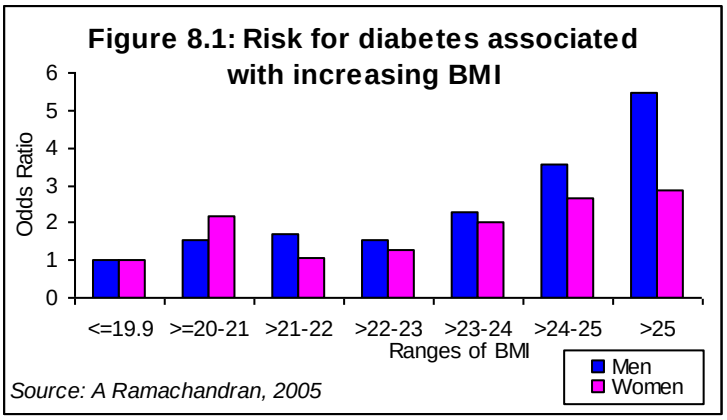
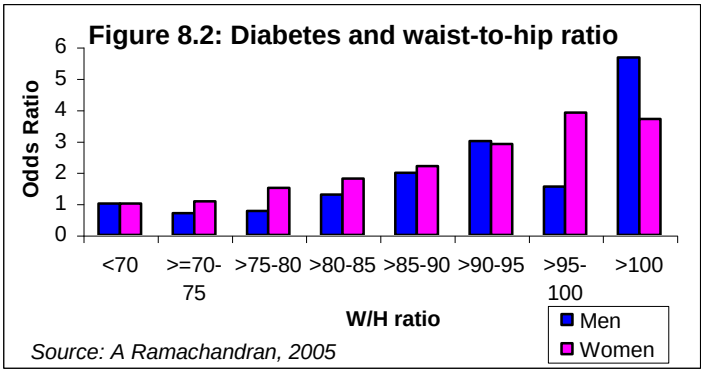
8. OVER NUTRITION NCD LINKAGES

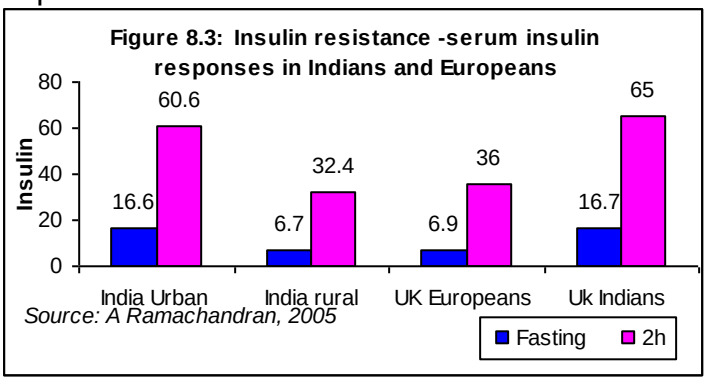
Linkages between over nutrition and diabetes



Studies from Chennai have shown that with increasing BMI there is increase in risk of diabetes both in men and women. There is a steep increase in risk of diabetes when BMI increase beyond 23 (Figure 8.1). There was a progressive increase in prevalence of diabetes with increasing waist-hip-ratio both in men and women (Figure 8.2). Association between abdominal obesity and the metabolic syndrome of hypertension, di



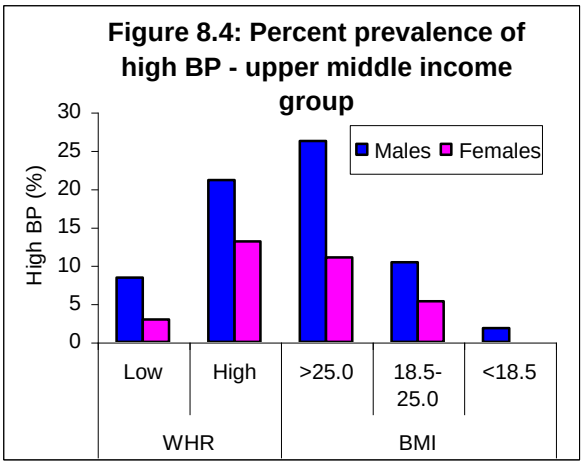
slipedemia, insulin resistance and diabetes have been well documented. Comparison of insulin resistance and insulin response between Indians and UK citizens showed that both fasting and 2 hour insulin levels are lower in Indians in rural areas and Europeans in UK; urban Indians and Indians residing UK have substantially higher fasting and 2 hour insulin levels indicating insulin resistance (Figure 8.3). Data from urban affluent population show that prevalence of insulin resistance is high not only in adults but also in children and young adults (Yajnik et al, 2002).

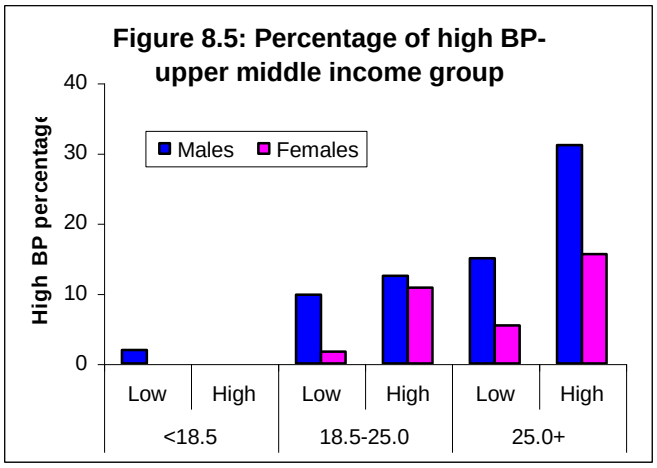


Linkages between over-nutrition and hypertension

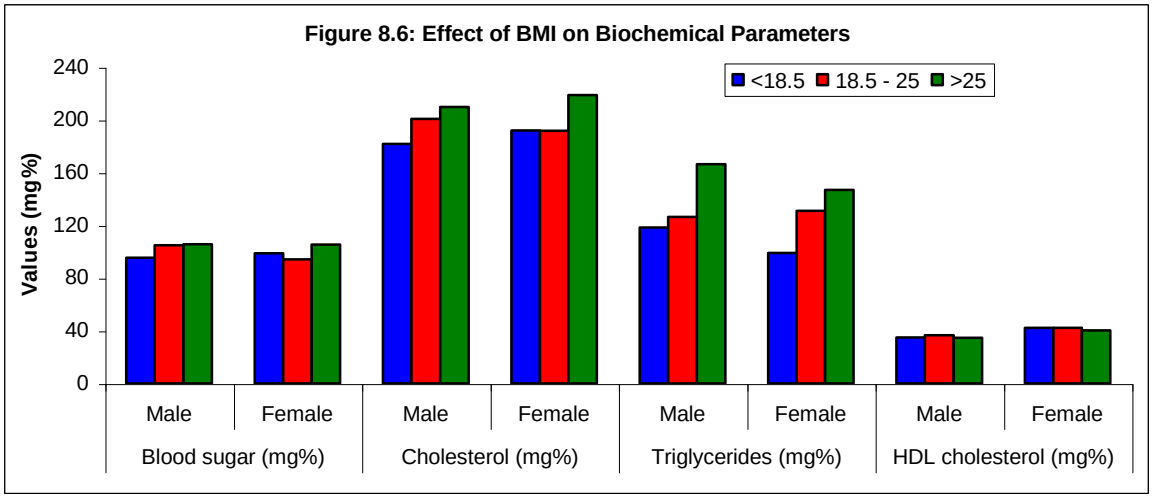
Nutrition Foundation of India carried out studies exploring relationship between over nutrition and cardiovascular diseases in persons belonging to different income groups working in a government institution. In this group prevalence of abdominal obesity (higher waist hip ratio) was higher (50.3%) as compared to

overnutrition (BMI > 25; 30.8%). Higher the BMI and WHR the higher were the

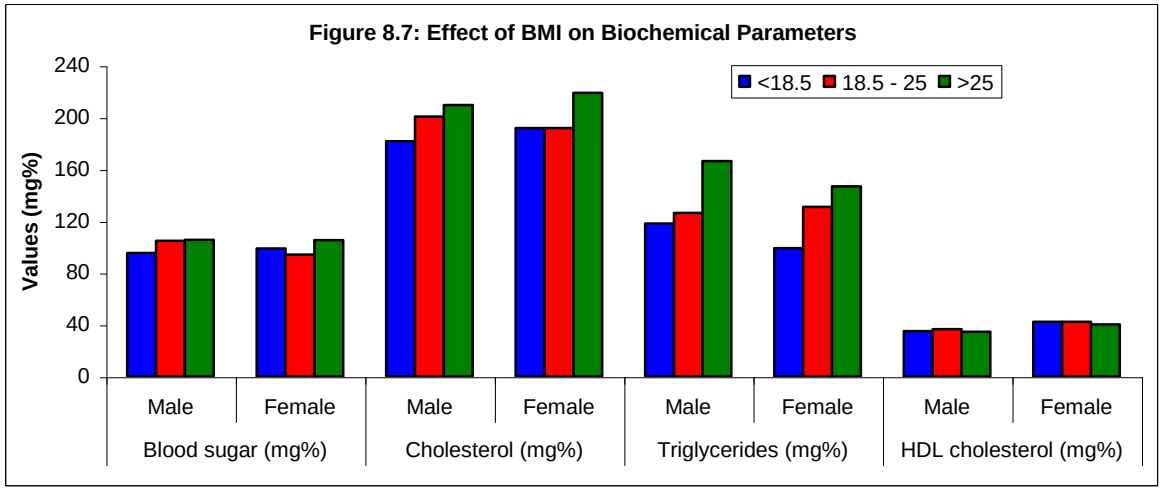




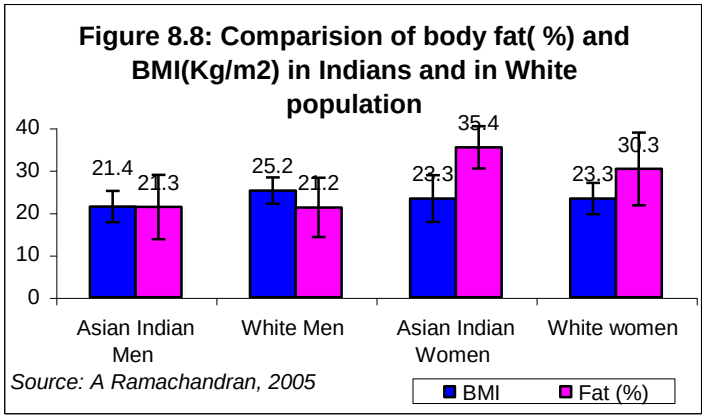
prevalence rates of hypertension both in men and women (Figure 8.4 and 8.5). The prevalence of high blood pressure in the normal and overweight subjects was higher when WHR was high. Overweight/obese subjects of both sexes with abdominal adiposity had higher systolic and diastolic blood pressure. Serum cholesterol and triglycerides in men were significantly higher in subjects with



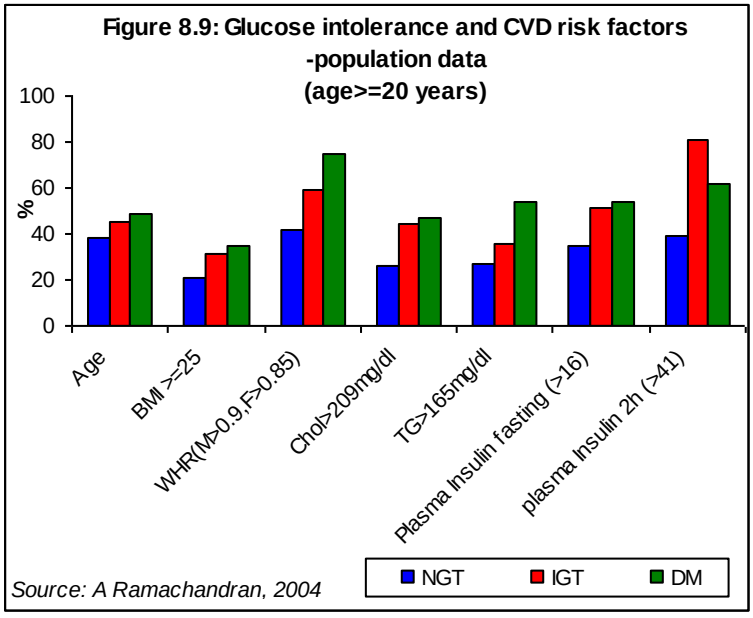
BMI>25. There was a trend of increase in blood sugar in those with abdominal obesity as compared to those without abdominal obesity (Figure 8.5). Serum cholesterol and triglycerides in men were significantly higher in subjects with BMI>25. There was a trend of increase in blood sugar with increasing values of BMI both in men and women. Serum cholesterol and triglycerides increased significantly with increasing BMI and WHR both in men and women. A similar trend was seen in the ratio of total cholesterol and HDL cholesterol (Figure 8.6). Cholesterol levels greater than 180 mg % and blood sugar levels of 140 mg % were mostly seen in subjects with high BMI, and those with greater WHR (Figure 8.7).



Linkages between obesity, diabetes and cardiovascular diseases



Indians have higher body fat for any BMI as compared to Caucasians (Figure 8.8). The susceptibility of the urban Indians to central adiposity has been highlighted by all studies. All studies in India have shown that abdominal obesity was more strongly associated with glucose intolerance than generalized obesity. The cluster of risk factors shown to be associated with central obesity including glucose intolerance, obesity, hyperinsulinameia, hypertriglyceridaemia, and hypertension, are all-important risk factors for ischaemic heart disease. Recent studies comparing body fat topography in migrant Asian subjects with those of white Caucasians have also reported a higher waist-hip ratio with hyperglycemia, elevated



plasma insulin concentrations, altered blood lipids and increased risk of coronary heart disease in Indians. Indians are at higher risk of metabolic syndrome with Type 2 diabetes, dyslipedemia, hypertension and cardiovascular disease (Figure 8.9). Risk of glucose intolerance, insulin resistance and hypertension increases with age, BMI. Waist-to-hip ratio, blood cholesterol (> 209mg/dl) and triglyceride level (>165 mg/dl).

Comparison of newly diagnosed non insulin dependent diabetes mellitus (NIDDM) patients in KEM hospital, Pune compared with migrant Indian and white Caucasian NIDDM patients in UK showed that

- At diagnosis diabetic patients in India are about a decade younger (20% < 35 years, and 50% <40 years of age).
- Obesity (using body mass index, as criterion) is less common, but central obesity (increased waist-hip ratio, WHR) is a very striking feature in Indian patients. Highest glucose concentration was found in subjects who were thin but centrally obese.
- Hypercholesterolemia is uncommon (5%), but plasma triglycerides and non-esterified fatty acids (NEFA) are significantly elevated in both IGT and diabetic Indian patients, compared to those with normal glucose tolerance (NGT).
- Both IGT and diabetic patients show fasting hyperinsulinameia compared to NGT subjects but post-glucose plasma immunoreactive insulin (IRI) concentrations are diminished in diabetic patients. Plasma IRI concentrations show an inverted U-shaped distribution in relation to plasma glucose concentration suggesting that insulin resistance and compensatory hyperinsulinaemia precede diabetes. Even NGT Indians are substantially more hyperinsulinaemic and insulin resistant than white Caucasians.

In Indians the cardio vascular risk factors (obesity, central obesity, hypertension, high plasma triglycerides and elevated NEFAs) are increased not only in diabetic patients but also in those with IGT, a stage, which precedes diabetes by many years. Electrocardiographic changes suggestive of CHD were associated with older age, higher blood pressure, higher plasma triglycerides and immuno reactive insulin (IRI) concentrations. Cardio-vascular risk factors were all related to plasma insulin levels and can be thought of as occurring as a part of the complex metabolic profile called the ‘insulin resistance syndrome’, metabolic syndrome or Syndrome X.

Indians appear to have a predisposition for adiposity especially abdominal, insulin resistance and diabetes, hyper-triglyceridaemia and cardiovascular diseases. This predisposition could be genetic or environmental; it can manifest itself at birth, in childhood, during adolescence and in adult life. Prevention of intrauterine growth retardation through antenatal care, early detection and correction of under-nutrition so that children attain appropriate weight for their height are essential to promote linear growth; this can be achieved through

effective implementation of ongoing intervention programmes utilizing the available infrastructure. It is never too early for Indians to start practicing healthy lifestyle and dietary habits.

Reduction of physical activity is the major factor behind the progressive increase in over-nutrition. In the urban affluent segments there has been an increase in energy intake form fats, refined cereals and sugar; there has been a simultaneous reduction in physical activity .As a result they have high prevalence of obesity and associated health hazards. Nutrition education that children, adolescents and adults should eat balanced diet with just adequate energy intake and lots of vegetables and health education that exercise has to become a part of daily routine to promote muscle and bone health as well as prevent development of adiposity in all age groups have to be beamed regularly through all channels of communication. As this segment accesses information and services readily, they can be persuaded to change their life styles so that they regain their normal weight and health. The fact that they have changed could stimulate the other segments to follow suit.

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