

Emerging Obesity in Northern Indian States: A Serious threat for Health

Praween Kumar Agrawal

Research Scholar
International Institute for Population Sciences
Mumbai
India

Paper for presentation at the IUSSP Conference on Bangkok, June 10-12, 2002

Author is grateful to Dr. Vinod Mishra of East West Centre, Hawaii and Prof. Kamla Gupta of IIPS, India for their suggestions for the paper.

Emerging Obesity in Northern Indian States: A Serious threat for Health

Praween Kumar Agrawal*

Introduction

Obesity is increasing at an alarming rate throughout the world. Today it is estimated that there are more than 250 million obese people worldwide, equivalent to seven percent of the adult population (WHO 1998). National Family Health Survey (NFHS-2, 1998-99) shows 5.8 percent obese women with BMI (Body Mass Index) 30 or more and 17.7 percent overweight women with BMI between 25-30 in urban India. Because of urbanization and modernization, our lives are becoming more sedentary and less physically active than it was before. Women (house-wives) are spending most of their leisure time in front of T.V. Household durable goods like washing machines, cooking gas and electric ovens etc again reduce the physical activity. Application of transportation even for shorter distance is increasing. All these prevent the people from physical activity and leads to overweight and obesity. At the same time, consumption of oily and junky food is responsible for overweight and obesity.

Obesity is not immediate lethal disease itself, but it is a significant risk factor associated with a range of serious non-communicable diseases and condition (Tanaka K. and Nakanishi T.1996). Cohort and cross-sectional studies have indicated that obesity may be linked with an increased risk of coronary heart disease, hypertension, diabetes mellitus and gallstone (Saw and Rajan 1997).

One of the first attempts to document systematically the relationship between obesity and menstrual dysfunction was presented by Rogers and Mitchell in 1952. They found a much higher incident of obesity in amenorrhic women (45 percent) than they did in two populations of normal cycling control subjects (13 percent and 9 percent). Obesity increases the risk of several reproductive disorders, negatively affecting normal natural function and fertility (American Obesity Association). Hamilton-Fairley in 1992, found significantly higher abortion rates in moderately obese females than in females in normal weight.

The adverse health implications of obesity are significant and, accordingly, all obese patients, regardless of their menstrual function and fertility, should be encouraged to participate in some form of structured weight control program (Simopoulos 1958). In one sense, the fertile obese patient may be a greater problem to the obstetrician/gynecologist for, if she achieves pregnancy, she has an increase risk of developing a variety of medical and surgical complications (Kleiginan et. al., 1985 and Pasukala et. al., 1986).

Obesity has been described as the “last remaining socially acceptable form of prejudice” (Stunkard and Sobal 1995).

Need of the study

The WHO recently stated that the growth in the number of severely overweight adults is expected to be double that of under-weight during 1995-2025 (WHO 1998). Although obesity is the starting scene in India compared to western country, nevertheless it needs to be tackled aggressively before it assumes serious epidemic properties.

In India, because of migration and industrialization, urbanization is increasing at significant rate. There is much scope of urbanization and concentration of population in bigger cities. Trend also shows that concentration of population in large city is increasing very fast. These all will lead for modernization and urban way of life. Globalization is also playing an important role for modernization and sedentary life. So in near future obesity would emerge as a challenging problem for India. Therefore, attention should be taken in to account for this coming future, as *prevention is better than cure*. The NFHS-2 shows that 9 percent women in Delhi are obese and another 25 percent are overweight, which is highest among all the states in country. Punjab comes after Delhi with 21.1 percent overweight and 9.1 percent obese women. Also Haryana comes third rank in north India with 12.3 percent overweight and 3.9 percent obese women. All together, these three north Indian states comprise 18.5 percent overweight and 7.2 percent obese women.

Objective of the study

The objective of the present study is:

1. To assess the prevalence of overweight & obesity among women belonging to different socio-economic groups in northern India.
2. To know the differential in diet consumption and utilization of modern goods among underweight, normal and overweight/obese women.
3. To know the effect of overweight/obesity on the morbidity pattern, with special focus on maternal and reproductive health.
4. To know the relative risk of being obese than normal on maternal and reproductive health.

The concept of BMI

Quetelet in 1869 was the first person to observe that among adults of normal build but different heights, weight was roughly proportional to height square. Quetelet Index (Weight in kg. /Height in meters²) was later renamed '**body mass index (BMI)**' by Keys et al. (1972).

FAO over the last decades has been advocating the collection and analysis of adult anthropometry worldwide. The effort gained momentum following the International Dietary Energy Constancy Group (IDECG) meeting in Guatemala in 1987 while addressing issues related to chronic energy deficiency (CED).

Following the meeting, FAO embarked on a detailed analysis of BMI data from all over the world (Ismail & Zawiah, 1991) and encouraged the recalculation of data and reevaluation morbidity data, which might provide us a practical usefulness of the chosen cut-off points in BMI. The cut-off points of BMI are as follow:

- 1) BMI <18.5 Underweight
- 2) BMI 18.5 - 25 Normal
- 3) BMI 25 - 30 Overweight
- 4) BMI > 30 Obese

Despite its inherent limitations like it is independent of age of the respondent and it does not provide information on a person's percentage of body fat, BMI has been widely used as a measure of obesity and risk of mortality. More recently, WHO (1993) organized an Expert Committee Meeting in Geneva, to examine the use of anthropometry in health and to formulate recommendations on appropriate reference data and also to device simple methods for collecting and interpreting information.

Data and Methods

The National Family Health Survey (NFHS-2, 1998-99) of each of the states Delhi, Punjab and Haryana comprises of the representative sample of about 3,000 eligible-women of age 15–49 years. All together a sample of 8,181 eligible-women of age 15–49 years from all the three states has taken for analysis. NFHS-2 gives important information about the weight and height of eligible women, which has been used as a base for the proposed study on obesity. NFHS-2 provides detailed information on nutrition, fertility, family planning, morbidity and maternal and reproductive health, which are important inputs for the study.

For analysis point of view women has been divided into four categories according to their BMI as:

- 1) BMI <18.5 Underweight
- 2) BMI 18.5 - 25 Normal
- 3) BMI 25 - 30 Overweight
- 4) BMI > 30 Obese

Bivariate as well as multivariate analysis has been done for data analysis. In bivariate, cross tabulation is done in each of the four categories with different dependent variables in respect of different socio-economic and demographic conditions of individual. In multivariate analysis, binary logit regression analysis has been incorporated to know the odds ratio of overweight/obesity for each socio-economic and demographic characteristic, controlling for others.

Analysis and results

1. Socio-economic and demographic differentials

Table 1a shows the socio-economic and demographic differential among underweight, normal, overweight and obese women in northern states of India. Age

shows a positive relationship with overweight and obesity whereas negative relation in case of normal and underweight. As the age of the women is increasing they are being overweight and obese. Four-fold increase (2.9 to 11.8) has been noticed in obese women from age group of 20–29 to 40–49 years. Similarly, two and half times more women are overweight in the age group of 40–49 than 20–29 years. Proportion of overweight and obese women in teen age (15–19 years) is very less.

There is a wide gap in the types of residence category of overweight and obese women. Twenty-five and 11 percent of urban women of the northern part of India are overweight and obese respectively compared to 13 and 4 percent of rural women. This shows two fold gap for overweight and three fold gap for obese between urban and rural northern India. However, situation is almost reverse in case of underweight women.

Education of the women plays a significant role in increasing obesity. As the education of women increases obesity also likely to increase. Three percent of illiterate women are obese while 6 percent literate but middle school incomplete women are obese. Obesity increases further to 9 and 12 percent for women with middle school complete and high school & above, respectively. Overweight also shows a strong relationship with education. However, percentage of underweight women decreases as the women gets higher education. Not only the education affects the obesity/overweight or underweight conditions of women but husband's education also emerges as a significant factor. Similar relationship as with women's education is found in husband's education with the obesity/overweight or underweight conditions of women.

Religion wise differential in obesity also exists. Eight percent and 21 percent of Sikh women are obese and overweight followed by 7 and 18 percent obese and overweight among the Hindu women, respectively. Muslim women are least overweight and most underweight.

Ten percent of the other caste (general) women are obese followed by 8 percent of scheduled tribes and 5 percent of other backward class women. Scheduled caste women are least obese. Overweight condition also shows the similar situation with 23 percent of general women followed by 16 percent of tribal women. However, tribal women are mostly underweight followed by scheduled caste, 40 and 27 percent respectively.

Working status of women shows that 12 percent of self-employed women are obese followed by 8 percent employed by someone else. Women working in family farm/business are least obese. However, a good proportion of not working women are also obese and overweight. Women whose occupation is related to professional/technical/managerial work are mostly obese or overweight, 14 and 32 percent, respectively followed by women with clerical/sales work, 11 and 29 percent, respectively. However, women whose occupation is household work and labour are least obese and overweight. About one quarter of women whose occupation is household work and labour are underweight.

Standard of living index calculated by the household goods is the proxy variable for representing the economic condition of a household. It shows a significant differential with obesity. Ten percent of women belonging to high standard of living are obese followed by 8 percent of women belonging to medium standard of living. However, only one percent of women belonging to low standard of living are obese. Similarly, 25 percent of women belonging to high standard of living are overweight followed by 11 percent of women belonging to medium standard of living. However, only 4 percent of women belonging to low standard of living are overweight. On the other hand, 40 percent of women belonging to low standard of living are underweight followed by 26 percent of women belonging to medium standard of living. However, only 12 percent of women belonging to high standard of living are underweight.

Table 1b shows the logistic regression for overweight/obese women in different socio-economic and demographic characteristics. The result of logistic regression also substantiate that overweight/obesity is significantly influenced by residence, education, religion, castes, standard of living and number of children ever born. However marital status, age and working status doesn't come out as a significant variable with obesity. The odds ratio shows that the likelihood of overweight/obesity in rural area is 0.48 times less than in urban area. Education of women shows strong significant influence with overweight/obesity. Women with high school complete and above are 1.83 times more likely to be overweight/obese than illiterate women. Also, up to middle school complete women are 1.36 times more likely to be overweight/obese than illiterate women.

Among religion, Hindu and Sikh women are significantly influenced by overweight/obesity. Sikh women are 1.57 times more likely to be overweight/obese than Hindu women. Muslim women are less likely to be overweight/obese than Hindu women, but result is not significant.

Caste is another critical variable. Women belonging to general caste category are 1.5 times more likely to be overweight/obese than scheduled caste women. The odds ratio of scheduled tribes and other backward caste is also more than scheduled caste but not statistically significant. Standard of living index of women shows highly significant influence with overweight/obesity where odd ratio increases steeply with increase in standard of living. Women belonging to higher standard of living are 5.8 times more likely to be overweight/obese than low standard of living women. Again, women belonging to medium standard of living are 2.7 times more likely to be overweight/obese than low standard of living women.

The odds ratio for children ever born also show very much significant and is highly positively correlated with overweight/obesity. Women with children ever born 5 and above are 4.1 times more likely to be overweight/obese than no children ever born. Similarly, the odds ratio for women with children ever born 3–4 and children

ever born 1–2 is 3.3 and 2.1 respectively. Thus, higher the children ever born, prevalence of overweight/obesity will be higher.

2. Diet consumptions

Table 2a shows the daily diet consumption of milk, pulse, green leafy vegetables, meat, fruits and eggs among underweight, normal, overweight and obese women. All the edibles show the positive increase in consumption except meat and fruits. Daily milk consumption increases from 72 percent to 79 percent of women for underweight to obese women respectively. Egg shows a steep change from 0.7 percent to 4.3 percent of women in its consumption, a six-fold increase from underweight to obese women. Pulse and green vegetables do not varies like milk and eggs. However, meat shows a remarkable decline in its consumption from 86 percent to 81 percent by underweight and obese women respectively.

Table 2b shows the daily diet consumption of milk, pulse, green leafy vegetables, meat, fruits and eggs between normal and overweight/obese women. The table substantiates more clear results between the two groups of women. Milk, fruits and eggs consumption is more by overweight/obese women, whereas meat consumption is less by overweight/obese women. Green vegetables consumption is more or less constant by both normal and overweight/obese women.

Although on the basis of this table one cannot draw a strong conclusion, yet milk and eggs accelerate overweight/obesity whereas meat does not. In addition, pulse and green vegetables do not affect much for overweight/obesity.

3. Availability of modern goods and facilities

Table 3 shows availability of household amenities among the underweight, normal, overweight and obese women. Availability of electricity increases from 89 percent to 99 percent for underweight to obese women. Television leads the women physical inactive. The availability of television significantly increases from underweight to normal and obese i.e. 56 percent, 74 percent and 91 percent, respectively. Refrigerator, where junky and fast food used to be kept also significantly increases from underweight to normal and obese i.e. 21 percent, 66 percent and 77 percent, respectively. Telephone ownership increases from 7 percent in underweight to 20 percent in normal and further 47 percent in obese women. Motorcycle, which may prevent the women from walking, also increases from 15 percent in underweight to 29 percent in normal and further 57 percent in obese women. Car ownership, which is a symbol of sedentary and luxury life in Indian context, also significantly increases from underweight to obese women. A three-fold increase is found between normal and obese women regarding ownership of car i.e. 5 percent and 15 percent, respectively.

4. Health Problems

Several health problems are associated with the obesity and overweight. **Table 4** shows maternal and reproductive health problems among underweight, normal, overweight and obese women. Table shows the experience of women regarding maternal health problems as: *ever had an abortion, at least one induced abortion, two or more induced abortion, ever terminated pregnancy, last birth caesarean, swelling and excessive fatigue*; and reproductive health problems such as: *itching, bad odour, abdominal pain, fever and other problems, pain or burning sensation during urination, painful intercourse and blood after sex*.

Maternal health problems emerge significantly in overweight and obese women. Thirty percent of obese women ever had an abortion compared to 11 percent of normal women. Again, 9 percent of obese women had experienced at least one induced abortion compared to 5 percent of normal women. In addition of this, 5 percent of obese women had experienced two or more induced abortion compared to 1.5 percent of normal women.

Twenty seven percent of obese women ever experienced terminated pregnancy compared to 22 percent of normal women. The occurrence of caesarean birth is found to be very high among overweight and obese women. Thirty-five percent of obese women's and 21 percent of overweight women's last birth was caesarean compared to 15 percent of normal women's. Swelling is also found high among obese and overweight women, 29 percent and 27 percent, respectively. However 22 percent of normal women experienced swelling.

It is comfortable that reproductive health problems are less among overweight/obese women than normal women. Only abdominal pain and fever during menstruation is noticed little higher among overweight/obese. However, itching, bad odour, painful intercourse and blood visible after sex are found less among overweight/obese women.

5. Relative Risk for Health Problems

Table 5 presents the relative risk of maternal and reproductive health problems for overweight/obese than normal women. Relative risk for the entire maternal health problem is high for overweight/obese women. However, relative risk for most of the reproductive health problem is low for overweight/obese women.

Relative risk is highest for two or more induced abortion i.e. 207, which shows that overweight/obese women have more than double risks of two or more induced abortion than general women. After that, relative risk for overweight/obese women who ever had an abortion is 164, which is followed by last birth caesarean i.e.161. It

indicates more than one and half times additional chance of abortion and caesarean operation among overweight/obese women. Again relative risk for at least one induced abortion is 151, which indicates one and half times supplementary chance of induced abortion among overweight/obese women.

Relative risk for abdominal pain and fever during menstruation is slightly high among overweight/obese women, which is 103 and 106 respectively. It represents little more reproductive health problems during menstruation among overweight/obese women than normal women. However, relative risk for all other reproductive health problems is less. As, painful intercourse shows a relative risk of 83, which indicate that overweight/obese women are experiencing 17 percent less painful intercourse than normal women. Again, relative risk for blood visible after sex, pain or burning during urination, itching, and bad odour is 91, 94, 88 and 97 respectively. It indicates a reduced amount of problems among overweight/obese women than normal women.

Conclusions

Background characteristics shows that the percentage of the obese and overweight women are higher in urban area compared to rural area. Age wise also significant increase has been noticed. Women in their higher age are more overweight and obese. Educated women are more obese and overweight. Sikh women are more overweight and obese than Hindu, whereas Muslim women are least overweight and obese. Women belonging to other castes are more obese than women belonging to scheduled tribes and other backward caste. Self-employed women are more obese than women employed by someone else. Women working as Professional/technical/manager are more common to be overweight and obese than women working in other field. Standard of living is also highly associated with overweight and obesity of women. A substantial proportion of women belonging to high standard of living are overweight or obese. Logistic regression result also substantiate that overweight/obesity significantly varies by residence, education, religion, caste, standard of living and children ever born. As the education or standard of living or children ever born increases likely hood of overweight/obesity also increases.

Variation has also been found regarding daily consumption of different diet among normal and overweight/obese women. Milk and eggs are consumed by more percentage of overweight/obese women than normal women. However, meat is consumed by less percentage of overweight/obese women than normal women. While others edibles don't show much variation in its consumption by different categories of women. Thus, milk and egg may be more responsible for overweight and obesity of women.

More availability of modern household amenities has been found in overweight/obese women house than normal women house. A continuous increase in the percentage of each modern durable goods like Car, Television, Refrigerator

has been found from normal to overweight and further obese women's house. This shows that the more use of modern facilities and sedentary life leads to overweight/obesity.

Maternal and obstetric health problems have been found more among overweight and obese women. Induced abortion is found quite high among overweight/obese women than normal women. Caesarean childbirth is more common in case of overweight/obese. Most of the reproductive health problems are not higher among overweight/obese women than normal women except abdominal pain and fever during menstruation. Even though problems persist among overweight/obese little bit lesser than normal women.

Thus, study suggests that because of uncontrolled diet consumption and more sedentary life, women are becoming overweight and obese. This is the consequence of higher education and high standard of living, which are continuous increasing. Higher birth order also plays an important role in overweight and obesity. Several maternal and obstetrics problems are associated with the overweight and obesity.

So, there should be programs at primary level to aware the society regarding causes and consequences of overweight and obesity. Some health care centres should be open for weight control to maintain women's normal condition. In addition of this overweight and obese women should be taken more into consideration at the time of pregnancy and childbirth.

REFERENCES

American Obesity Association, www.obesity.org.

Carolus J. C. M., Kamal A. and Ulla V. (1995) 'The high prevalence of Obesity in a Saudi Infertility Population' Ann Saudi Med, 15 (4).

Hamilton-Fairely D, Kiddy D, Watson H, Paterson C, Franks S. (1992) 'Association of moderate obesity with a poor pregnancy outcome in females with polycystic ovary syndrome treated with low dose gonadotrophin'. Br J Obstet Gynaecol, 126–31.

Ismail M. N. & Zawiah H. (1991) 'Anthropometric Assessment of Adult Malaysians' Report submitted for the Sixth World Food Survey, FAO, Rome.

International Institute for Population Sciences (IIPS) and ORC Macro 2000 National Family Health Survey (NFHS-2), 1998-99, Mumbai:IIPS

Keys A. K, Fidanza F., Karvonen M. J., Kimura N. & Taylor H.L. (1972) 'Indices of relative weight and obesity'. J.Chron Dis, 25, 329-343

Kleiginan R. M, Gross T. (1985) 'Perinatal problems of the obese mother and her infant'. Obstet Gynecol , 66, 299.

Pasukala P.S., Bristrian B.R., Benotri P.N., Blackburn G.L. (1986) 'The risk of surgery in obese patients'. Ann Intern Med, 104–540.

Rogers J., Mitchell G.W. (1952) 'The relation of obesity to menstrual disturbances'. N Engl J Med, 247–357.

Saw S.M. and Rajan U. (1997) 'The epidemiology of obesity: A review'. Annals of the Academy of Medicine, Singapore, 26(4), 489–93

Simopoulos A. P. (1958) 'The health implications of overweight and obesity'. Nutr Rev, 43–33

Stunkard and Sobal. (1995) 'Psychological Consequences of Obesity in Eating Disorders and Obesity: A comprehensive Handbook', in K.D. Brownwell and C.G Fairburn (eds.), The Guildford Press, NewYork, pp. 417.

Tanaka K. and Nakanishi T. (1996) 'Obesity as a risk factor for various diseases: Necessity of lifestyle changes for healthy aging'. Appl Human Science, 15(4), 139–148

WHO (1993) 'Diet, Nutrition and the prevention of chronic diseases'. Technical Report Series No. 797, Geneva, WHO

WHO (1998) 'World Health Report'. Life in 21st Century: A vision for all, Geneva, pp 132

Table 1a: Background Characteristics of Underweight, Normal, Overweight and Obese Women in Northern Part of India, 1999

Background	Underweight	Normal	Overweight	Obese
Age				
15–19	28.1	67.4	3.9	0.6
20–29	24.1	61.7	11.4	2.9
30–39	16.2	52.5	22.1	9.3
40–49	12.2	48.7	27.3	11.8
Residence				
Urban	11.7	52.5	24.8	11.0
Rural	25.0	58.4	12.9	3.7
Education				
Illiterate	26.1	58.4	12.3	3.2
Literate, < middle school complete	19.2	55.8	18.6	6.4
Middle school complete	16.4	55.9	18.9	8.7
High school complete and above	8.7	51.5	27.2	12.6
Husband's Education				
Illiterate	30.1	57.1	9.9	2.9
Literate, < middle school complete	22.0	57.2	16.3	4.5
Middle school complete	21.5	56.3	15.6	6.5
High school complete and above	12.1	54.3	23.6	9.9
Religion				
Hindu	19.3	56.0	17.7	6.9
Muslims	21.1	57.8	14.4	6.7
Sikh	16.7	53.8	21.4	8.1
Others	10.8	59.8	24.5	4.9
Caste/tribes				
Scheduled caste	26.9	58.6	12.0	2.5
Scheduled tribe	40.0	36.0	16.0	8.0
Other backward class	23.0	58.2	13.8	4.9
Other	14.1	53.8	22.5	9.6
Working Status				
Working in family farm/business	20.7	61.7	14.4	3.2
Employed by someone else	16.6	53.4	21.6	8.4
Self-employed	10.9	48.9	28.5	11.7
Not worked in past 12 month	19.1	55.8	18.1	7.0
Occupation				
Professional/Technical	4.4	49.8	32.2	13.6
Clerical/sales	8.3	51.1	29.1	10.5
Labour	24.0	57.2	86.1	4.9
Household worker	23.2	57.6	14.2	4.0
Standard of living index				
Low	40.1	55.3	3.6	0.9
Medium	25.8	60.2	10.8	8.2
High	11.7	52.7	25.2	10.4
Total	18.7	55.6	18.5	7.2

Table 1b: Odds Ratio For Overweigh/Obese Women in Different Socio-economic Demographic Characteristics in Northern Part of India, 1999

Variables	B	Exp (B)
Age		
15–19 ^R		1.000
20–29	– 0.031	0.969
30–39	– 0.990	0.372**
40–49	– 0.197	0.822
Marital Status		
Currently Married ^R		1.000
Ever married	0.125	1.133
Residence		
Urban ^R		1.000***
Rural	– 0.735	0.479***
Education		
Illiterate ^R		1.000***
Literate, < middle school complete	0.305	1.356***
Middle school complete	0.308	1.360***
High school complete and above	0.604	1.829***
Religion		
Hindu ^R		1.000***
Muslims	– 0.058	0.944
Sikh	0.453	1.573***
Others	0.065	1.067
Caste/tribes		
Scheduled caste ^R		1.000***
Scheduled tribe	0.249	1.283
Other backward class	0.169	1.184
Other	0.410	1.507***
Working Status		
Working ^R		1.000
Not worked in past 12 month	– 0.114	0.892
Standard of living index		
Low ^R		1.000***
Medium	0.996	2.707***
High	1.755	5.786***
Children Ever Born		
None ^R		1.000***
1–2	0.743	2.101***
3–4	1.202	3.326***
5 and above	1.422	4.143***
Constant	– 3.567	0.028

*** < 0.001; ** < 0.01;

^R Reference Category

Table 2a: Daily Diet Consumption Pattern among Underweight, Normal, Overweight and Obese Women in Northern Part of India, 1999

Dietary Items	Underweight	Normal	Overweight	Obese
Milk	71.9	75.8	79.3	79.0
Pulse	73.4	75.6	78.6	77.3
Green vegetables	69.0	69.6	71.9	74.3
Meat	86.3	82.6	79.8	81.1
Fruits	8.2	17.9	28.6	19.6
Eggs	0.7	2.3	2.9	4.3

Table 2b: Daily Diet Consumption Pattern for Overweight/Obese Women and Normal Women in Northern Part of India, 1999

Dietary Items	Normal	Overweight/obese
Milk	75.8	79.2
Pulse	75.6	78.2
Green vegetables	69.6	70.6
Meat	82.6	79.8
Fruits	17.9	31.4
Eggs	2.3	3.3

Table 3: Availability of Household Amenities among Underweight, Normal, Overweight and Obese Women in Northern Part of India, 1999

Amenities	Underweight	Normal	Overweight	Obese
Electricity	89.2	94.6	99.0	98.9
Television	56.2	73.8	87.7	91.4
Refrigerator	21.1	39.5	65.9	77.2
Telephone	6.7	19.9	38.1	47.3
Motorcycle	14.9	29.1	48.2	57.2
Car	1.3	5.4	11.0	14.8

Table 4: Maternal and Reproductive Health Problems among Underweight, Normal, Overweight and Obese Women in Northern Part of India, 1999

Problems	Underweight	Normal	Overweight	Obese
Maternal Health Problems				
Ever had an abortion	10.3	10.8	13.3	30.0
At least one induced abortion	3.5	5.3	5.3	8.8
Two or more induced abortion	1.0	1.5	2.5	4.9
Ever had a terminated pregnancy	21.2	22.2	26.3	27.3
Last birth caesarean	11.1	14.8	20.5	34.5
Swelling of hands and feet	18.7	21.5	27.0	28.8
Excessive fatigue	42.9	41.6	28.8	45.2
Reproductive Health Problems				
Itching	22.8	19.0	16.5	17.1
Bad odour	18.3	14.3	13.7	14.0
Abdominal pain	18.3	15.6	15.6	17.4
Fever	3.5	3.6	3.5	4.5
Other problems	6.0	4.8	3.9	4.9
Pain or burning during urination	12.1	11.7	10.0	12.5
Painful intercourse	8.5	8.0	6.5	6.9
Blood visible after sex	0.8	1.1	1.0	1.1

Table 5: Relative Risks of Maternal and Reproductive Health Problems for Overweight/Obese Women than Normal Women in Northern Part of India, 1999

Problems	Normal (BMI 18.5 – 25)	Overweight & Obese (BMI > 25)	Relative Risk
Maternal Health Problems			
Ever had an abortion	10.8	17.7	163.9
At least one induced abortion	5.3	8.0	150.9
Two or more induced abortion	1.5	3.1	206.7
Ever had a terminated pregnancy	22.2	26.6	119.8
Last birth caesarean	14.8	23.8	160.8
Swelling of hands and feet	21.5	27.4	127.2
Excessive fatigue	41.6	45.6	109.7
Reproductive Health Problems			
Itching	19.0	16.7	87.9
Bad odour	14.3	13.8	96.5
Abdominal pain	15.6	16.1	103.2
Fever	3.6	3.8	105.6
Other problems	4.8	4.2	87.5
Pain or burning during urination	11.7	11.0	94.0
Painful intercourse	8.0	6.6	82.5
Blood visible after sex	1.1	1.0	90.9

Figure 1: Availability of Household Amenities among Underweight, Normal, Overweight and Obese Women in Northern Part of India, 1999

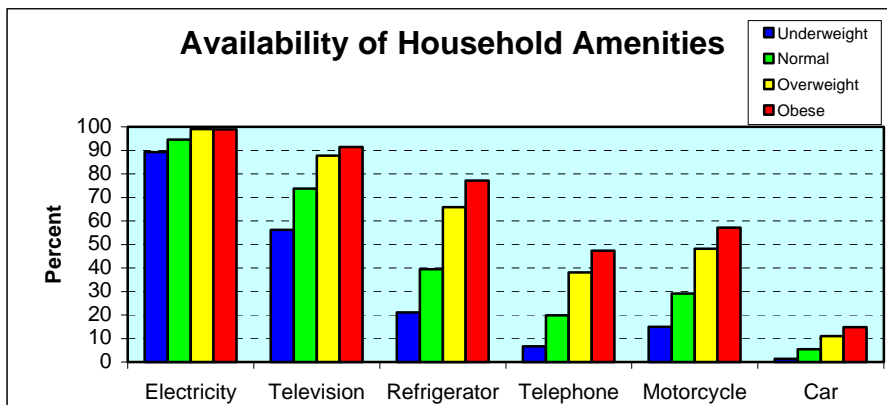


Figure 2: Maternal Health Problems among Underweight, Normal, Overweight and Obese Women in Northern Part of India, 1999

