



## THE PROBLEM OF OBESITY AND INTEGRATED WEIGHT MANAGEMENT APPROACH IN CHILDREN AND ADOLESCENTS

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### Abstract

*This study was undertaken to explore the causes and necessary measures of prevention, defining the integrated management approach to address the alarming issue of obesity that has been confronted with children and adolescents world over notably in developed nations, and is also stretching in Pakistan among economically sound families. The rate of obesity has significantly increased in the developed nations such as in USA and Australia during 1985 to 1995 with prevalence of over weight doubling and obesity trebling. In the recent years, Pakistan is also going through this alarming issue, developing at faster rate among economically sound families causing health problems to their children, needing immediate attention to overcome this dangerous problem confronted to their child.*

*Scientifically Body Mass Index (BMI), generally referred to standard scale for age and sex, used for practical measurement and monitoring overweight and obesity in children and adolescents as medical research described it as one of the root cause of serious health problems in adult life that may result in Type-2 diabetes, hypertension dyslipidemia and steatohepatitis heart disease, which keeps the life at total risk. World Health Organization has also termed it as one of the major concerns of the society, though blatantly visible, but not addressed adequately world over and has become a most neglected public health problem.*



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## **Introduction**

Obesity, a medical condition characterized by storage of excess body fats. The human naturally stores fat tissue under the skin in around organs and joints. Fat is critical for good health because it is a source of energy, when body lacks it, the energy necessary to sustain life process and it provides insulation and protection of internal organs. But the accumulation of too much fat in the body is associated with the variety of health problems. Studies show that individuals who are over weight or obese run a greater risk of developing diabetes mellitus, hyper tension, coronary heart diseases, stroke, arthritis, dyslipidemia and non-alcoholic staeatohepatitis.

According to the Centre for Disease Control and Prevention (CDCP) in United States nearly 31% of population is of obese, up from 13% in 1960, and from 1980 to 2000 obesity among Americans was doubled in number of children and teenagers nearly tripled. Public health officials are concerned that obesity is reaching epidemic proportions. The health problem resulting from obesity could reverse many of health gains achieved in USA in recent decades.

The study estimates in Australian children and young people indicate that 20% to 25% are overweight or obese. The 1995 National Nutritional survey found that 4.9% of boys and 5.4% girls were obese. Two other surveys held in 1997 by The New South Wales School of Fitness and Physical Activity and Health of young Victorian studies gave almost similar results. There is



also evidence that from 1985 to 1995 the rate of overweight has doubled and obesity has trebled.

**Table-1**  
**The ratio of overweight and obesity in Euro-American adult men**

Country	Years of Survey (s)	Obese (%)	Overweight (%)
Belgium	1990-1993	13-19	47-52
Brazil	1989	10	n/a
Canada	1991	15	n/a
Denmark	1991-1992	13	41
Finland	1992	22-24	46-49
France	1994-1997	13-22	40-51
Germany	1988-1995	13-24	49-56
Hungary	1987-1989	22-23	40-46
Italy	1993-1994	14-17	50-51
Poland	1992-1993	15-22	41-45
Spain	1994-1996	16	53
Sweden	1994-1996	13-14	47-50
Switzerland	1992-1993	13-16	47-53
United Kingdom	1991-1995	14-23	42-49
United States of America	1999	29	33

**Source:** (Ref: Text Book of Men's Health Edited by Bruno Lynnfield, MD, 2002 p. 209-210)

Some countries conducted surveys more than once in different years and in different regions. It is noted that many of the recent surveys date back 10 years, and seems that instead of improving the situation the problem has increased.



## Classification and Major Causes

The most common current method of classifying the weight is based upon proportion of weight for height and the preference is given to Body Mass Index (BMI) which is calculated by dividing the weight in Kilo grams by height in ( $m^2$ ).

**Table-2**

Classification	BMI Kg/m <sup>2</sup>	Disease Risk / Waist Circumference	
		< 102 cm (male) < 88 cm (females)	> 102 cm (male) > 88 cm (females)
Underweight	< 18.5	-	-
Normal Range	18.5 – 24.9	-	-
Over weight	25.0 – 29.9	Increased	High
Obesity (class-I)	30.0 – 34.9	High	Very High
Obesity (class-II)	35.0 – 39.9	Very High	Very High
Extreme Obesity (class-III)	> 40.0	Extremely High	Extremely High

**Source:** (Adopted from WHO consultation 1998)

**Table-3**  
**Fat as the Macronutrient culprit**

	Protein	Carbohydrate	Fat
Energy content / gm	4	4	9
Ability to end eating	High	Moderate	Low
Ability to suppress hunger	High	High	Low
Storage Capacity	Low	Low	High
Ability to stimulate own oxidation	Excellent	Excellent	Poor

**Source:** (Adopted from WHO consultation 1998)



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## **Causes of Obesity**

### **Heredity & Genetics Factors**

Several studies have shown that there is a strong genetic basis to the development of obesity it appears to be a poly genetic disorder with many genes associated with the predisposition to excess adiposity. At least 5 single gene mutations causing human obesity that present in child hood have been identified. These are rare and all are associated with severe and at very early on set of obesity.

### **Environmental factors**

Sedentary behavior like physical inactivity is a major element in development of obesity in westernizes society in children and adults. International studies have shown that Television viewing is associated with increased incidents of new cases of obesity as well decrease in success rate of obesity intervention. Television viewing exposes children to food marketing, increase opportunity for snacking on high energy food and drinks, decreases opportunities for physical activity and reinforces sedentary behavior. There are as yet no clear data linking.

### **Dietary Intake:**

The increase prevalence of obesity in recent decades may have partly resulted from increase consumption of high fat food or sweetened drinks, although the evidence for clear effect of diet is not strong in young children parental influence on food selection is strong. In older children peer influence is important



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**Early Infant Feeding:**

Breast feeding is possibly protective for the development of obesity. Parental obesity, eating patterns and attitudes more than doubles the risk of adult obesity. Dietary dis-inhibition in the mothers of preschoolers is associated with excess weight gain in their daughters. The studies on children showed that parental dietary dis-inhibition is associated with greater risk of body fatness. Parents who strongly encouraged their children to eat have heavier children.

**Socio Economic status**

In some development countries, poor children or those rural settings are more at risk of obesity where as in countries under going economic transition child obesity is associated with a more affluent life style in with living in urban regions.

**Ethnicity**

Data from United States shows that there is increase risk of obesity in Native Americans and Hispanic Americans compared with white Americans although these differences may be largely related to socio economic status.

(Ref: Health Rays Digest By Jennifer A Batch and Louise A. Baur, Ed. May 06 Pg. 35, 36, 37)

**Unhealthy intake and practices****• Insufficient energy expenditure**

- Sedentary work
- Cars
- Drive to School
- Road Safety
- Computer



➤ T. V watching

If you spend most of your time at a desk or on a sofa watching TV or using computers, using cars for short distances rather walking your risk for obesity becomes higher, sedentary behaviour is the major element in development of obesity.

● **Excessive caloric in take**

- High fat
- High sugar
- Snack food
- Accessible (Home deliveries)
- Alcohol
- Social pressures

Increased consumption of high fatty food like Hotdogs, Burgers, French fries cheese macaroni, sweet & drinks, Ice cream, home delivering foods and social pressures like attending parties or wedding ceremonies etc. all results in fat gain. Fat intake makes more then 30% of the daily caloric intake, is it any surprise that fatty food are contributing to soaring obesity rates globally?

High-Tech Increase Body weight	Small Movement Add up
Cellular phones and remote controls deprive us from walking!	TV and AC remote control and Cordless phones can result in
20 times daily into 20 meters = 40 meters	20 less short walks / day
Therefore walking distance lost per year	20 x 20 meters = 400 meters
= 400 x 365 = 146000 meters	400m x 365 days = 146Km
146 km = 25 hrs. of walking	5 km / hr. = 25 hr
1 hr. of walking = 113 - 226 Kcal	220 K. cal / hr. x 25 hr. = 6000 Kcal
Energy saved = 2800 - 6000 Kcal / 25 years	So 1 Kg of fat in one year

**Source:** Rossener, 2002



One don't even think that use of High Tech like cellular phone & remote control can increase the risk of obesity as calculated above. It deprives us from walking 400m less a day and 146000m a year. 146km of walking require 25 hr and in 1 hr. of walking we spend 113-226Kcal of energy so use of High Tech deprived us of approximately 2825Kcal- 5650Kcal of energy expenditure.

❖ **Small Measures Add up**

- 1 Chocolate biscuit per day  
Over 1 year = 5 Kg weight gain as  
1 biscuit = 80 Kcal  
365 days = 29200 Kcal  
= 5 Kg fat gained

(Ref: Rossner 2002)

Habit of taking just 1 biscuit at tea time can result in 5 Kg of fat gain / year as shown in the calculation above, these small measure which most people ignore can really increase the risk of obesity.

Study shows that people who get 20 - 30 minute of exercise most days are less likely to be obese and obesity risk is even lower if you combine an active life style with low fat low calorie diet.

**Obesity and co-morbidities**

- Depression
- Stroke
- Sleep apnea and asthma
- Myocardial Infarction





- Hypertension
- Diabetes
- Bowel and Genito-Urinary cancer
- Osteoarthritis
- Gout
- Peripheral vascular disease

Although studies in Northern Europe, particularly Finland, had identified that there are substantial economic costs from excess weight, these have been quantified only recently. Current estimates are concerned with the more easily quantifiable health-care costs rather than the further community economic costs. These direct costs, i.e. those costs related to the diagnosis and treatment of both obesity and diseases related to obesity, amount to some 2-8% of the total health-care costs. To these should be added those attributable to the diagnosis of overweight, which, with the greater number of patients, would probably amount to at least the same level as those for obesity. Additional, indirect costs to society include not only sick-pay, pensions and so on, but also the loss of productivity from sick-leave, together with the personal costs from higher insurance premiums, job discrimination and adaptations to cope with disability. Hence, the overall economic cost of excess weight is substantial.

Against this, the efforts adopted by society to minimize the risk of developing excess weight are derisory. .

(Ref: Text Book of Men's Health Edited by Bruno Lynnfeild, MD 2002 Pg. 209-210)



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## **The cost of obesity**

**Direct:** Co-morbidities, diabetes, hearts diseases, stroke etc. Health services expenditure, prescription, hospital, drugs.

**Indirect:** Disability, mortality, loss of employment, early pension able retirement, poorer education.

*Obese die nine years earlier.*

### **Intangible cost:**

Not qualified for in monetary terms

Psychological distress, loss of self esteem,

Physical pain, social isolation, relationship difficulties.

### ***Main concerns of obese person***

Self - Image: Clothes, self perception other's opinion, feeling unattractive.

## **Health problems**

Symptoms:

Limited physical activity

General discomforts

Fatigue

## **The Integrated Weight Management Approach**

Weight loss and Weight maintenance through:

Diet / Nutrition

Physical activity

Life style modifications

Medications / surgery



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### **Calorie Reduction**

Providing that the energy intake is consistently low than energy expenditure, there will be a reduction in weight. Differences will occur in the rate at which the weight will fall; depending only on the margin between the energy intake and the total energy expenditure. This total energy expenditure depends on both the basal energy expenditure (from the fat-free mass) and the energy expenditure of physical activity. As the body weight is reduced, by whatever method, there is a reduction in the fat-free mass, since protein and fat are lost together, the accepted proportion being 75% fat and 25% protein whatever the starting weight of the individuals. To achieve this weight reduction, various non-invasive methods are available, selection depending largely on the individual preferences of doctor and dieter.

Recommendations per Day

Calorie intake should be reduced by 500  
- 1000 Kcal / day

Less dietary fat, fewer empty calories

Regular three meals daily

Realistic sustainable diet

New long term habit development

### **Physical Activity**

Since body weight depends upon the balance of energy intake and total energy output, physical activity during dieting should help. Unfortunately, there are three fallacies to this argument: those who are overweight find it difficult to exercise, prolonged periods of strenuous exercise would be necessary to



produce a significant effect and compliance with training programs is poor.

### Recommendations

Encourage activity than exercise

Moderate level of physical activity for 30 - 45 minutes

3-5 days per week (ideally every day)

Gardening, walking cycling, swimming, house work

Less TV, computers

### Calories Burned During Exercise

This table shows calories burned per hour for different activities. The amount of calories used during physical activity depends on a person's body mass and the intensity of the activity.

**Table-4**

Activity	Calories Burned Per Hour Per Body Weight			
	34 Kg (75 lb)	50 Kg (100 lb)	70 Kg (150 lb)	90 Kg (200 lb)
Bicycling, 10 Km/h (6mph)	135	160	240	320
Bicycling, 20 Km/h (12 mph)	225	270	410	540
Running, 9 Km/h (5.5 mph)	365	440	660	880
Running, 11 Km/h (7 mph)	510	610	920	1,220



Running, 16 Km/h (10 mph)	710	850	1,280	1,700
Jumping Rope	415	500	750	1,000
Swimming, 23 m/min (25yd/min)	155	185	275	370
Swimming, 46 m/min (50yd / min)	270	325	500	650
Tennis, singles	220	265	400	530
Walking, 3 Km/h (2mph)	125	160	240	320
Walking, 5 Km/h (3 mph)	175	210	320	420
Walking, 7 Km/h (4.5 mph)	245	295	440	590

Microsoft @ Encarta @ Encyclopedia 2005

### **Behavioral Modifications**

- Self -monitoring of diet
- Occasional weighing
- Stimulus control, avoid temptations
- Keep food diary recording food or drinks consumed
- Suppress negative emotions
- Determination and development of balanced dietary habits

### **Weight Loss Medications**

Weight loss medications are only appropriate for people with BMI of 30 or more or with BMI of 27 with related medical problems

### **Surgery**

Surgery may be a weight loss option for people who are severely obese with BMI of 40 or above with severe health problems. There are two accepted surgical



procedures for reducing obesity i.e. Gastroplasty and gastric bypass, both reduces stomach size to a pouch smaller than chicken's egg limiting the amount of food that can be consumed at one time.

### **Conclusion**

Concluding, besides many developed nations of Buro-America obesity has become as one of today's most critical and blatantly visible yet most neglected public health problem? Obesity prevalence over time shows markable increase. Luxuries of life like cars, TV, Computers, air conditioners etc. and hi-tech inventions like cellular phones and remote control all result in insufficient energy expenditure that is less physical activity and at the same time people are taking excessive calories by consuming large amount of fatty food in the form of snack food, sweetened drinks, ice cream etc. and home delivering of food makes it more difficult to resist these high caloric food. Combination of both these causes, that is high caloric intake and less energy expenditure are contributing to soaring obesity rate globally. People still are not aware of the cost of obesity which include health problems like hypertension diseases, diabetics and indirect cost like disability, poor education mortality, and psychology distress loss of self esteem, un-attractiveness relationship difficulties, fatigue, and social isolation. As regarding prevention of obesity the potential of combining a reduction in sedentary behavior and an increase in physical activity as well as low fat low calorie light diet is high. Assessing the environment i-e (micro environment and macro



environment) of a community indicates the opportunities for preventive strategies. As yet there are few successful example of multi faceted large scale intervention to guide obesity prevention programs; they need to be supported by adequate renouncing and significant ownership. The treatment of obesity by weight loss and weight maintenance through diet, physical activity, life style modification, medication and surgery is recommended but weight loss goal of most obese dieters is to achieve an ideal weight defined by celebrities or in fashion magazines. But research over the last decade indicates that 5-10% reduction in body weight is sufficient to significantly improve medical condition associated with obesity such as hypertension, diabetes mellitus, and elevated cholesterol levels. Obese people often seek weight loss goals that may be biologically impossible to achieve or if achieved can not be maintained. No obesity treatment produces long the term weight maintenance; one has to modify behavior by eating low calorie diet with some regular physical activity.

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