

Review Article

A REVIEW ON NICOTINE FOR HEALTH: INSIGHT FOR “PRO-HEALTH” NICOTINE USAGE

FLORENCE PRIBADI¹, RAHAJOE IMAM SANTOSA², ARIEF GUNAWAN DARMANTO¹

¹Pharmacology, ²Clinical Pathologist, Faculty of Medicine, Universitas Ciputra Surabaya, Citraland CBD Boulevard, Made, Kec Sambikerep, Surabaya 60219, East Java, Indonesia
Email: florence.pribadi@ciputra.ac.id

Received: 17 Mar 2020, Revised and Accepted: 19 May 2020

ABSTRACT

Nicotine is a major chemical of tobacco that makes smokers having difficulties to stop consuming cigarette. That chemical is an alkaloid-based plant and known for one of the major compound of cigarette. Many researches showed the negative side of nicotine. In contrast, a recent study showed the benefits of nicotine. Some researches proved that nicotine has high possibility to improve the depressive behavior both in animal models and human subject. In addition, more research also proved that nicotine has cognitive-enhancing effects, which means it has the ability to improve the function of working memory, episodic memory, attention, and fine motor function. The current review deliberates about the good side and the diversity usage of nicotine, particularly in medicine, as novel therapeutics for neurodegenerative diseases.

Keywords: Nicotine, Cigarette, Tobacco, Cognitive-enhancing effects

© 2020 The Authors. Published by Innovare Academic Sciences Pvt Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>)
DOI: <http://dx.doi.org/10.22159/ijcpr.2020v12i4.39081>. Journal homepage: <https://innovareacademics.in/journals/index.php/ijcpr>

INTRODUCTION

Nicotine is an alkaloid-based plant famous for being an active ingredient of cigarette smoke. It is addictive and has been related to several diseases but, as a coin nicotine, has another side that has been understudied. Recent research results reveal the health benefits of nicotine [1]; hence, it deserves a throughout review for better understanding to bring insight for pro-health nicotine usage.

Does nicotine all bad? Nicotine is always associated with tobacco, smoking and harm for health when tomatoes and black tea are also sources of nicotine but they are considered healthy food and not carcinogenic [2]. Smoking is listed as a carcinogen in IARC monograph [3], along with drinking hot coffee [4] and DDT [5], but nicotine is not. Cigarette smokes contain 69 carcinogenic chemicals, other than nicotine [6, 7].

Smoking also a risk factor for metabolic syndrome, yet smoking cessation is also causing weight gain which lead to obesity and diabetes, but nicotine is associated to appetite control; hence, nicotine is used in weight loss research [8–13]. Other doubt raised from cardiovascular department, where smoking paradox is found. Acute myocardial infarction has lower mortality rate in smokers and also revascularization and reperfusion therapy is more effective in smokers [14–19].

Nicotine has also been widely researched for medicinal purposes, especially in Parkinson and other neurodegenerative disorders [20–24]. All of the positive points above are obscured from the hazards of smoking. How did human first encounter nicotine from tobacco?

Bitter sweet relationship with tobacco

Tobacco plant (*Nicotiana tabacum*) is a cross between *Nicotiana glauca* and *Nicotiana glauca*, a nightshade family along with bell peppers and eggplant, but *N. tabacum* has the highest nicotine content of all plants [25]. Tobacco farming is still farmer favorite plant as it brings higher revenue compared to chili, hybrid corn or soy [26]. Tobacco product industry also brings 96.65% of exercise duty in 2016 and absorb more than 4 million workers in industry sector and about 1.7 million farmers [27]. On the other side of the high employment rate and revenue for people, and also government tax income, there is health sector protest. Smokers starting age gets younger, and there are more and more diseases are attributable to smoking [28, 29].

As exercise duty, health concern and vape popularity increases, cigarette sales decreases [30–32]. A leading cigarette industry is

developing heat not burn cigarette, as a method for smokers to continue on enjoying cigarette without the smoke [33]. Government farming, industry and health sector, should aware of this shift and be prepared for future change. Another alternative is to bring product diversity to from tobacco leaves and industry waste. The love and hate situation with tobacco been around since Christopher Columbus era. He brought the gift of tobacco back from San Salvador, and Sir Walter Raleigh began tobacco farming in Virginia, until now, Virginia tobacco dominate 40% of world tobacco population [34].

King James I first wrote the famous “A Counterblast to Tobacco” in 1604, an-eight-sections long essay describing his resentment to tobacco, and exercise high tax for tobacco, yet he was addicted to the revenue stream and even monopolies the importation and sales of tobacco [35]. Tough by time health concern for smoking is rising, it has hooked and rooted deep hence unavoidable.

During wars times, smoking was considered as a “comfort” and lighten the hardships, when the soldiers didn’t know if they will be still alive in the next 20 min, long term health havoc of nicotine usage is a minor concern [36]. Why people smoke and why tobacco leaves is the chosen one for smoking it is down to the main content that is nicotine.

History of tobacco use for health

Tobacco has been used since the Mayan empire at first for religious purposes, along with other mixture of herbs, considered sacred and have medicinal use [37, 38]. The odor of fresh green leaves was used to relieve persistent headaches by Catherine de’ Medici and her son Francis II, hence tobacco leaves was called the Queen’s herb [39].

The powdered leaves used to treat cough and cold and as toothpaste, the leaves can be applied topically to heal wounds and burns; believed to improve respiratory diseases and in desperate cases, until it was regarded as penicillin of the seventeenth century [38, 40, 41]. The dispute of tobacco usage also occurs among physicians, tough no one questions tobacco’s effectiveness to ward of outbreak of plaque and outbreak, kills germs and ward of diseases, all concurs that it also brings constitutional effects [40].

As scientist manage to isolate nicotine from tobacco leaves, the usage grows The use of nicotine as pesticide was vastly popular until in 1940s when new and cheaper pesticide is invented, along with more and more health hazard awareness’ campaign [42].