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The Inverse Relationship between Tobacco Use and Body Weight

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1. INTRODUCTION

Cigarette smoking in the United States is responsible for one-third of cardiovascular diseases, one-third of cancer deaths, a large number of respiratory diseases, and a substantial proportion of deaths by fire (USDHEW, 1979; USDHHS, 1982, 1983, 1984). Other forms of tobacco use (e.g., smokeless tobacco) are responsible for additional cases of neck and head cancer (USDHHS, 1986; NIH Consensus Conference, 1986). In fact, more than twice as many deaths are caused by tobacco products in this country than by all other addictive drugs combined, including alcohol (USDHHS, 1988). Despite the well-known and extensively documented health risks of cigarette smoking and tobacco use, 51.1 million Americans smoke cigarettes and additional millions consume other forms of tobacco (USDHHS, 1988). Improved understanding of why people use tobacco products and are reluctant to give them up is important in order to design more effective cessation and prevention strategies.

Many smokers report that control of body weight is a major reason why they smoke and refuse to quit (Charlton, 1984; Klesges and Klesges, 1988; Page, 1983). This chapter reviews evidence that there is an inverse relationship between cigarette smoking and body weight and discusses the role of nicotine in this relationship. Possible reasons for the inverse relationships between smoking and body weight, and nicotine and body weight, are presented, and studies that examine each of these reasons are reviewed. Mechanisms that may underlie the reasons for the nicotine/body weight relationship are discussed. Finally, the data and postulates linking nicotine and body weight are considered with respect to other pharmacological agents of addiction.

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2. CIGARETTE SMOKING AND BODY WEIGHT

The generalization that cigarette smoking helps to control body weight is supported by two types of data: (1) cross-sectional between-subjects comparisons of the body weights of smokers and nonsmokers; and (2) longitudinal within-subject assessment of the body weights of smokers who quit smoking compared to nonsmokers. These two data bases are reviewed.

Between-Subjects Comparisons of the Body Weights of Smokers, Nonsmokers, and Ex-smokers

Studies comparing the body weights of smokers and nonsmokers date back 100 years. There are several reports published in the 19th century that tobacco use stunts growth (Otis, 1884; Kitchen, 1889; Seaver, 1897). Between 1900 and 1970, many studies reported that tobacco use was associated with lower body weights (Anderson, 1914; Ashford et al., 1961; Blackburn et al., 1960; Bogen, 1929; Fink, 1921; Heath, 1958; Higgins and Kjelsberg, 1967; Holt, 1921; Jenkins et al., 1968; Lickint, 1933; Pemberton and Macleod, 1956; Taylor, 1910). However, some studies conducted during this period reported no significant weight differences between smokers and nonsmokers (Anderson, 1914; Diehl, 1929; Hadley, 1941; Holt, 1922–1923; Peters and Ferris, 1967; Shah et al., 1959; Short et al., 1939; Turley and Harrison, 1932).

Grunberg (1980, 1986*a*) pointed out that most of the null findings regarding smoking and body weight were based on studies of adolescents and young adult males. He suggested that the limited exposure of these subjects to tobacco may be partially responsible for the lack of a smoking/body weight relationship. Also, the high metabolic rates that naturally occur for young people may have masked or offset any effects of tobacco on body weight. Possibly, the sex of the subjects contributed to the weak findings as well.

Studies that included a large age range of subjects report a consistent inverse relationship between cigarette smoking and body weight. Moreover, examination of subjects by age group supports Grunberg's (1980, 1986*a*) suggestion that the null findings reported by some investigators are attributable to the youth of their subjects. For example, Higgins and Kjelsberg (1967) compared the body weights of 5020 smokers and nonsmokers who ranged in age from 16 to 79 years. Over all ages smokers weighed significantly less (roughly 8 lb less) than did nonsmokers. However, the 16- to 19-year-old smokers had body weights similar to their nonsmoking counterparts. Kopczynski (1972) studied 1245 smokers and 1814 nonsmokers and similarly reported that, except for 19- to 20-year-old males, smokers weighed less than comparably aged nonsmokers.

A recent review (USDHHS, 1988) of cross-sectional studies on smoking and body weight published between 1971 and 1987 revealed the following (see Table 1): (1) 25 of the 28 (i.e., 89%) studies found that smokers weighed less than nonsmokers; (2) one study reported this relationship for women but not for men (Sutherland et al., 1980); (3) one study reported this relationship for 45- to 49-year-old men but not for 40- to 44-year-old men (Hjermann et al., 1976); (4) one study did not find a body weight difference (Waller and Brooks, 1972).