**LITERATURE SURVEY**

# The Obesity Epidemic: Challenges, Health Initiatives, and Implications for Gastroenterologists

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# Obesity is the next major epidemiologic challenge facing today's doctors, with the annual allocation of healthcare resources for the disease and related comorbidities projected to exceed $150 billion in the United States. The incidence of obesity has risen in the United States over the past 30 years; 60% of adults are currently either obese or overweight. Obesity is associated with a higher incidence of a number of diseases, including diabetes, cardiovascular disease, and cancer. Consumption of fast food, trans fatty acids (TFAs), and fructose—combined with increasing portion sizes and decreased physical activity—has been implicated as a potential contributing factor in the obesity crisis. The use of body mass index (BMI) alone is of limited utility for predicting adverse cardiovascular outcomes, but the utility of this measure may be strengthened when combined with waist circumference and other anthropomorphic measurements. Certain public health initiatives have helped to identify and reduce some of the factors contributing to obesity. In New York City and Denmark, for example, such initiatives have succeeded in passing legislation to reduce or remove TFAs from residents' diets. The obesity epidemic will likely change practice for gastroenterologists, as shifts will be seen in the incidence of obesity-related gastrointestinal disorders, disease severity, and the nature of comorbidities. The experience gained with previous epidemiologic problems such as smoking should help involved parties to expand needed health initiatives and increase the likelihood of preventing future generations from suffering the consequences of obesity.

# 2) The relationship of autonomic imbalance, heart rate variability and cardiovascular disease risk factors

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# Cardiovascular disease (CVD) is the leading cause of death and disability worldwide. The understanding of the risk factors for CVD may yield important insights into the prevention, etiology, course, and treatment of this major public health concern. Autonomic imbalance, characterized by a hyperactive sympathetic system and a hypoactive parasympathetic system, is associated with various pathological conditions. Over time, excessive energy demands on the system can lead to premature aging and diseases. Therefore, autonomic imbalance may be a final common pathway to increased morbidity and mortality from a host of conditions and diseases, including cardiovascular disease. Heart rate variability (HRV) may be used to assess autonomic imbalances, diseases and mortality. Parasympathetic activity and HRV have been associated with a wide range of conditions including CVD. Here we review the evidence linking HRV to established and emerging modifiable and non-modifiable CVD risk factors such as hypertension, obesity, family history and work stress. Substantial evidence exists to support the notion that decreased HRV precedes the development of a number of risk factors and that lowering risk profiles is associated with increased HRV. We close with a suggestion that a model of autonomic imbalance may provide a unifying framework within which to investigate the impact of risk factors, including psychosocial factors and work stress, on cardiovascular disease.

# 3) Impact of obesity on autonomic modulation, heart rate and blood pressure in obese young people

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# Obesity can be understood as a comorbidity of increasing systemic impact, including a deficit in the autonomic nervous system. To analyze cardiac autonomic behavior and hemodynamic parameters in obese young people. 92 individuals (20.58±1.48years) were evaluated, divided into two groups: obese and eutrophic. Heart rate (HR) was captured for 30min in the supine position whilst breathing spontaneously. Blood pressure (BP) values were obtained prior to performance of the protocol. For the autonomic analysis, 1000 beats were used for the calculation of heart rate variability indices in the time (Mean RR, SDNN and RMSSD) and frequency (LF, HF and LF/HF) domains, in addition to the Poincaré plot (SD1, SD2, SD1/SD2 and qualitative visual analysis). The obese group presented higher baseline BP and HR values compared to the eutrophic. Regarding autonomic modulation a significant decrease was observed in the RMSSD; SD1, HFms and HFnu indices in the obese group, indicating a decrease in vagal activity and reduced SDNN and SD2 rates, with statistical significance for the former, suggesting a reduction in overall variability. The high value of the LFnu index and decrease in Mean RR in the obese group pointed to relative sympathetic predominance in these individuals. The visual analysis of the Poincaré plot showed less dispersion of the points in the obese group. The obese group presented higher BP and HR values at rest and autonomic impairment, characterized by a reduction in parasympathetic activity and relative predominance of sympathetic activity.

# 4) Synthetic Minority Over-sampling Technique

**AUTHORS** : N. V. Chawla ,K. W. Bowyer, L. O. Hall

# An approach to the construction of classifiers from imbalanced datasets is described. A dataset is imbalanced if the classification categories are not approximately equally represented. Often real-world data sets are predominately composed of ``normal'' examples with only a small percentage of ``abnormal'' or ``interesting'' examples. It is also the case that the cost of misclassifying an abnormal (interesting) example as a normal example is often much higher than the cost of the reverse error. Under-sampling of the majority (normal) class has been proposed as a good means of increasing the sensitivity of a classifier to the minority class. This paper shows that a combination of our method of over-sampling the minority (abnormal) class and under-sampling the majority (normal) class can achieve better classifier performance (in ROC space) than only under-sampling the majority class. This paper also shows that a combination of our method of over-sampling the minority class and under-sampling the majority class can achieve better classifier performance (in ROC space) than varying the loss ratios in Ripper or class priors in Naive Bayes. Our method of over-sampling the minority class involves creating synthetic minority class examples. Experiments are performed using C4.5, Ripper and a Naive Bayes classifier. The method is evaluated using the area under the Receiver Operating Characteristic curve (AUC) and the ROC convex hull strategy.

# 5) Accuracy of Body Mass Index to Diagnose Obesity In the US Adult Population

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Body mass index (BMI) is a person’s weight in kilograms divided by the square of height in meters. BMI is an inexpensive and easy screening method for weight category—underweight, healthy weight, overweight, and obesity.

BMI does not measure body fat directly, but BMI is moderately correlated with more direct measures of body fat 1,2,3. Furthermore, BMI appears to be as strongly correlated with various metabolic and disease outcome as are these more direct measures of body fatness.