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The Value of Primordial Prevention in the Obesity Epidemic and Related Comorbidities

Samantha Buls^{1*} and Mercedes Sotos-Prieto^{1,2}¹Division of Food and Nutrition Sciences, School of Applied Health Sciences and Wellness, Ohio University, Athens, USA²Department of Nutrition and Department of Environmental Health, Harvard T.H. Chan School of Public Health, Boston, MA, and Division of Occupational Medicine, Cambridge Health Alliance/Harvard Medical School, USA***Corresponding author:** Samantha Buls, Division of Food and Nutrition Sciences, School of Applied Health Sciences and Wellness, Ohio University, Athens, USA. Tel: 2402850933; E-mail: sb400211@ohio.edu**Received date:** Jul 21, 2017; **Accepted date:** Sep 25, 2017; **Published date:** Oct 03, 2017**Citation:** Buls S, Sotos-Prieto M (2017) The value of Primordial Prevention in the Obesity Epidemic and Related Comorbidities. *J Obes Eat Disord* 3:1. doi: 10.21767/2471-8203.100032**Copyright:** ©2017 Buls S, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Short Communication

Despite an overall increase in public health awareness, the prevalence of obesity remains epidemically high. Worldwide, over half a billion people are currently classified as obese (body mass index [BMI] ≥ 30 kg/m²), and it is estimated that over 40% of the U.S population will be obese by the year 2030 [1]. These statistics are of serious concern because of the recognized relationship between obesity and chronic disease, specifically cardiovascular disease (CVD) being the number one cause of death in the United States [2].

Even in the absence of other cardiac related comorbidities, excess adipose tissue often induces dyslipidaemia, hypertension and glucose intolerance, all indicative of metabolic syndrome [3]. While each of these components is known to increase CVD risk independently, the combination of these markers and the presence of metabolic syndrome itself is associated with a significant long-term risk of CVD [4].

Strong evidence suggests that healthy lifestyle habits can influence CVD risk factors [5]. For example, when observing more than 80,000 nurses, over 90% of diabetes mellitus cases, 57% of hypertension cases, and 40% of hypercholesterolemia cases were attributed to poor lifestyle factors [6]. Research has also showed that a combination of at least three low risk lifestyle factors and a BMI between 18.5-22.4 is associated with the lowest risk of CVD (0.37, 0.29 to 0.46) mortality, when compared with those with a BMI between 22.5-24.9 and none of the four low-risk lifestyle factors [7]. This emphasizes the importance of maintaining a healthy weight and the prevention of clinical risk factor development, recognizing the value of primordial prevention.

Primordial prevention is defined as the prevention of the risk factors themselves, before the individual is negatively affected by the symptoms [8]. This is often thought of as radical, especially in young patients who don't currently exhibit concerning biomarkers. Primordial prevention differs from primary prevention in that the emphasis is on early dietary and lifestyle modifications to prevent the risk factors in the first place. If these risk factors are proven to lead to the onset of disease, why would health providers not want to prevent them

from occurring in the first place? This is especially true when considering the alarming long-term risk that the obese population faces for developing CVD despite a perceived low short-term risk [4].

Currently, there are numerous risk prediction tools that include in their assessment clinical risk factors such as blood pressure, and blood lipids to estimate an individual's short term (i.e., 10-years) risk of CVD. For individuals with a high risk based on these factors, it is common practice to attempt to decrease risk pharmacologically [9]. However, individuals with a low short term risk but elevated long term risk may benefit from alternative methods of risk factor management. In addition, the fact that drug therapy is usually prescribed when short term risk is high (>7.5% over 10 years) has led to hypertension, diabetes mellitus, and hyperlipidemia becoming three of the top diagnoses related to direct health expenditures in the U.S. [10]. Long term risk factor control plays a key role in the prevention of CVD and is rarely talked about in the clinical setting which may be problematic because short term risk, while clinically important, often underestimate risk burden in young adults (<50 years) [11]. For example, the lifetime risk of CVD in adults with ≥ 2 risk factors at age 55 (50% in men and 29% in women) was 3-fold greater than the risk in adults with optimal risk factor status at age 55 [12]. Therefore, an individual's overall cardiovascular risk may be best estimated by a combination of short and long-term (30-year) risk assessment.

Long term CVD risk can be reduced by implementing and maintaining primordial prevention strategies to create a normalized metabolic profile [13]. Young adults who are able to maintain a low CVD risk profile into middle age drastically reduce, if not eliminate, their long term risk for life threatening CVD events [14]. If the majority of the population were able to reach middle age with a low CVD risk profile, the vast majority of expected CVD related deaths could be prevented [14]. Yet the current focus has been on primary prevention or short term risk prevention, and over the last decade less than 6% of the US population maintained a low risk profile, drastically reducing life expectancy by as many as 10 years [14,15].

The first step in effective primordial prevention is recognizing long term risk and encouraging lifestyle modifications. Even

minor improvements to diet and physical activity levels have been proven to significantly lower blood pressure, improve lipid profile, and affect the efficiency of glucose metabolism and longevity [3,16,17]. However, primordial prevention is often forgotten and physicians spend little time advising patients on the importance of long-term health and lifestyle behaviours [18,19].

Health professionals need to start recognizing long term risk, and discussing the importance of primordial prevention with patients. Created by a team at the Harvard T.H. Chan School of Public Health, The Healthy Heart Score is an online 20-year risk prediction tool with the potential to be utilized in the clinical setting to catalyse the conversation. The Healthy Heart Score uses modifiable lifestyle factors (diet, physical activity, alcohol intake, smoking, and body weight) to estimate 20-years risk of CVD. The model has been validated [7] with data from large cohorts that consist primarily of non-Hispanic white, middle-aged women and men and performs best among individuals without baseline CVD risk factors. Previous findings using the Healthy Heart Score showed that women in the highest quintile (poorest behaviour's) of the Healthy Heart Score had a predicted 18.01 (14.39-22.72) higher risk of diabetes, 5.00 (4.56, 5.45) of hypertension, 2.57 (2.40, 2.75) of hypercholesterolemia, and 52.75 (95% CI: 33.75-82.45) of all 3 risk factors combined, compared to women in the lowest quintile (healthiest behaviour's) [20]. Researchers are currently collecting qualitative data to better understand the clinical utility of a lifestyle-only risk assessment tool with goal of adding clinical value when used in combination with short term risk models. Preliminary findings suggest that implementing the Healthy Heart Score into the clinical setting would be accepted by patients and could help increase patient motivation to make and maintain lifestyle changes. Many existing comprehensive lifestyle interventions have been successful in changing lifestyle behaviour's resulting in weight loss and other health benefits [10]. The challenge is to achieve low cost, sustainable interventions that can educate patients on healthy behaviour's so that every person many fully engage in their own health care and healthy lifestyle maintenance. Overall identifying and preventing CVD risk in individuals of all ages is of paramount importance. Education is the key to motivating people to make lifestyle and behavioural changes to improve or maintain cardiovascular health and decrease CVD burden

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