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Pathare, Abhinav Vitthalrao

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Exercise Does Not Solve Obesity: The "Calorie-Burning Theory" Is Misleading And Incorrect.

Abhinav Vitthalrao Pathare

MS Applied Public Health, University of Central Lancashire (UCLan), England.

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ABOUT AUTHOR:

Abhinav is an Indian Researcher in Public Health. He received a Master of Science degree in Applied Public Health from the University of Central Lancashire, England, in 2020 with merit classification. He is interested in researching the effects of macronutrients on Chronic Diseases. Abhinav aims to help reverse the obesity epidemic, and he has a distinct idea for doing this, which is discussed extensively in his Master of Science's dissertation entitled 'Critical Exploration of the Nutritional Factors Related to Obesity in Socioeconomically Disadvantaged Children and Adolescents of the United Kingdom: A Modified Systematic Review'. His work implies that the macronutrient-composition of the United Kingdom's existing National Dietary Guidelines, i.e., High-Carbohydrates Low-Fat, needs an urgent change due to the adverse effects of the high carbohydrate content.

Along with the MSc in Public Health, Abhinav holds a bachelor's degree in Engineering from Sant Gadge Baba Amravati University (received in 2013); thus, he holds an understanding of Thermodynamics. Altogether, this gives him a unique interdisciplinary lens to address Public Health issues. For example, the long-standing theory behind Obesity is based on the "Laws of Thermodynamics", which states that Obesity and overweight is fundamentally a result of consuming more calories than we expend (and vice versa reverses Obesity). However, in his seminars, talks, and writings, Abhinav demonstrates that this thermodynamics-based Energy Imbalance Concept provides an oversimplified, inappropriate and tautological explanation of Obesity. Therefore, by applying his multidisciplinary knowledge, Abhinav aims to provide a deeper understanding of the Obesity epidemic to the wider public and health professionals.

Furthermore, Abhinav's research interest expands to:

- Investigating the appropriateness of the Diet-Heart-Hypothesis.

- Healthy Setting Approach; Health-Promoting Universities.
- Health Inequalities and Disparities.
- Impact of High-Fat Low-Carbohydrate Diet on Health and Performance.

KEY WORDS: physical activity, exercise, obesity, overweight, fat loss, carbohydrates.

Please Note: This article does not have an abstract, as it is an "editorial/commentary". The "Main Body" of the article starts from the next paragraph.

ARTICLE:

Indian Public Health guidelines encourage people to engage in at least 30 minutes of moderate-intensity regular exercise on most days; doing so, as suggested by the National Health Portal of India (NHPI, 2016), would reduce the risk of Obesity and Comorbidities. Moreover, 30 minutes of moderate exercise five times a week, according to research from the UK's Academy Of Medical Royal Colleges (AOMRC, 2015), is more valuable than several medicines used to prevent, treat and manage chronic metabolic disorders and several Non-Communicable Diseases (NCDs). Risk factors for a range of NCDs—Cardiovascular Diseases (CVDs), Type-2 Diabetes, Dementia, and certain Cancers' varieties—can be reduced by at least 30% when people engage in regular physical exercise, suggests AOMRC (2015). However, in lowering Obesity, physical activity only has a moderate or modest role to play. This article will discuss that although physical activity is prudent to prevent and manage several metabolic conditions, it may not effectively induce fat-loss. Therefore, this article does not discourage people from exercising. However, to help people better understand and achieve fat-loss, this article debunks the myths associated with exercising.

Obesity is a multifactorial issue, and the role of physical inactivity may not be entirely denied; however, according to Luke and Cooper (2013), in the last three decades, as Obesity has



dramatically increased, there has been just a slight change in the western population's physical activity levels. This explicitly suggests that other determinants may have played a prominent role in aiding the Obesity epidemic; importantly, as analysed by Newton et al. (2015), poor nutrition should not be ignored. Moreover, Obesity is just one among the plethora of other negative health consequences of poor nutrition. This, therefore, signifies to investigate the impact of poor nutrition on public health more deeply. Interestingly, as analysed in the Lancet Global Burden of Diseases Studies by Newton et al. (2015), poor nutrition contributes to worldwide NCDs-related burden more than physical inactivity, alcohol, and smoking combined. Therefore, this collectively implies that poor nutrition—in comparison to physical inactivity—is a much more significant determinant of NCDs (including Obesity).

Up to 40% of the adult population with normal weight have metabolic abnormalities such as Hypertension, Dyslipidemia, Non-Alcoholic Fatty Liver Disease (NAFLD), and CVDs, which are all associated typically with Obesity (Weiss, Bremer, & Lustig, 2013). Importantly, these metabolic complications are not just restricted to adults because, as explained by Weiss et al. (2013), the metabolic conditions—primarily NAFLD and Type-2 Diabetes Mellitus—are evident in children as well. This suggests today's public is significantly vulnerable to metabolic disorders regardless of age and weight. Another important implication of Weiss et al. (2013) is that although Obesity and Overweight are associated with various metabolic complications, they are not the cause of these disorders. Therefore, as an explanation to the possible cause of the metabolic disorders, including Obesity, Weiss et al. (2013) proffered a condition called "Insulin Resistance" (IR). This means, solving IR may solve the cluster of metabolic diseases like—but not limited to—Obesity, Hypertension, Type-2 Diabetes, NAFLD, and Altered Glucose Metabolism. Furthermore, to address IR, and so the other cluster of metabolic diseases, Weiss et al. (2013) suggest that the environmental factors—especially the Western diet—are likely to be the most crucial drivers. Collectively, this again indicates that one of the biggest drivers of the global NCD burden is, primarily, a poor diet rather than physical inactivity.

THE QUALITY OF CALORIES TRIGGERS OBESITY, NOT THE QUANTITY:

Three macronutrients—Carbohydrates, Dietary-Fats, and Proteins—comprises human nutrition. According to the longstanding Public Health belief, dietary-fat (especially the saturated one) is considered fattening due to its caloric density, thus, the public is consistently encouraged to base their diet mostly on carbohydrate-rich food; however, a growing body of robust evidence suggests that carbohydrates are fattening, and saturated fat is healthy (Gershuni, 2018; Hamley, 2017). Ebbeling et al. (2012, 2018), in their isocaloric experiments, found that calories coming from the high-carbohydrate low-saturated-fat diet induce the risk of Obesity and indirectly reduces the propensity of participants towards physical activity; this was not true when tested by feeding the same number of calories coming from high-saturated-fat low-carbohydrate diet. These isocaloric experiments suggest that all calories are not the same, and it is the type of calorie that triggers Obesity, not the amount. However, unfortunately, despite the substantial scientific literature, this is still poorly understood by scientists, clinicians, media writers, and policymakers.

Instead, the public is bombarded with an unhelpful message about "calorie tracking/counting" as a means of maintaining a 'healthy weight,' and many people continue to assume that Obesity is only attributable to a lack of exercise. This mistaken conception stems from the food industry's "Public Relations" or "Image Management" machine, which—for their commercial benefits—employs frighteningly similar methods and techniques to those employed by Big Tobacco. Big Tobacco is a collective term used to collectively refer to the global tobacco industry's most prominent companies.

FOOD INDUSTRY MIMICKING BIG TOBACCO:

Almost five decades ago, since the initial links between smoking and Lung Cancer were revealed, the tobacco industry has effectively hindered government interventions. As phenomenally explained by Brownell and Warner (2009), the demolition was carried out using "The playbook". The Playbook was a Master plan, a script that Big Tobacco thoughtfully drafted to deny good science, establish distraction by creating doubts, and confuse the public. Interestingly, David Kessler—a former Food and Drug Administration (FDA) commissioner—wrote in A Question of Intent:



"Devised in the 1950s and '60s, the tobacco industry's strategy was embodied in a script written by the lawyers. Every tobacco company executive in the public eye was told to learn the script backwards and forwards, no deviation was allowed. The basic premise was simple—smoking had not been proved to cause cancer. Not proven, not proven, not proven—this would be stated insistently and repeatedly. Inject a thin wedge of doubt, create controversy, never deviate from the prepared line. It was a simple plan and it worked." (Kessler, 2001, p. xiii, as cited in Brownell & Warner, 2009).

Like Big Tobacco, as stated by Brownell and Warner (2009), the food industry today appears to have similar strategies, one of which is to convince everyone—professionals and public—to "emphasize physical activity over diet." For instance, Coca-Cola—which spent an average of \$4 billion/year over the last six years on advertising (Conway, 2021)—promotes the idea that *'all calories count, no matter where they come from'* (Hsu, 2013). They link their goods to sports, implying that it is acceptable to consume their beverages as long as you exercise. For example, the following is the quote made by Coca-Cola, which is reported by Hsu (2013): *"...if you eat and drink more calories than you burn off, you'll gain weight."* On top of this, Coca-Cola advocates that this idea (of "all calories count") is common sense (Hsu, 2013). Science, on the other hand, acquaints that this is both deceptive and incorrect. It is important to know where the calories originate from, i.e., the quality of calories. Sugar or carbohydrate calories encourage body-fat accumulation as well as appetite. On the other hand, fullness, or satiation, is induced by the calories coming from dietary-fats; and these calories are not likely to encourage body-fat accumulation (here, the "dietary-fats" does not refer to the Industrial Trans Fat (ITF) because ITF is harmful to health; therefore, this article is not supporting the ITF's consumption at all)

IT IS NOT JUST ABOUT COUNTING CALORIES AND EXPENDING THEM:

In a very extensive—including 175 countries—econometric analysis of sugar availability across the globe uncovered that for every excess 150 sugar calories, there was an 11-fold increment in the Type-2 Diabetes Mellitus's prevalence, compared to—the equal amount—150 calories from other food/macronutrient sources (Basu, Yoffe, Hills, & Lustig, 2013; Diabetes In Control [DIC, 2015]). This was true regardless of

the individual's body weight or degree of physical exercise. This study has enormous Public Health implications because it suggests that, statistically, the variation in diabetes prevalence cannot be explained by the variation in physical activity, Overweight or Obesity; however, it can be explained by the variations in sugar availability.

This ultimately indicates that every calorie is not the same, and merely counting the calories or attempting to burn them by exercising may not keep a person from metabolic complications or NCDs because a choice of lousy calorie can outrun the metabolic benefits of exercising; where the lousy entitles to the calories coming from sugar, and also, as explained by Taubes (2007, 2011, 2020), from most carbohydrates. However, despite the existence of quality evidence, unfortunately, merely a lack of exercise and increased consumption of overall calories is considered as the most decisive risk factor for NCDs (including Obesity) by most Public Health policymakers, frontline health workers, and the general public.

CARBOHYDRATE RESTRICTION: A SINGLE MOST EFFECTIVE INTERVENTION:

Moreover, according to a nutrition-related critical review published collectively by twenty-six authors, dietary carbohydrate restriction is the single most effective intervention for lowering all characteristics of the metabolic syndrome and should be the primary approach in diabetes care (Feinman et al., 2015). The metabolic benefits of a carbohydrates restricted diet can be experienced and observed regardless of the weight loss, although they are still the best way to lose weight or body-fat (Feinman et al., 2015). This suggests that a proper dietary intervention—mainly restricted in carbohydrates—could do both, i.e., induce a fat-loss (resolving Obesity) and reduce the risk of developing metabolic disorders or NCDs. These comprehensive metabolic benefits—as this article has discussed in length so far—may not be achieved through merely exercising and restricting overall calories.

A CONCERN OF TYPE-2 DIABETES IN HIGH-CARBOHYDRATE EATING ATHLETES:

"Carbohydrate Loading" (CL) and "High Carbohydrate Diet" (HCD) is a longstanding practice advocated by most sports scientists and coaches; however, Noakes, Volek, and Phinney (2014) argue otherwise. According to the conventional way of thinking, CL and HCD in



sports are mainly justified by the following two points: first, the body's ability to retain carbohydrates is limited; second, carbohydrates are required for more intensive activity. On the other hand, Noakes et al. (2014) found that prolonged adaptation to a high-fat low-carbohydrate diet causes quite a high fat-oxidation rate during exercise, which is adequate for most exercisers in most kinds of exercise, without the need for additional carbohydrates. As a result, it appears that dietary-fat, including ketone bodies, is the best fuel for most activities; it is plentiful, does not require replacement or supplementation during activity, and can feed the types of exercise that the majority of individuals engage in (Noakes et al., 2014). As these dietary practices—CL and HCD—exacerbates Insulin Resistance (IR), Noakes et al. (2014) have proffered a concern of the chance of developing Type-2 Diabetes Mellitus in insulin-resistant athletes if they practice CL and HCD for decades. This again suggests that even rigorous physical activity may not block the adverse effects of poor nutrition, mainly attributed to the calories coming from sugar and carbohydrates.

LEGISLATIVE ACTIONS NEEDED:

In order to increase the sale of nutrient-deficient products, overestimating the healthfulness of an item merely on a single claim—such as being low in calories or low in fat or reduced-fat—is known as the "Health Halo Effect". The food industry creates this effect and uses it to benefit because it forms a misleading image of a particular food product being healthy.

Research dealing with the Front-Of-Package (FOP) labelling illustrates that a macronutrient-related claim such as Low Fat can successfully lead a consumer to perceive that product as a "healthy choice", ignoring the impact of other nutrients (Fernan, Schuldt, & Niederdeppe, 2018). For example, low-fat or fat-reduced products, to maintain palatability, are generally high in sugar and carbohydrate (Nguyen, Lin, & Heidenreich, 2016); therefore, the Health Halo Effect attached with low-fat labelled products can indirectly increase the consumption of sugar and carbohydrates. Similarly, a low-calorie label can lead to increased consumption without considering the quality/type of the calorie, which is the prime factor in defining a product's healthiness.

Vested interests have tainted diet and exercise-related public Health messages and misexplained the relationship between diet, exercise, and Obesity & Type-2 Diabetes Mellitus's

epidemics to the broader public. The marketed fraudulent connection between junk food and sugary drinks with sports—which is not just misleading but also unscientific—must be sabotaged by implementing legislative actions. Government actions—for example, by the UK government—such as introducing Soft Drink Industry Levy (SDIL) or the prohibition of junk food advertising are sabotaged by this deceptive marketing. These marketing tactics boost the junk food industry's profits by sacrificing the population's health.

The Centers for Disease Control and Prevention (CDC, 2013) Health Impact Pyramid explains the effectiveness of different types of Public Health intervention. This pyramid clearly explicates that changing an environment/context using legislative actions—as compared to counselling and educating the public—is way more effective, making the public's default decision healthy. In other words, a healthy context/environment/surrounding leads to healthy choices. This, therefore, clearly suggests that improving the food environment will default the public's preferences to healthy food; this will have a far more significant impact on Public Health than counselling, teaching, or behavioural change interventions. Furthermore, to make healthy choices easy, educational, health, and physical activity-related settings—such as universities, schools, colleges, hospitals, sports & health centres, and gyms—should take the lead to remove the sale of unhealthy food—mainly sugars and the junk—from their premises and vending machines.

FINAL WORDS:

Considering the ever-rising enormous global burden of NCDs and Obesity, the time has come to clear the Public Health message: physical activity may not influence the Obesity risk, nor it can be used as a weapon to counterbalance the consumption of sugar and carbohydrates. To reiterate: this article is not against the Public Health physical activity guidelines and does not discourage people from exercising. This article highlights how the calorie's quality plays a vital role than the quantity, and physical activity is not a compensatory tool. It is time to sabotage and reverse the years of Public Health damage caused by the commercial food industry's longstanding strategies to disseminate an unscientific and deceptive notion of "emphasising physical activity over diet."

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CONFLICT OF INTEREST:

None.

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