Assessment of relationship between socio economic status and body mass index among pregnant women and lactating mothers in Jamshedpur

RAMAA SUBRAMANIAN
Head
University Department of Home Science
Kolhan University, Chaibasa (Jharkhand) India

ABSTRACT

BMI is related to SES with regard to physical activity and sedentary behaviours. Studies show that persons from lower socio economic status lack social encouragements due to poor parental education, poor neighbourhood safety and low access to recreational resources. The objective of this study is to access the socio economic status of pregnant and lactating women and calculate the BMI level of both. The calculated BMI level is compared with socio economic status of pregnant women and lactating mothers. The relationship between BMI level and socio economic status is also assessed. The results of the study reveales that as the socio economic status increases there is increase in awareness which protects the women from undesirable BMI which indicates over weight, obesity etc. It is also true that women from lower socio economic status are not victims of very poor BMI. There are few cases of overweight, obesity etc. which may not be only due socio economic indicators.

Key Words : BMI, SES, WHO, Pregnant women, Lactating mothers

INTRODUCTION

There are no documented studies on socio economic status (SES) and Body Mass Index (BMI) among pregnant and lactating women. There is negative relationship between SES and BMI in most developed countries. Although general assumption is that higher SES people are prone to have higher BMI and vice versa. But a detailed study of many research findings across the world shows that the assumption is invalid. Many of the men and women in higher SES are not suffering from overweight or obesity. But lower SES men and women are found to be obese. Obese women continue to remain in the same status even during pregnancy and lactation. The additional loads of nutrient requirement do not seem to cause any change in BMI during these special conditions.

Quality of diet is also a factor influencing BMI. This in turn is related to the socio economic factor income. People from high SES consume foods which contain less calorie, high fibre, low cholesterol, low fat dairy products and more of fresh fruits and vegetables. The diet of lower SES people contain more of refined cereals, added fats, less of quality protein and lack of healthy foods.

Hence diet pattern is directly related to income of the family which in turn is related to BMI.

BMI is related to SES with regard to physical activity and sedentary behaviours. Studies show persons from lower socio economic status lack social encouragements due to poor parental education, poor neighbourhood safety and low access to recreational resources. In case of pregnant women lack of physical activity and sedentary behaviour may be due to physiological changes which they find difficult to manage. Lactating women are forced to refrain from severe physical activity due to baby care and feeding occupying most of their time. Not all women of this category give priority to physical activity.

Educated persons are more aware of the negative consequences of having higher BMI. They have better knowledge about keeping fit, eating good food, consuming healthy diet and doing exercises. Lack of education is one of the causes of pregnant women consuming more of energy rich foods which lead to undesired weight gain.

Pregnant and lactating women under estimate their weight gain and consume higher energy and also lead sedentary life style. In their anxiety to gain weight they gain weight more than the required rate. Weight misperception is very high among less educated women.

High BMI during pregnancy leads to an increased risk of gestational diabetes, hypertensive disorders and a big baby. Maternity experts caution women that they should maintain BMI within normal range (18.5-24.99) in order to reduce the risk of pregnancy and child birth.

Obesity increases the risk of miscarriage and is linked to increased risk of gestational hypertension, preeclampsia and gestational diabetes. As a woman's BMI increases there is increase in chances of having interventions during labour and a C-section birth.

BMI during early pregnancy shows indications of the need to gain more weight in order to improve health of infants at birth. It is also important for intrauterine growth retardation, low birth weight and prenatal mortality. This indicator relates to three of the Millennium Development Goals: (1) Reduce poverty and hunger, (4) Reduce child mortality and (5) Improve maternal health.

In many cultural settings women often eat "last and least". Even in households with adequate food availability women become undernourished and continue to become more so during pregnancy. Through education and communication with husband, in laws and parents it is possible to make them realize the need to give pregnant women more nutritious and adequate food so that their health and nutrition will improve during pregnancy.

Obese women are likely to delay breast feeding initiation. Obesity is related to shorter duration of exclusive breastfeeding. Women who breastfeed have lower BMI. Under weight women who have low BMI and continuing breastfeeding may become more undernourished.

Definition of Body Mass Index:

According to WHO Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m^2). For example, an adult who weighs 70kg and whose height is 1.75m will have a BMI of 22.9.

BMI = 70 kg / (1.75 m^2) = 70 / 3.06 = 22.9

Objectives :
1. To access the socio economic status of pregnant and lactating women
2. To calculate the BMI level of both pregnant women and lactating mother
3. To compare the calculated BMI level with socio economic status of pregnant women and

lactating mother.

4. To find out whether there is any relationship between BMI level and socio economic status.

Limitations :

The study is limited to pregnant women in all three trimesters and lactating women having infant in the age group of 0-12 Months.

Review of Literature :

Studies from Western Countries :

In the developed world there is a consistently inverse relationship between socio economic status (SES) and obesity or overweight for women, and no relationship in men or children (Sobal and Stunkard, 1989). In contrast, there is a positive relationship between SES and obesity in both sexes in the developing world. However, increasing evidence from between-country analyses reveals that the association of obesity and per capita gross domestic product (GDP) is not a constant function (Monteiro *et al.*, 2004).

National data from poorer countries in Latin America, such as Guatemala and Honduras, for example, show higher levels of SES associated with a greater prevalence of obesity; however, in the richer countries, like Mexico, there is a clear negative association between SES and obesity (Barquera *et al.*, 2003)

Studies from Asian Countries :

A study in South India attempted to relate maternal anthropometry with birth weight in 1,642 live births (Kapur *et al.*, 1971) and found that the mean heights of the mothers appeared to be similar in all socio-economic groups while body weights were nearly 10 kg less in mothers who belonged to the group with the lowest socioeconomic status. The birth weights followed the same trend; the mothers of the poorer socioeconomic strata had infants with the lowest birth weights. The birth weights appeared to be linearly correlated with both maternal body weights and heights. Using previous anthropometric studies on maternal nutrition, summarized by Kapur and colleagues (1971), the BMIs can be computed from mean heights and weights, all of which show maternal BMIs < 20 and in some studies, mean maternal BMIs of < 18.5. In Vietnam, these results were confirmed. The birth weight was always lower with low BMI (< 18.5) whatever the weight gain of the mother was during pregnancy (Giay and Khoi, 1992).

METHODOLOGY

Source of data:

Modified Kuppuswamy scale (proposed updating for January 2017) is used to collect primary data from pregnant women and lactating mothers in Jamshedpur. Necessary additional information were collected to achieve objectives.

Sample of the study :

This study was carried out in different areas of Jamshedpur .Total no sample is 60 in which 30 were pregnant women and 30 lactating mothers.

RESULTS AND DISCUSSION

The head of the family of 40% pregnant women are educated up to +2 levels as show by the higher frequency. 13.33% of head of families are either professionally educated or done under graduation or post graduation. 20% are educated up to higher secondary level and 10% up to middle school. None of the heads of families are illiterate (Table 1).

Table 1 : Education of Head of the Family of Pregnant Women			
Score	Education	Frequency	Percentage
7	Profession	4	13.33
6	UG/PG	4	13.33
5	+2	12	40
4	Higher Secondary	6	20
3	Middle	3	10
2	Primary	1	3.33
1	Literate	--	--

23.33% of heads of families of lactating mothers are educated up to under graduate or post graduate levels. 20% are educated up to either higher secondary or middle school level. 10% are either primary level educated or professionally qualified. None of them are illiterates (Table 2).

Table 2 : Education of the Head of the Family of Lactating Mothers			
Score	Education	Frequency	Percentage
7	Profession	3	10
6	UG/PG	7	23.33
5	+2	5	16.66
4	Higher Secondary	6	20
3	Middle	6	20
2	Primary	3	10
1	Literate	--	--

Inference:

Survey is conducted in Jamshedpur city in the outpatient department of a private hospital. The types of people who visit this hospital are not from very low income group and hence it is possible that none of them are illiterate. Family heads are educated up to at least senior secondary level.

33.33% of heads of families are skilled workers followed by 26.66% of semi-skilled workers. Slightly higher level of occupation is carried out by 13.33%-semi professionals or clerks/shop owners. 10% of heads of families are only professionals. 3.33% are unskilled workers (Table 3).

Table 3 : Occupation of the Head of the Family of Pregnant Women			
Score	Occupation	Frequency	Percentage
10	Profession	3	10
6	Semi Profession	4	13.33
5	Clerical/shop owner	4	13.33
4	Skilled worker	10	33.33
3	Semi-skilled	8	26.66
2	Unskilled	1	3.33
1	Unemployed	--	--

In case of families of lactating mothers most of the family heads (30%) are skilled workers. Slightly lesser per cent (26.66%) are semi-skilled workers. 16.6% are semi professionals. 10% of family heads are professionals or clerks/shop owners. Only 6.66% are unskilled workers. None of them are unemployed (Table 4).

Table 4 : Occupation of the Head of the Family of Lactating Mothers			
Score	Occupation	Frequency	Percentage
10	Profession	3	10
6	Semi Profession	5	16.66
5	Clerical/shop owner	3	10
4	Skilled worker	9	30
3	Semi-skilled	8	26.66
2	Unskilled	2	6.66
1	Unemployed	--	--

Inference:

It can be inferred that the sample of women in this study belong to the group involved in skilled or semi skilled work. Very small numbers belong to highest or lower categories. It is likely that their BMI and health will be moderate. None of them may belong to extreme categories.

33.33% of the heads of the families of the pregnant women belong earn monthly income of Rs. 6214-10350. Next higher percentage 26.66% belongs to the group that earn Rs. 10357-15535. The next group earning Rs. 15536-20714 has 23.33% families, 10% belongs to the group of earning Rs. 2075-41429 and only earning small percentage of family belongs to highest and lower income group. None of the families earn less than Rs. 2091 per month (Table 5).

Table 5 : Monthly Income of the Family of Pregnant Women			
Score	Monthly Income (Rs.)	Frequency	Percentage
12	>41430	1	3.33
10	20715-41429	3	10
6	15536-20714	7	23.33
4	10357-15535	8	26.66
3	6214-10350	10	33.33
2	2092-6213	1	3.33
1	<2091	--	--

The group earning monthly income Rs. 15536-20714 has maximum no of families 36.66%. This is followed by 23.33% of families earning monthly income Rs. 10357-15535. All the other groups except highest and lowest are equal no of families present in the group - 33.33%. None of the families belong to the highest and lowest income group (Table 6).

Table 6 : Monthly Income of the Lactating Mothers			
Score	Monthly Income (Rs.)	Frequency	Percentage
12	>41430	0	--
10	20715-41429	4	13.33
6	15536-20714	11	36.66
4	10357-15535	7	23.33
3	6214-10350	4	13.33
2	2092-6213	4	13.33
1	<2091	--	--

Inference:

As seen in the occupation table most of them are involved in semi skilled and skilled work. Hence most of them are in the income group earning minimum around Rs. 6,000 and maximum around Rs. 20,000. In case of families of lactating mothers none of them is in the highest income group. In the group of pregnant women only one person in the sample is in the highest income group.

Most of the pregnant women belong to the lower middle class, 3.33%. Upper middle class and upper lower class are equal no families present in them (20%). None of the families belong to the lower group. Only 6.66% belongs to the upper class (Table 7).

Table 7 : Socio Economic Class of Pregnant Women			
	SE Class	Frequency	Percentage
26-29	Upper Class	2	6.66
16-25	Upper Middle	6	20
11-15	Lower middle	16	53.33
5-10	Upper low	6	20
0<5	Lower	--	--

33.33% of families belong to upper middle class. Slightly lesser percentage- 30% belongs to the lower middle and upper middle class. Only 6.66% belong to upper class. None of the families belong to the lower class (Table 8).

Table 8 : Socio Economic Class of Lactating Mothers			
Score	SE Class	Frequency	Percentage
26-29	Upper Class	2	6.66
16-25	Upper Middle	10	33.33
11-15	Lower middle	9	30
5-10	Upper low	9	30
0<5	Lower	--	--

Inference:

Most of the families of pregnant women belong to lower middle class and those of lactating mothers belongs upper middle class.

All the pregnant women are either healthy or pre obese. Number of pre obese women (16) is slightly more than healthy (14). More than 5% of pregnant women are in pre obese stage (Table 9).

Table 9 : BMI of Pregnant Women			
Description	BMI Level	Frequency	Percentage
Under Weight	<=18.5	0	--
Healthy	18.5-24.9	14	46.66
Pre Obese	25-29.9	16	53.33
Moderately obese	30-34.9	0	--
Severely Obese	35-39.9	0	--
Morbidly Obese	>=40	0	--

50% of lactating mothers are obese. 36.6% are healthy and only 13.33% are moderately obese. The lactating mothers are likely to consume rich fatty foods due to traditional food habits.

This may lead to obesity. In their anxiety to get good milk production they eat more.

Chi Square Test :

Comparison of Socio Economic Status with BMI Level of Pregnant Women							
Description	BMI level	Upper class	Upper middle class	Lower middle	Upper lower	Lower	Total
Under Weight	<=18.5	--	--	--	--	--	--
Healthy	18.5-24.9	--	2	10	1	--	13
Pre Obese	25-29.9	2	4	6	5	--	17
Moderately Obese	30-34.9	--	--	--	--	--	
Severely Obese	35-39.9	--	--	--	--	--	
Morbidly Obese	>=40	--	--	--	--	--	
	Total	2	6	16	6	--	30

H_o There is no relationship between socio economic status and BMI of pregnant women

Observed Frequency :

	Upper class	Upper middle class	Lower middle	Upper lower	Total
Healthy	0	2	10	1	13
Pre Obese	2	4	6	5	17
Total	2	6	16	6	30

Expected Frequency Table

	Upper class	Upper middle class	Lower middle	Upper lower	Total
Healthy	0.86	2.6	6.93	2.6	12.99
Pre Obese	1.13	3.4	9.07	3.4	17.00
Total	1.99	6.00	16.00	6.00	29.99

$$V = (V - 1)(C - 1)$$
$$= (2 - 1)(4 - 1)$$
$$= 1 \times 3$$
$$= 3$$

For df 3 table value is 7.81

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$
$$= 5.91$$

Inference :

Calculated value is less than table value. Hence the hypothesis is accepted. There is no relationship between socio economic status and BMI level.

Therefore it can be concluded that socio economic status do not influence the BMI of pregnant women.

Comparison of Socio Economic Status with BMI Level of Lactating Mothers:							
Description	BMI Level	Upper class	Upper middle class	Lower middle	Upper lower	Lower	Total
Under Weight	<=18.5	--	--	--	--	--	
Healthy	18.5-24.9	1	6	7	5	--	19
Pre Obese	25-29.9	1	1	2	3	---	7
Moderately	30-34.9	--	3	--	1	--	4
Severely Obese	35-39.9	--	--	---	--	--	--
Morbidly Obese	>=40	--	--	---	--	---	--
	Total	2	10	9	9	--	30

H_o There is no relationship between socio economic status and BMI of lactating women

Observed Frequency :

	Upper class	Upper middle class	Lower middle	Upper lower	Total
Healthy	1	6	7	5	19
Pre Obese	1	1	2	3	7
Moderately Obese	0	3	0	1	4
Total	2	10	9	9	30

Expected Frequency Table :

	Upper class	Upper middle class	Lower middle	Upper lower	Total
Healthy	1.27	6.33	5.7	5.7	19.0
Pre Obese	0.46	2.33	2.1	2.1	6.99
Moderately Obese	0.26	1.33	1.2	1.2	3.99
Total	1.99	9.99	9.0	9.0	29.98

$$V = (V - 1)(C - 1)$$
$$= (3 - 1)(4 - 1)$$
$$= 2 \times 3$$
$$= 6$$

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$
$$= 7.075$$

For df 6 table value is 12.59 at 0.05 level of significance

Inference :

Calculated value is less than table value the hypothesis is accepted. There is no relationship between socio economic status and BMI level.

It can be inferred that socio economic status does not influence BMI level of lactating women.

Conclusion:

The general presumption is that people from higher socio economic status have higher BMI due to good food, lack of exercise etc. Review of literature shows that people from higher socio

economic status are not suffering from overweight and obesity. Education increases awareness and income enables eating of good food. The results of this study also support the inference drawn from literature review. This conclusion is also applicable to pregnant women and lactating mothers. Care of women in these special conditions is also influenced by education, income and occupation. As the socio economic status increases there is increase in awareness which protects the women from undesirable BMI which indicates over weight, obesity etc. It is also true that women from lower socio economic status are not victims of very poor BMI. There are few cases of overweight, obesity etc. which may not be only due socio economic indicators.

Recommendations :

There is a general thinking that people from high socio economic status are pre obese or obese and those of low status are thin. This is totally wrong because there is no relationship between socio economic status and BMI. People should be aware about healthy eating habits. Education helps them to know about the foods which are good for healthy living. More than income it is the awareness which helps people to know about good eating habits. Hence it is recommended that people should be made aware of right choice of food within the available budget along with sufficient exercises and physical activities to maintain required BMI level.

REFERENCES

Barquera, S., Rivera, J., Espinosa- Montero, J., Safdie, M., Campirano, F., Monterrubio, E. (2003). Energy and nutrient consumption in Mexicon women 12-49 years of age: analysis of the National Nutrition Surey 1999. *Salud Pub. Mex.,* (Suppl 4): S530 – 539. [PubMed]

Giay, T. and Khoi, H.H. (1992). Use of body mass index (BMI) in the assesment of adult nutritional status in Vietnam (BMI meeting)

Kapur, S., Kumar, G., Mammen, K.C. and Jesdian, G. (1971). Height an Weight of south Indian Women of child bearing age and thei effect on birth , weight and length of the baby. *Ind. J. Med. Res.,* **59**:1480 – 1490.

Monteiro, C.A., Moura, E.C., Conde, W.L. and Popin, B. (1989). A review of the literature. *Psych. Bull.,* **106** : 206 – 275. [Pub Med]

Dictionary. the freeictionary.com/pregnancy

The New Dictionary of Cultural Literacy, Third Edition Copyright 2005 by Honghton Miffin Harcourt Publishing Company.

****