

• Global Views

SEEDi^{1.0–3.0} strategies for major noncommunicable diseases in China

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ABSTRACT

The purpose of this article is to briefly introduce the status and challenges of major noncommunicable diseases (mNCDs), which include cardiovascular disease, diabetes and cancer, as well as related risk factors, such as environmental pollution, smoking, obesity and sleep disorders. “S-E-E-D” rules or the strategies of “S-E-E-D” intervention (SEEDi) consist of four core healthy elements: sleep, emotion, exercise and diet. The history of SEEDi^{1.0–3.0} is also introduced, which includes versions 1.0, 1.5, 2.0 and 3.0 of the program. These guidelines are suitable for prevention and control of mNCDs. Not only the “Healthy China” initiated in China’s “13th Five-year Plan,” but also the “Healthy World” philosophy needs SEEDi^{1.0–3.0} strategies for control of mNCDs.

Keywords: noncommunicable diseases; cardiovascular disease; diabetes mellitus; cancer; lifestyle

Citation: Hu CS, Tkebuchava T. SEEDi^{1.0–3.0} strategies for major noncommunicable diseases in China. *J Integr Med*. 2017; 15(4): 265–269.

1 Introduction

According to *World Health Statistics 2016: Monitoring Health for the SDGs*,^[1] the average life expectancy increased by 5 years between 2000 and 2015, and global life expectancy for children born in 2015 was 71.4 years (73.8 years for females and 69.1 years for males). However, healthy life expectancy was only 63.1 years globally. According to the report on cardiovascular disease (CVD) in China, 2015,^[2] CVD remains the leading cause of death. The large epidemic of major noncommunicable diseases (mNCDs), due to unhealthy lifestyles, including environmental pollution, has become a heavy burden and a tremendous challenge,^[2–4] seriously affecting the healthy development of the economy and society in China and the rest of the world. Currently, mNCDs remain the leading

cause of death in most countries.^[5] How to prevent and effectively manage mNCDs for the health of China and the world has become an important topic and research subject.

2 Current status and challenge in mNCDs

According to the latest data from the World Health Organization, a quarter of global deaths are caused by pollution in air, water, soil and other environmental factors.^[6] As many as 8.2 million deaths can be attributed to air pollution; for example, exposure to secondhand smoke may result in atherosclerotic cardiovascular disease (ASCVD), diabetes, cancer and chronic respiratory diseases. According to the 2015 adult survey report of tobacco in China,^[7] the smoking rate was 27.7% in older

[http://dx.doi.org/10.1016/S2095-4964\(17\)60355-8](http://dx.doi.org/10.1016/S2095-4964(17)60355-8)

Received January 7, 2017; accepted May 2, 2017.

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adults. It was 52.1% in men and 2.7% in women, with the total number of smokers reaching 316 million. China and the United States have the largest populations dealing with obesity. According to *The Lancet*,^[8] obesity is a health problem affecting 4 320 million men and 4 640 million women in China. Since obesity is a major risk factor for mNCDs, it is a serious public health concern. For example, every year obesity places a 60 billion pound burden on the UK.^[8] If the present trends continue, by 2025, global obesity prevalence will reach 18% in men and surpass 21% in women; severe obesity will surpass 9% in women and 6% in men.^[8] Sleep disorders are also important risk factors of mNCDs; 38.2% of Chinese adults have insomnia. Long-term sleep disorders, such as obstructive sleep apnea and insomnia, are closely related to hypertension, arrhythmia, myocardial infarction and even sudden cardiac death, as well as diabetes and cancer. In addition, modern electronic devices and entertainment have also contributed to a surge in mNCDs, due to a sedentary lifestyle and lack of exercise.

There are more than 300 million people suffering from CVD in China. More than four-fifths of young people do not get enough physical activity, and nearly one in four (25.2%) adults, aged 18 years old and above, in China have hypertension.^[2,9] Further, more than 100 million people suffer from diabetes in China; of these, the prevalence of adult-onset diabetes increased from 0.9% in 1980 to 11.6% in 2010.^[3] Spending on diabetes is expected to reach 360 billion yuan by 2030,^[10] becoming a sizable economic burden. Besides obesity, long working hours, reduction of sleep, mental stress and other unhealthy lifestyles are also important risk factors for diabetes. Obesity and unhealthy lifestyles may also increase the risk of cancers. According to the report *Cancer Statistics in China 2015*,^[4] there were estimated 4 292 000 new cancer cases, and 2 814 000 deaths in China in 2015. CVD, diabetes and cancer are just like “the three big mountains” of human health, and they are often linked to each other resulting in deadly comorbidities or strips, due to shared risk factors among mNCDs.^[11,12] Major risk factors are variable, and related mNCDs are preventable. Just as “the foolish old man” slowly removes “the three big mountains” (Figure 1), people need to continuously develop fresh programs,^[15] new platforms^[16,17] and novel strategies to help in the prevention and control of mNCDs.

3 History of SEED intervention

In 2005, “S-E-E-D” rules (SEEDRs) for healthcare were creatively proposed. They consist of four core healthy elements, which are sleep, emotion, exercise, and diet. SEEDRs included “Sleep Rule”: a reasonable sleep and rest at midday; “Emotion Rule”: emotional stability and peace

of mind; “Exercise Rule”: aerobics, static and dynamic binding; and “Diet Rule”: scientific diet, balanced and consistent nutrition including smoking cessation and alcohol limitation. SEEDRs or SEED intervention (SEEDi) are suitable for everyone’s health, especially for the prevention of unhealthy lifestyle-related mNCDs, which also include ASCVD.^[18] Whoever has a good “SEED” will have good health. Considering a major impact of the environment on health, SEEDi was further developed into E(e)SEEDi. Here, E(e) signifies big and small environments, as well as internal and external environments, and is represented by the “Environment Rule”: a suitable environment, away from pollution. While SEEDi is known as the 1.0 version or “SEEDi^{1.0},” E(e)SEEDi is the 1.5 version of SEEDi known as “SEEDi^{1.5}.” As an early strategy of prevention, SEEDi or E(e)SEEDi is especially suitable for mNCDs related to unhealthy lifestyles (Table 1).

In 2009, the E(e)SEED-BasED healthy lifestyle was further summarized and named “Hu’s healthy lifestyles (HHL).” It contains five core health elements which are environment, sleep, emotion, exercise and diet, as well as a total of 15 core lifestyles. Therefore, HHL intervention is known as SEEDi version 2.0 or “SEEDi^{2.0}.” Next, a general formula, named the health and longevity equation (Health and Longevity = RT-ABCDEF + E(e)SEED-BasED + 210) was set up,^[13,14,16,18] and meets the latest “5P” medical model for prevention and management of mNCDs. The general formula is known as the 3.0 version of SEEDi, or “SEEDi^{3.0}.”

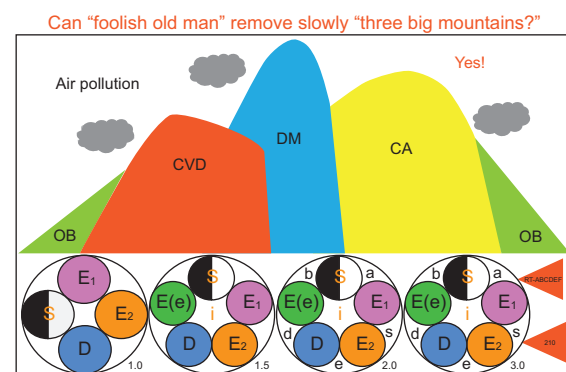


Figure 1 SEEDi^{1.0-3.0} for noncommunicable disease

CVD: cardiovascular disease; DM: diabetes mellitus; CA: cancer; OB: obesity; E(e): environment; S: sleep; E₁: emotion; E₂: exercise; D: diet; b: behavior; a: age; s: safety, sex, study; e: education, employment, ethnic; d: disease, drug; i: intervention. RT-ABCDEF is a strategy for management and prevention of human diseases, which was originated from RT-ABCDE (RT: right, routine, and reversible treatment; A: antagonistic treatment; B: biohazard control; C: change unhealthy lifestyle; D: disease and risk control; E: examination),^[13] with F standing for “follow-up.” The “210” stands for a comprehensive strategy of prevention, which includes primary and secondary prevention, and “Grade-zero” prevention.^[14] The latter is also called policy of prevention. 1.0: version 1.0; 1.5: version 1.5; 2.0: version 2.0; 3.0: version 3.0.

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