

RELATIONSHIP BETWEEN CIGARETTE SMOKING AND BODY MASS INDEX IN THE ITALIAN POPULATION

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ABSTRACT

Objective: Tobacco smoke, as numerous studies have established, is due to some diseases related to the respiratory, cardio - circulatory and gastrointestinal systems. In addition, tobacco consumption is often associated with a decrease in weight, while former smokers often experience an increase in BMI. The purpose of this research is to test the behavior of body mass index in relation to a representative sample of the Italian population, covering the period 2004-2005.

Design: Calculations were made using SPSS software. The data were stratified by age and gender, using odds ratio (OR) to determine the significance of smoking in relation to BMI. The OR was calculated both in a timely manner, both considering a confidence interval of 95%.

Material and methods: In this research, we will analyze the variable "BMI", in relation to the variable "tobacco smoke", derived from the multipurpose ISTAT called *Condizione di salute e ricorso ai servizi sanitari*. The sample was stratified by age, 18 years and over, and gender.

Results: The analysis shows that in 2005, 10% of the Italian population results in overweight, while 22% said they smoke; 23% of female smokers claiming to be underweight, while for the former smokers the value drops to 10%. For males, the difference in BMI between smokers and former smokers is minimal. The OR shows that weight gain among former smokers and smokers is actually due to custom/cessation from tobacco smoke.

Conclusion: The structure of BMI in relation to smoking has confirmed the existence emerged in the literature, so that those who quit smoking reflects an increase in weight. However, the results highlighted by some foreign studies, which propose an increase in obesity among former smokers, is not confirmed in the Italian population.

Keywords: body mass index; smoking; odds ratio.

INTRODUCTION

Tobacco smoke, as numerous studies have established, is due to some diseases related to the respiratory, cardio - circulatory and gastrointestinal[1,2]. In this case, smoking acts as an accelerator of metabolism, due to the nicotine content of cigarettes. Therefore, the consumption of tobacco is often associated with a decrease of the weight and, consequently, a decrease in body mass index; by contrast, those who stop smoking may experience an increase in weight and body mass index. Furthermore, the association of smoking styles of sedentary behavior may produce more dyscrasias and diseases in individuals[3-11]. Many are the studies and research carried out at the international level on the relationship between smoking and the development of body weight[12-25]. However, it seems to be missing in the Italian population of rigorous studies on the subject and capillaries. The purpose of this research is to test the behavior of body mass index in relation to a representative sample of the Italian population, covering the period 2004 - 2005, comparing it with the people who, at the time of the survey, stated that they smoke, they have stopped or never having been smokers.

Subjects and methods

In this research, we will analyze the variable "BMI", in relation to the variable "tobacco smoke", derived from the multipurpose ISTAT called *Condizione di salute e ricorso ai servizi sanitari*, created in 2004 - 2005[26]. The subjects studied as part of the investigation are: health conditions (perception of health status, presence of chronic diseases, etc.), the presence of disability, lifestyle (smoking habits, physical activity, etc.) the prevention, the use of health services, the use of drugs or unconventional therapies and the path of motherhood from pregnancy to breastfeeding. In order to minimize the effect of seasonal phenomena, of particular relevance to the issues of health, the survey was conducted on a quarterly basis in the months of March, June, September and December on the

resident population in Italy, net of the permanent members of cohabitation. Every three months, was interviewed a quarter of the total sample. The sample has two stages with stratification of the units of the first stage (Towns). The sample size has been expanded over time, with the assistance of the National Health Fund mandated by the State-Regions Conference to allow regional and sub-regional estimates. The information was collected through direct interview for a part of the questions. In cases where the individual was not available to interview for particular reasons, the information was provided by another member of the family. For another part of the questions has been provided as auto. The survey unit is constituted by the family of fact (FF) associated with the family registry (FA) sampled. The family is in fact defined as the set of people who usually live in the same dwelling and are related by kinship, affinity, affection or friendship. Note that for the detection of a FF are more important than the concepts of "home" and "usual residence", which is not the actual birth registration of individuals living together. Within each FF can be detected none, one or more families. The definition of family is more restrictive than that of the family. In fact, per household means:

1. married or cohabiting couple without children or with children never married nor cohabiting or having children of their own;
2. a single parent with one or more children never married nor cohabiting or having children of their own.

The members of the family that do not meet the above requirements shall be considered as "isolated members". For each survey, it was decided to extrapolate the variables related to the weight and height of individuals. The survey, now no longer in existence, was used in this research to the body of the sample, in addition to the presence of multiple variables related to health conditions, as well as lifestyle. The sample was stratified by age, 18 years and over, and gender.

Data analysis

Calculations were made using SPSS software. The data were stratified by age and gender, using descriptive statistics to analyze the salient features of the variables and the odds ratio (OR) to determine the significance of smoking in relation to BMI. The OR was calculated both in a timely manner, both considering a confidence interval of 95%.

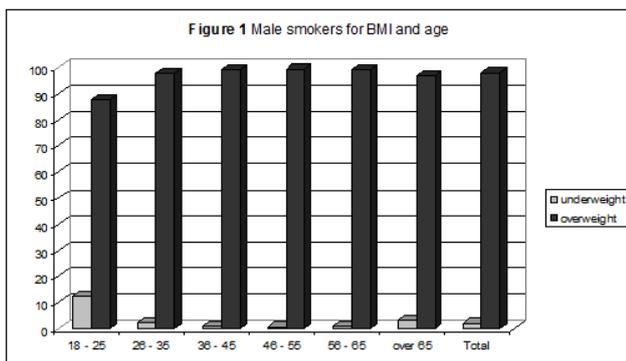
Results and discussion

The descriptive statistics are summarized in Table 1. It is apparent that 43.7% of Italians are overweight, while 22% say they smoke (compared to 55.4% who say they have never smoked) at the time of the interview. Stratification by age shows that the working-age population amounted to 77.6% of the total, while you generally get almost equal: 47.7% males and 52.3% females.

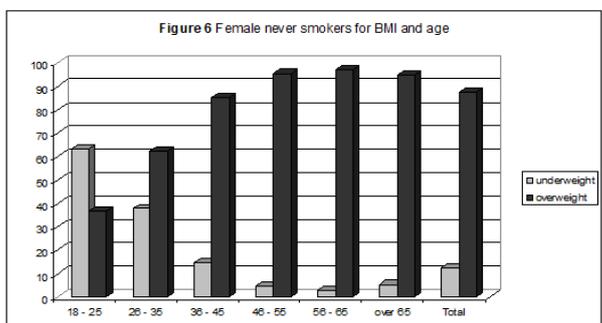
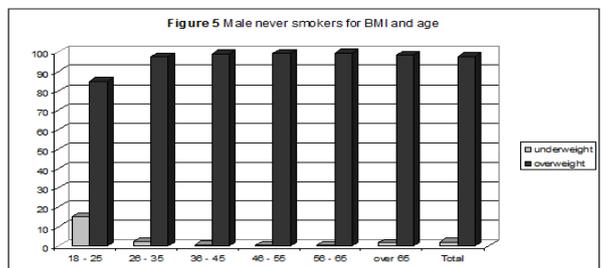
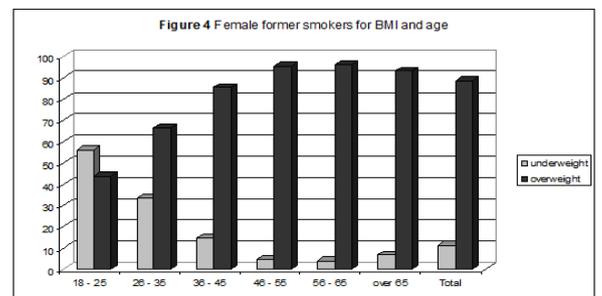
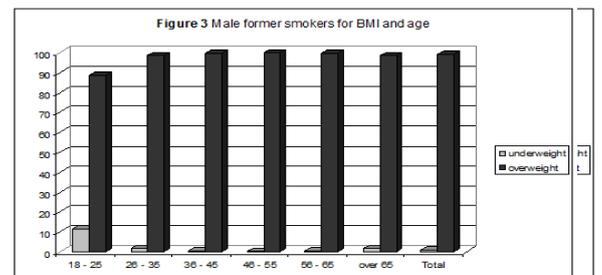
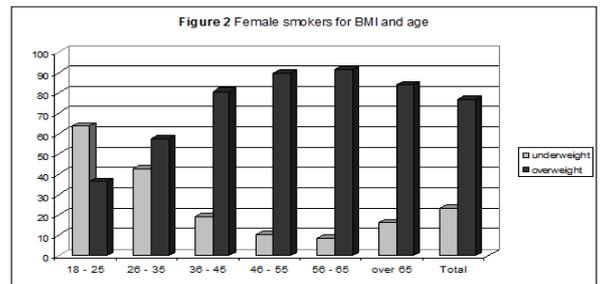
Table 1 Descriptive statistics for the entire sample (N=105844)

Variables	%
BMI	
Until to 19,99	3.4
18,50 - 24,99	53.0
25,00 - 29,99	33.6
30,00 - 34,99	8.4
40,00 - 44,99	1.5
45 and over	0.1
Smoking habits	
Smokers	22.0
Former smokers	22.6
Never smokers	55.4
Gender	
Male	47.7
Female	52.3
Age	
18 - 25	10.4
26 - 35	17.0
36 - 45	19.0
46 - 55	16.4
56 - 65	14.8
oltre 65	22.4
Variables	
BMI	Mean
Age	24.79
	49.19

Going in the analysis for smoking status, gender and characteristics of BMI (overweight, underweight) the following graphs show the evolution of intersections for these variables.



In general, there is an increase in body weight among former smokers compared to smokers. The analysis by gender shows that the female part of the population was affected by a greater increase in BMI among former smokers, compared to female smokers (Figures 2, 4 and 6). The male part of the Italian population, in absolute terms, give the biggest contributor to the increase in BMI than women among former smokers, ex-smokers as males tend to serve a more significant weight gain than females, when they stop



smoking. Interesting analysis by age group, which still shows a marked underweight for female youth classes, analyzed more carefully in other studies[27]. Regarding the male component of the Italian population, there is a general tendency to "excess weight" for each age class (Figures 1, 3 and 5). As for the female, the youngest

age (18-25) shows a higher tendency to "underweight". The next class (26-35) shows an increase of overweight women, which exceed those in under weight. This feature is as true for smokers, former

smokers than for never smokers and, although former smokers show a further increase of the "overweight" compared to the other two variables related to smoking. It should be noted that the female part of the population is, especially in the age groups younger, more

attentive to weight control, compared to their male counterparts, regardless of the habit of smoking tobacco. A better contribution to this analysis comes from processing of odds ratio, which in Table 2 shows the values of the OR in relation to BMI and smoking habits. In the category "non-smoking" have been merged both "former-smokers", and the "never smokers". The variable "underweight" sum the values of BMI less than 18.50, while the variable "overweight2" sum the values of BMI greater than 24.99.

Table 2 Values of OR in relation to BMI and smoking habits

Smoking habits	Underweight			Overweight		
	Value	Confidence interval 95%		Value	Confidence interval 95%	
		Lower	Upper		Lower	Upper
Smokers/No smokers	1.212	1.126	1.304	0.984	0.978	0.991
Smokers/Former smokers	2.314	2.076	2.579	0.951	0.944	0.957
Former smokers/Never smokers	0.421	0.383	0.464	1.055	1.049	1.060
Smokers/Never smokers	0.975	0.904	1.051	1.002	0.995	1.009

The results clearly show that smokers are serving on average lower BMI values than in former-smokers and non-smokers in general. There appears to be little difference between smokers and never-smokers. For former smokers, the OR values are greater than 1, so

those who have stopped smoking affected, indeed, an increase in weight; on the contrary, the values of the OR for former smokers are significantly less than 1 for the variable underweight. A better explanation of this phenomenon comes from the analysis of the OR for gender, summarized in Tables 3 and 4.

Table 3 Values of OR in relation to BMI and smoking habits (females)

Smoking habits	Underweight			Overweight		
	Value	Confidence interval 95%		Value	Confidence interval 95%	
		Lower	Upper		Lower	Upper
Smokers/No smokers	1.875	1.740	2.020	0.876	0.858	0.894
Smokers/Former smokers	2.039	1.819	2.285	0.866	0.846	0.886
Former smokers/Never smokers	0.904	0.816	1.002	1.014	1.000	1.028
Smokers/Never smokers	1.844	1.708	1.990	0.878	0.860	0.896

Table 4 Values of OR in relation to BMI and smoking habits (males)

Smoking habits	Underweight			Overweight		
	Value	Confidence interval 95%		Value	Confidence interval 95%	
		Lower	Upper		Lower	Upper
Smokers/No smokers	1.320	1.090	1.599	0.995	0.991	0.999
Smokers/Former smokers	2.178	1.669	2.808	0.988	0.985	0.992
Former smokers/Never smokers	0.436	0.344	0.554	1.013	1.009	1.016
Smokers/Never smokers	0.951	0.775	1.166	1.001	0.997	1.006

The analysis by gender essentially confirms the findings in the overall analysis (Table 2). Note the greater contribution of female non-smokers, respects to those who have never smoked, in relation to an accentuated weight (Table 3). Regarding the comparison between former smokers and never smokers, the OR values are similar both for males, both for females.

CONCLUSIONS

The structure of BMI in relation to smoking has confirmed the existence emerged in the literature, so that those who quit smoking reflects an increase in weight. However, the results highlighted by some foreign studies, which propose an increase in obesity among former smokers, is not confirmed in the Italian population, analyzed in 2005. For Italians, both males and females, weight gain appears to be content among former smokers without encroaching obesity. Therefore, it should be analyzed more carefully the temporal dynamics, especially in relation to the period in which it is smoked, in relation to the period in which it was stopped smoking, as in other studies[28]. Just always pay attention to the risks and costs associated with obesity [29-30], but it is necessary capillarizzare attention on real causes, which are not necessarily linked to smoking. More attention should be paid to the need to analyze the structure in advance, over time, the physical characteristics of the population in relation to BMI[31], but also to other physiological aspects. Only in this way you can define exhaustively the real contribution of smoking to the

increase or decrease in weight, as well as many other human diseases.

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