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Eating behaviour and well-being: an analysis on the Aspects of Italian daily life"

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Abstract

Nutrition related diseases have reached epidemic proportions in Western Countries. Because of the huge economic costs and the impact on human well-being, nutrition and related disease have become a major public health concern. In this research paper we analyse the factors determining obesity, starting from the ISTAT multipurpose survey "Aspects of italian daily life" on the households, carried out in 2012. The analysis was based on multiple correspondence analysis and using logistic regression models. Starting from the main variables related to nutritional habits, eating habits and eating out, sedentary lifestyle, socio-economic status indicators that imply a different diet we have tried to shed light on the main factors responsible for obesity. From this evidence we tried to suggest the policy interventions can be implemented in order to act on the problem.

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*Keywords:*Obesity ; lifestylist; psychological social aspects; multivariate analysis .

1. Introduction

Nutrition related diseases have reached epidemic proportions in Western Countries. Worldwide obesity has more than doubled since 1980 when only 1 on 10 people were obese. According to WHO estimates in 2014, 39% of adults aged 18+ were overweight and 13% were obese. The problem of obesity has risen worldwide, representing a public health problem with significant economic and social consequences. In Europe, more than 50% of people among

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males and more than 40% among females are overweight. OCSE forecasting (2011 Fit non fat) show that in the following decades overweight and obesity will increase more and more also in countries where the problem is still not important. Because of the huge economic costs and the impact on human well-being, nutrition and related disease have become a major public health concern. The causes of overweight and unhealthy diet, which are of interest for socio-economic aspects, are attributable to socio-environmental and psychological factors that, together, determine the "behaviour" and "decision making" of the consumer. Understanding the causes of consumer food choices is necessary to design interventions for rebalancing the market in an attempt to stem the failures.

The first question of the problem of obesity-related research is the study of the causes that determine it. This has long been addressed by various disciplines, not only medical but also socio-economic, anthropological and behavioural, taking into account the multi-causal nature of the phenomenon and its socio-economic and health impact. There are several approaches to the study of obesity that have analysed socio-environmental factors, physical inactivity, psychological, pharmacological, genetic and metabolic causes. So even in a strictly economic view, overweight and unhealthy eating are all problems, which are expressed by the "consumer behaviour" in the early stages of selection, purchase and consumption of food. Several studies detected and showed the association between BMI and the increase of chronic diseases like high blood pressure, ischemic heart and brain disease, tumours, diabetes, osteoporosis, and psychological problems such as low levels self-esteem and depression. It is therefore strategic for the policy makers to understand the causes of obesity, in order to act on the citizen-consumer and to design interventions that act on the consumer and on companies to correct market inefficiencies that are often connected to these phenomena.

In this research paper, the data have been collected from the multipurpose Italian survey “Aspects of daily life” which was conducted by Italian Institute of Statistics (ISTAT) in 2012. The considered variables are weight and height (to compute the body mass index –BMI), socio-demographic characteristics (gender, age class, educational level, residence), life habits (physical activity) and nutritional habits (modalities and frequency of consumption of certain foods, attention to "food”).

The present study is limited to non-diabetic people aged 18-64 years for the following reasons: i) diabetes affects eating and nutritional habits of overweight or obese people; ii) the data show that the consumption of meals outside the home during the working day can relate almost exclusively to people in working age.

The analysis was based on a multiple correspondence approach using logistic regression models.

Starting from the main variables related to nutritional habits, eating habits and eating out, sedentary lifestyle, socio-economic status indicators that imply a different diet we have tried to shed light on the main factors responsible for obesity. From this evidence we tried to suggest the policy interventions can be implemented in order to act on the problem.

2. Literature review: Obesity, food choices and lifestyles.

Analysing the causes of obesity that are of interest in terms of socio-economic factors,, there are different contributions that address and interpret the problems of obesity in a strictly economic view. The problem of obesity takes a multicasual dimension, which is expressed by the "consumer behaviour" in the early stages of selection, purchase and consumption of food. The nutritional habits, therefore the aspects of variety and balanced diet, have been studied using several approaches, in particular in relation to the aspects related to lifestyle, such as the study of Basu (et al. 2013) on the consumption of soft drinks and obesity and the research of Smith (et al. 2012) on the consequences of sedentary life. Moreover, regarding lifestyle, we found research papers that showed the impact of alcohol consumed before or with meals that tends on one hand to increase food intake and on the other hand, as shown by epidemiological data, to protect against obesity if moderate, particularly in women. In contrast, higher intakes of alcohol in the absence of alcohol dependence may increase the risk of obesity (Traversy and Chaput, 2015; Yeomans 2010). Moreover, some other studies have suggested that eating patterns, which describe eating frequency, the temporal distribution of eating events across the day, breakfast skipping, and the frequency of eating meals away from home, may be related to obesity (Ma. et al., 2003). Other researches showed how the socio-economic status was studied in terms of the impact on different diets. A correlation was found between socio

economic status and fruits / vegetables consumption. In particular, the three categories of food for which the frequency of consumption have been considered were fresh fruit, cheese and cake. To this end, as indicators of socio economic status used in the literature in similar studies (Pechey, et al 2015) were considered the employment from official sources, the gross income, the highest educational qualification, the gender, the age and the ethnicity. Results showed that there is evidence for social patterning in food motivation.

About the other factors, there are also papers that support the impact of psychological and physical factors in influencing obesity. Nemiary et al. (2012) showed the incidence of depression on obesity and overweight and the study of Lopresti (et al 2013) focused on the impact of psychiatric disorders.

Psychosocial stress is emerging as a potential risk factor for excessive weight and obesity (Isasi et al. 2015). Cross-sectional and prospective studies indicate that individuals with higher stress levels are more likely to be obese and to experience greater weight gain over time (Torre, 2007; Iversen, 2012). Psychosocial stress may be related to the development of obesity through biological and behavioural pathways. Biological responses to stress include the activation of neuroendocrine and inflammatory processes that directly increase fat accumulation, promoting visceral adiposity (Wardle J, 2011), and the release of appetite hormones that increase food consumption, leading to a positive energy balance.

Moreover, recent studies (Morris et al., 2014) showed that a diet rich in fats and sugars, on one hand is stimulated by the "reward" effect that reduces the state of stress but on the other hand it is itself a cause of stress and responsible of inflammatory processes of the brain tissues, encouraging to eat abnormal levels of “pleasure foods”. The study thus demonstrates the existence of cyclical and reciprocal interaction mechanisms among stress - research of reward mechanisms –inadequate diet- and again stress. Therefore, the study of the physical conditions of the individual becomes important because they are both cause and effect of the interaction between diet and socio-relational environment.

3. Results from the Multiple Correspondence Analysis

Applying the correspondence analysis, the structural variables (gender, age class, educational level, area) are the active ones together with the body structure indicator (under/normalweight, overweight, obese).The first biplot derives from the intersection of the first and second component and it explains 57,12%of the total variance. The variables that contribute to the construction of the first axis are age class, educational level, type of sports activity and weight; those which contribute to the second axis are gender, sports activity and type of weight (modes under/normalweight and overweight). The contrast between individuals with excess of weight (on the left of the biplot) and individuals in good physical shape (on the right) comes up. The first are more often adult (35-64), residents of the southern regions, poorly educated and not at all interested in a sporting activities. The individuals in good physical shape, as already known in the literature, are most often young adults (18-34), living in the centre-north of the country, medium or highly educated (at least graduates), engaging in regular physical activities. The modes “male” and “female” of the covariate gender, located orthogonally to the first axis, confirm the descriptive results: on the one hand a larger number of overweight people among men (43.5% vs 26.4%) and a larger presence of under / normal weight people among women (64.1% vs 45.0%), and on the other hand a share of obese people not very different by gender (males 11.1% vs 9.5% females). Four groups of illustrative variable were in turn projected on the biplot to measure the association with demographic and socioeconomic framework. The first group accounts for the eating habits in terms of modalities of meals (breakfast habit, main meal, instead of lunch on working days); the second one for the frequency of consumption of certain foods (carbohydrates, meats, fruits and vegetables, legumes) and water; the third group relates to attention to some "food" (oils and fats in cooking and raw, use of salt, consumption of salty snacks and sweets, consumption of carbonated beverages); the forth group to health and psycho social aspects (friends, perceived health, illness and limitation, weight control). The main results are as follows.

1) A very clear relationship with the type of breakfast emerges: more specifically, people who claim to have a proper breakfast (they eat and drink something other than coffee or tea only) are less frequently over weighted and are the same ones that consider breakfast their main meal. An adequate breakfast is confirmed, as is already well known in the literature, as a proxy for the healthy eating habits that predispose to less excess weight. The importance of breakfast for the maintenance of a proper state of health is now recognized, and there are many

scientific evidences that support the role that the first meal of the day has in the organism in metabolic and functional terms: ensuring proper intake of calories and nutrients and contributing to the maintenance of body weight (Ma et al, 2003). On the other hand, as confirmed by many studies conducted in the United States, the habit of having lunch outside the home every weekday at bars, eateries or restaurants, does not seem to be associated with overweight people, although it is possible that food "outside home" is less balanced from the point of view of the contribution of calories and nutrients. This result may depend on the small numbers of respondents, since that habit concerns only 8.4% of interviewees, who, in most cases, have lunch at home (71%), in the canteen (6.4%) or in the workplace (12.3%), with no food consumption in bars, eateries or restaurants.

2) In line with other studies (Wang and Beydoun, 2009; Rouhani et al. 2014), underweight and normal weight individuals rarely consume carbohydrates and meats daily. On the contrary, according to other studies (Field et al, 2003; Ledoux et al 2011), there is a clear relationship between the frequent consumption of fruits and vegetables with normal weight, while excess weight is more closely related to excessive consumption of meats and vegetables rich in proteins. No significant results come from the water consumption and physical shape even if the individuals who claim to dink a minimum of 1,5 litres per day are more often normal weighted. It's well known that water is the best drink to control calorie intake. Adopting healthy hydration habits is not only a matter of "how much to drink" but also of the quality of what we drink. As water does not bring any calories of sugar to our bodies, drinking water is a simple solution to avoid excess of sugar.

3) According to the frequency of carbonated beverages and savoury snacks and sweets, some apparently conflicting results emerge: contrary to what could be expected, obese people state to rarely eat unhealthy snacks and sodas. This result is closely related to the limits of the survey that was cross-sectional, in assessing the relationships between certain eating habits and excess weight. In order to capture the effects of "bad" eating habits that can cause overweight, it is necessary to work on panel surveys. In other words, it allows us to study the association between eating habits at the time of the survey, the excess weight and the behaviour of individuals, especially if obese; behaviour that could develop in the limitation of the intake of high calorie foods but "not necessary" for the proper nutritional intake: the obese and overweight give up sweet and savoury snacks and sodas, probably in an attempt to reduce body weight. The situation is different for carbonated beverages: among people who drink them daily, 9% are obese, a result that can be connected to the low consumption of water that emerged for the same category. Excess weight is associated more frequently with cooking and dressing using vegetable fats and oils different from olive oil and using not iodized salt, although the use of such ingredients has reduced over time. Such behaviour may be considered as a lower level of attention to the quality of foods by obese individuals. With regard to the variables fat, sugar and salt, through the analysis of contingency tables other interesting results come up. A big difference in obesity is given by dressing using other oils and fats. The obese are 10% of the individuals using other oils and 8% of those who use uncooked olive oil. Among those who have always paid attention to salt, 63% are of normal weight, which are also people who most often use iodized salt (61.4% of the sample).

4) With respect to the variables that consider "health and psycho social aspects" it emerges that health conditions (objective and perceived) and socialization have a significant relationships with overweight. Obesity is more frequently associated with the perception of unhealthy conditions, linked to the presence of severe limitations in activities of daily life, and very little or no friendships that can be seen as cause and effect of a situation of confinement. On the contrary, good physical shape, also assured by greater attention to weight control, it is associated with better health and frequent opportunities for socialization.

4. Results from the Multinomial Logistic regression models

The ACM results help to select the main covariates to measure the probability of overweight and obesity in three multinomial logistic regression models. The outcome has three modes: 0=under/normal weight; 1=overweight; 2=obese. The contrast mode is under/normal weight.

Model 1 shows that men aged 35 to 64 years, living in the South with a medium-low education who do not practice any physical activity are more likely to be overweight (see Table 1). In particular, the risk of

overweight/obesity increases by 15-20%, moving from the north to the south; for every obese or overweight woman there are respectively more than 2 or 3 men with this problems; excessive weight increases significantly with age, revealing that for every out of shape young adult about three individuals from 35 to 64 are in the same condition. If the risk of overweight increases by "only" 70 % for those individuals with a qualification lower than the secondary school and who do not practice sport, the risk of obesity doubles.

Having an adequate breakfast protects against overweight/obesity together with the scarce consumption of meat, the consumption of least 4 or more portions of fruits or vegetables a day and to dress foods with raw olive oil. In particular, people who have a poor breakfast have an almost 40% risk of becoming overweight and 63% of being obese. Daily consumption of meat is mainly associated with a higher probability of being obese, while the low consumption of fruits and vegetables give a greater risk of being overweight. This last result may be related to the fact that obese individuals often exceed in the food intake (in other words, they might consume too many portions of fruits and vegetables). The non-use of olive oil is statistically significant only according to the risk of obesity and it can be an indicator of very low attention and concern about unhealthy food. These results should be read not only "per se" but taking into account that the indicators included in the model are configured primarily as proxies of good and bad eating habits and attention to food quality (eg use of raw olive oil. The overconsumption of meat or the habit to have a poor or inadequate breakfast or even the low consumption of fruit and vegetables and the use of fats other than olive oil do not constitute a risk factor for the “excess of weight”, but they may often be a sign of poor eating habits and therefore less attention to health and to quality of foods eaten, all of which are strongly related to the excess of weight.

Table 1. Structural and demographic aspects of individuals related to BMI

variables	% of overweight	Odds Ratios	Sig.	% of obese	Odds Ratios	Sig.
gender						
Men		3.139	***	2.248	***	
women		1		1		
Age class						
15-34		1		1		
35-64		2.564	***	3.058	***	
Area						
North		1		1		
Centre		1.077	***	ns		
South		1.296	*	1.136	**	
Educational level						
Up to low secondary		1.659	***	2.365	***	
High secondary		1.266	***	1.587	***	
Tertiary or more		1		1		
Sport activity						
Continuously		1		1		
Occasionally		1.228	***	1.278	***	
No		1.529	***	2.343	***	

Table 2 Attention and focus to food and nutrients related to BMI

variables	% of overweight	Odds Ratios	Sig.	% of obese	Odds Ratios	Sig.

variables	% of overweighted	Odds Ratios	Sig.	% of obese	Odds Ratios	Sig.
Type of breakfast						
adequate	30.4	1		7.3	1	
take something	32.3	1.370	***	7.7	1.626	
inadequate	36.1	1.104	**	10.2	ns	
Raw seasoning						
Olive oil	31.8	1		7.9	1	
Other seasonings	31.8	ns		9.9	1.255	**
Meat consumption						
At least 1 time a day	31.3	1.245	***	9.7	1.590	***
Sometimes a week	32.4	1.304	***	7.7	1.291	**
rarely	27.1	1		6.7	1	
Carbohydrates consumption						
At least 1 time a day	32.2	ns		8.1	ns	
Sometimes a week	30.1	ns		7.2	ns	
rarely	29.0	1		8.2	1	
Fruits and vegetables consumption						
At most 1 serving a day	32.7	1.150	***	8.1	ns	
2-3 servings a day	32.5	1.162	***	7.7	0.889	**
4 or more servings a day	28.6	1		8.5	1	
Nervous disorders						
yes	33.6	1		15.0	1	
no	31.8	ns		7.7	0.747	**
Frequenting friends						
Rarely or never	34.8	1.177	***	9.2	1.180	***
At least once a week	30.6	1		7.5	1	
Perceivedhealth status						
Discrete, bad, verybad	36.9	1.293	***	12.7	1.914	***
Good/verygood	30.5	1		6.7	1	
Presence of limitations						
serious	34.7	ns		14.8	1.451	***
Notserious	36.3	1.168	***	12.7	1.450	***
No limitations	29.0	1		8.2	1	
Weight control						
Atleast once a week	29.8	1		7.9	1	
Atleast once a month	30.7	ns		8.0	ns	
Rarely or never	33.6	ns		8.1	ns	

Table 3.Psychological and social aspects of individuals related to BMI

Starting from the evidence of the study by Morris, the psychophysical and social characteristics of the sample have been investigated. Table 3 shows the inference using a logit model between BMI and five variables that can represent both the indicators of psychosocial stress and the related perception of the health risk of the respondent.

Three variables were expressed as dummy. The first to indicate the friendly relationships (acquaintances of friends), the second to express the levels of stress generated by the health risk (perceived health status), and the third for the presence of neurological disturbs (nerve disorders). The remaining two variables refer to the presence of physical limitations and the presence of forms of stress generated by behaviours to limit body weight (weight control). The table 3 also shows the significant variables and the levels.

With regard to the levels of socialization, the probability of finding people who are overweight or obese among those who rarely attend friends is 18% higher that related to a more frequent level of meetings (at least once a week). People who have a bad perception of their own state of health have a 30% higher probability to be overweight and the percentage doubles in the case of obesity. This confirms both the pathological nature of obesity but also its ability to generate stress itself during the progress of the problem. Even the physical limitations create clusters of individuals that are more likely to be obese, although in this case the cause-effect relationship cannot be confirmed. Similar results emerge investigating different obsessive behaviours that characterize the phenomenon of obesity and the presence of neurological disorders. In this case, although the logit model is not explicating causal relations but only the probability of connection between variables, we can conclude that the results seem to confirm what was achieved by Morris and others studies at the clinical level.

5. CONCLUSION AND DISCUSSION

The results from this research paper are closely linked to the limits of the survey that was cross-sectional, in assessing the relationships between eating habits, overweight and obesity. In order to capture the effects of poor eating habits preceding the risk of overweight it is necessary to have a panel survey.

However, some habits and eating behaviours like the consumption of an inadequate breakfast, eating too much meat and too many vegetables containing proteins, drinking little water, dressing with oil and grease of poor quality, cannot be perceived as a direct impact on the risk of excess weight. All these eating behaviour are only the expression of a lesser focus on healthy eating habits and of a scarce attention to food quality. There are several approaches to the study of obesity and to the understanding of the causes of consumer food choices. The main results that come up from this research allow stating that the causes of obesity are numerous and some of them are due to incorrect behaviours. Such incorrect behaviours can be investigated also on cross sections data using indicators lights (scarce breakfast, low quality condiments, eating poor quality food, exceed in meat consumption etc.). In this scenario, the Mediterranean diet has been confirmed as a deterrent for the obesity and overweight.

Another interesting result that arises from this study comes from the analysis of demographic and social indicators. They confirm the outcome already widely debated in the literature about the positive relation between the educational level and healthy eating behaviours and the higher probability to find overweight and obese individuals in the south of Italy rather than in the north and centre of the Country. These results shed light on the importance to implement specific policy interventions based on information campaign to correct these behaviours.

Moreover, policy interventions based on information should work towards the creation of a cognitive process that is able to break the connection among stress, food reward and stress from missing pleasure food described in the medical literature, which is behind the psychosocial process that creates an obesogenic environment.

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