.

2.1. Advantages of physical exercises and sport activities during the second part of life

Self-reported walking difficulty, not linked to disability, was found to increase the risk of overall (HR = 1.74 [95% CI 1.71–1.74]) and cardiovascular mortality at 10 years (1.98 [95% CI 1.95–2.02]) in a Finnish cohort of male Second World War veterans [5]. A study of physical activity in US adults showed that exercisers performed consistently better on the long distance corridor walk over 8 years, and had greater aerobic fitness compared to inactive or lifestyle active participants [6]. Similarly, an English observational study of 3454 adults aged 63.7 ± 8.9 years at inclusion with 8 years follow-up, reported that taking up physical activities, even at an older age, has positive physical, functional and mental repercussions (*P* values ranging from > 0.005 to 0.001), compared to participants who remained sedentary [7].

Clearly, regular, reasoned and reasonable physical exercise and sport activities throughout one’s life, even those started at midlife, have multiple positive benefits and minimal disadvantages in the fight against the “sedentary death syndrome” [8].

2.2. An adapted diet at midlife greatly modifies health

It is now well established that a Mediterranean diet has significant beneficial effects on 10-year incidence of metabolic syndrome, diabetes, hypertension and inflammatory markers [9]. The PREDIMED randomized trial, which included 7447 volunteers aged 55 to 80 years at high cardiovascular risk, demonstrated that a Mediterranean diet supplemented with extra-virgin olive oil or nuts significantly reduced major cardiovascular events after a median follow-up of 4.8 years [10]. In a separate analysis from the same study, compared to a low-fat control diet, a Mediterranean diet supplemented in extra-virgin olive oil or mixed nuts significantly slowed cognitive decline, as assessed by the MMSE and clock drawing tests [11].

In summary, involuntary weight loss at midlife is a risk factor for mortality, while obesity at the same time period increases cardiovascular risk. This latter risk could be controlled by physical exercise and a Mediterranean diet supplemented in virgin olive oil or nuts, leading to a reduction or mitigation of clinical conditions causing disability.

2.3. Non-smoking adults have a greater chance of living longer, healthier lives

At the world level, between 1965 and 2014, passive and active smoking caused more than 20 million premature deaths (10 million from metabolic, cardio-, neuro- and reno-vascular events and 6.9 million from respiratory diseases) [12]. Moreover, it was recently shown that mid-life and late-life smokers had a significantly greater risk than lifelong non-smokers of developing

all-cause dementia (adjusted hazard ratio (aHR) = 2.28 [95% CI 1.49–3.49]), vascular dementia (aHR = 2.88 [95% CI 1.34–6.20]) and Alzheimer’s disease (aHR = 1.98 [95% CI 1.09–3.61]) [13]. Indeed, many diseases caused by tobacco smoking have a negative impact on daily functioning.

To fight against this scourge, the WHO has proposed to prohibit tobacco advertising, to protect non-smokers, promote education and help to increase the numbers of those who quit smoking. The World Bank has also reported that increasing the price of tobacco by 10% resulted in a 4% decrease in global tobacco sales, and an 8% decrease among the youngest smokers [14].

Without doubt, abstaining from smoking is the single lifestyle habit that offers the greatest protection against cardiovascular, neurological and renal vascular events, as well as respiratory diseases, and consequently, against their negative functional repercussions in daily life.

2.4. Light or moderate alcohol consumption does not make you live longer

Studies focused on life course trajectories of alcohol consumption are scarce. However, an analysis of 9 English studies demonstrated that 2 peaks of alcohol consumption exist, namely young, and pre-retired adults [15]. In France, 37% of adults aged 18 to 74 years are considered to have an at-risk level of alcohol intake [16]. The possible positive effect of light to moderate alcohol consumption on longevity was completely rejected by the Pianoro study. This 6-year follow-up of 5256 community-dwelling adults aged > 65 years from Northern Italy (2318 abstainers and 2309 light to moderate drinkers at ≤ 2 alcoholic drinks per day) showed that when adjusted for physical activity and self-reported health, light to moderate alcohol consumption had no direct protective effect on mortality [17]. On the contrary, harmful effects of moderate to heavy alcohol consumption appear at midlife, mainly in the form of acute cardiovascular and neurological events [18].

It is therefore essential to recall that a long-term or midlife sedentary lifestyle, malnutrition, tobacco smoking and moderate alcohol consumption are all avoidable health scourges that negatively affect health and functional capacity, and precipitate death. The key new message is that randomized controlled studies have shown that it is never too late to reap the positive benefits of controlling these deleterious life habits.

3. Interventions focused on diseases that increase both disability and mortality

Two main groups of chronic diseases that can increase both disability and mortality deserve to be targeted. The first group is composed of diseases that not only increase mortality, but in case of survival, will also be the cause of disability. The second group comprises classical geriatric diseases that do not directly bring on death, but do increase disability. A third and often-neglected issue, namely adverse effects of drugs and inappropriate prescriptions, also need to be addressed.

3.1. Life course vaccination program

The 2013 WHO report stated that currently, worldwide, vaccines annually prevent more than 2.3 million deaths from communicable diseases [19], which perfectly explains the decrease observed in worldwide communicable diseases, from 33% of all deaths in 1990 to 25% in 2010 [20]. However, there is a striking imbalance between the burden of preventable infectious diseases in US older adults compared to US children [21], reflecting the

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