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### ABSTRACT

Apart from its Dopamine releasing action which produces the “Pleasure effect”, Nicotine (Tobacco) has also been associated with weight loss. The association between Smoking and weight loss or say the correlation between the high levels of nicotine in the blood and the increased blood glucose levels has been intriguing. Also, Nicotine induced Insulin Sensitivity has also been observed among the smokers which in turn predisposes the addicted to Type 2 Diabetes. On the other hand, cigarette smoking; for its predicated weight loss effect, has been practiced by a lot of people since decades. The actual mechanism by which it causes the weight loss revolves around how nicotine raises the blood glucose levels by its catecholamine releasing action and the increased satiety which follows it. Also, the lipolysis induced by the nicotine has also been considered one of the factors aiding the presumed weight loss.

**KEYWORDS:** Smoking, Tobacco, Cessation.

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### INTRODUCTION:

Cigarette smoking for weight loss is a practice dating to early knowledge of nicotine as an appetite suppressant. Tobacco use was associated with appetite suppression among pre-Columbian indigenous Americans and old world Europeans.<sup>[1]</sup> For decades, tobacco companies have employed these connections between slimness and smoking in their advertisements, mainly in brands and advertisements targeting women. Culturally, the links between smoking cigarettes and controlling weight run deep. While it is unclear how many people begin or continue smoking because of weight concerns, research reveals that white female adolescents with established weight-related anxieties are particularly prone to initiate smoking.

Although knowledge of nicotine’s effects upon the appetite can contribute to people smoking for weight control purposes, studies have not shown that people smoke exclusively to maintain or lose weight.

Though smoking is widely discouraged by public health professionals for its countless negative health consequences, nicotine may be an appetite suppressant.<sup>[2]</sup> Nicotine could reduce appetite and influence an individual’s eating habits. A study on nicotine’s effects on appetite demonstrated that “net effects of nicotine include elevated blood pressure, heart rate, and gastric motility while eliciting a sustained decrease in food intake or appetite. Autonomic, sensory, and enteric neurons each

constitute potentially important loci for nicotine-mediated changes in feeding behavior.”<sup>[3]</sup> Thus the cultural associations between smoking and weight control in part reflect the body’s physiological reactions to nicotine.

Nicotine gum has similar effects to cigarettes in terms of appetite suppression, and there are some people who do not smoke, but use nicotine gum or any other Nicotine replacement product for the purpose of weight control or weight loss.

Nicotine can also lower insulin levels in a person’s bloodstream, which can reduce cravings for sugary foods.<sup>[4]</sup> Furthermore, “nicotine-triggered effects of adrenaline on the stomach’s musculature” lead to temporary feelings of subsided hunger.<sup>[5]</sup> Other studies have shown that smokers expend more calories while engaged in activity, which echo conclusions that smokers experience heightened metabolic rates.<sup>[6]</sup> Also worth noting are the diuretic properties of nicotine, which causes lower calcium levels in the blood.

There is much controversy concerning whether smokers are actually thinner than nonsmokers.<sup>[2]</sup> Some studies have shown that smokers—including long term and current smokers—weigh less than nonsmokers, and gain less weight over time.<sup>[7]</sup> Conversely, certain longitudinal studies have not shown correlation between weight loss and smoking at least among young persons.<sup>[8]</sup> Accordingly, while the connection between nicotine and appetite suppression, as well as other

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physiological responses to nicotine consumption, has been established, whether these chemical and biological reactions translate to smokers being thinner than nonsmokers (at least concerning certain age groups), is still debated. Age may act as a compounding factor in some of these studies. Essentially, a causal relationship has not been explicitly established between physiological effects of nicotine and epidemiological findings about weight among smokers and nonsmokers.

### **Perceptions of weight control among adolescent users:**

While most adults do not smoke for weight control,<sup>[9]</sup> studies have shown that associations between tobacco use, being thin and desire for weight control do influence adolescents in terms of smoking behavior. Research demonstrates that adolescent girls that strongly value being thin are more likely to initiate smoking.<sup>[10]</sup> Additionally, girls already engaged in risky behavior for weight control are at increased odds to begin smoking as well.<sup>[11]</sup>

Further research needs to examine trends in ethnicity concerning women and smoking for weight control. So far, studies have shown that young white women may be more prone to use cigarettes to manage their weight. Advertisements for particular brands and types of cigarettes seem to target this demographic accordingly.

Several studies have been conducted over the past decade examining this issue in depth.<sup>[12][13][14][15]</sup>

While it has generally been found that white females are more apt to smoke to lose weight, one study found that smoking to lose or control weight is not limited to white females, but is prevalent across racial and gender boundaries.<sup>[16]</sup> Within all racial groups, it was found that weight concerns and negative body perceptions were a significant factor in an adolescent's decision to smoke. However, it should be noted that the relationship between weight and smoking amongst young men was only statistically significant in white or mixed race groups.

In the past, studies have shown that adolescent girls do consider weight loss or weight control to be one of the positive values of smoking. Overall, young women and girls concerned about weight control, particularly those already using unhealthy weight

control techniques, are at a higher risk of smoking.<sup>[17]</sup>

### **Mechanism**<sup>20,21,22,23</sup>

Nicotine induced secretion of Catecholamines, as well as other hormones, such as glucagon and human growth hormone (HGH), impair the action of insulin and can induce insulin insensitivity. In fact, it has been reported that, at the cellular level, catecholamines impair the pathways that are related to the production of insulin, and the activity and synthesis of the proteins that transport glucose to cells. It is possible then that nicotine – via these and probably other as yet poorly understood brain and tissue-receptor mechanisms – impairs both insulin sensitivity and insulin secretion. It is possible that nicotine impairs both insulin sensitivity and insulin secretion

Studies have shown that smokers tend to become insulin resistant, and to compensate, their blood sugar levels rise to levels higher than normal, but not to full-blown diabetic levels. Some studies demonstrate that nicotine and cigarette smoking induce high levels of the stress hormone cortisol. As cortisol excess is known to induce insulin resistance, it has been suggested that glucocorticoids, such as cortisol, are the missing [causative] link between cigarette smoking and insulin resistance.

### **Fats:**

Additionally, the intake of nicotine provokes an increase in the breakdown of fats (lipolysis) and a rise in levels of free fatty acids in a person's blood. Nicotine does this in part by activating the adrenaline-related mechanisms in the brain and by directly activating a lipolytic cell surface receptor, located in fatty tissue. In turn, this chronic increase in levels of fatty acids adversely affects insulin sensitivity and insulin secretion through direct effects on the liver, pancreas and muscle.

### **Oxidative stress:**

Finally, we know that smoking increases oxidative stress, causes inflammation, and reduces the flow of blood to muscle, further contributing to the development and progression of insulin insensitivity and type 2 diabetes. However, although these factors have been found to be closely related to insulin insensitivity and impaired glucose

tolerance, the potential role of chronic inflammation and/or increased oxidative stress in the development of type 2 diabetes has not yet been fully established. Smoking may impact on the distribution of a person's body fat. It is possible that some of these factors play an important role in mediating some of the negative effects of tobacco smoke on a person's glucose and fat metabolism.

### **Tobacco cessation and the associated Weight Gain**

Weight gain as a side effect of smoking cessation remains a major aspect of smoking and weight control. People can be discouraged by weight gain experienced while quitting smoking. Weight gain is a common experience during smoking cessation, with roughly 75% of smokers gaining weight after quitting.<sup>[18]</sup> As nicotine is an appetite suppressant and smokers expend more energy, weight gain due to smoking cessation is generally attributed to increased caloric intake and a slowed metabolic rate.

Weight gain can be a deterrent in the smoking cessation process, even if many smokers did not smoke for weight control purposes.<sup>[19]</sup> Those in the

process of quitting smoking are recommended to follow a healthy diet and to exercise regularly. Most quitting advice encourages people to not be discouraged should they experience weight gain while quitting smoking, as the health benefits of quitting almost always exceed the costs of weight gain. Studies have shown that weight gain during the smoking cessation process can often be lost eventually through diet and exercise.

### **An Urgent need for prevention:**

There is abundant published evidence to support the strength and biological plausibility of the associations between tobacco smoke, reduced insulin sensitivity and the increased risk of developing type 2 Diabetes. Diabetes and tobacco use is a harmful combination. It is extremely important for people to stop smoking, or better still, never to start using tobacco. Every effort should be made to implement urgent lifestyle changes where necessary in order both to prevent the development of diabetes and, in people with the condition, to reduce the progression of chronic diabetes complications.

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