

**Scientific Report on “NAMS Regional Symposium on Emerging Epidemic of Obesity:  
Causes, concerns and consequences” held at AIIMS Jodhpur on 12<sup>th</sup> March 2015**

**Abstract:**

**Overview:** The world is witnessing an obesity pandemic with an enormous continuing increase in the co-morbidities such as prevalence of atherosclerotic cardiovascular disease, type2 diabetes, hypertension, stroke and some forms of cancer that would result in tremendous increase in health care expenditure. Obesity is also associated with an insidious, creeping increase in hitherto uncommon diseases such as non-alcoholic fatty liver disease and polycystic ovaries syndrome. A cluster of cardio metabolic risk factors has been described in association with obesity. In order to apprise the health workforce about the current status of Obesity and it's impact this symposium was prepared by Academic Committee of National Academy of Medical Sciences (India) under guidance of Prof J S Bajaj

**Aims:** (i) To create awareness about the impact of obesity on our health system

(ii) To improve knowledge skills and competencies in identifying obesity, finding co-morbidities and taking action in managing and preventing obesity by using appropriate tools including surgery and life style measures.

**Methodology:** An academic program for Regional Symposium on Obesity prepared by Academic Council was delivered through National and local experts in field of Nutrition, obesity, diabetes, psychiatry, gastroenterology, pediatrics and preventive medicine delivered to varied participants using pedagogical principles based on adult learning theory. The participants included 2nd year and 3rd year MBBS students, Medical Officers, public health students and faculty from AIIMS and Dr S N Medical College. Assessment was carried out through a pre and post test consisting of 30 pre- constructed questionnaires having similar difficulty level. Program evaluation was carried out by a pre-structured questionnaire based on Likert scale for program impact and academic improvement. Statistical analysis was performed using SPSS ver 17.0

**Results:** There were 208 participants who attended the symposium. One hundred and forty six participants were present at the beginning of symposium gave the pretest. Mean scores were 11.54. However, only 102 participants completed both pre and post tests. Participants belonged to three groups- 6<sup>th</sup> semester MBBS students (n= 43), 4<sup>th</sup> semester MBBS students (n=38) and others (n=21). All these participants also appeared in the post test. The mean (SD) score obtained in the pretest was 9.7±4.1 and only five (4.2%) participants passed the pretest (score >15). There was no significant difference in the scores obtained in the pretest among the three groups. The mean (SD) score obtained in the post test had increased from 9.7±4.1 to 13.3 ± 4.6 and the result was statistically significant (p < 0.01). The mean increase in the post test score was 3.5 (95% CI of 2.5 to 4.6) as compared to pre test score. The percentage of participants passing the post test had also increased from 4.9% (5/102) to 38.2% (39/102) and the difference was statistically significant (p < 0.01). There was statistically significant difference in the scores obtained in the post test among the three groups and on post hoc analysis there was statistically significant difference in the scores obtained by 6<sup>th</sup> semester students as compared to 4<sup>th</sup> semester student. The average score obtained by the 6<sup>th</sup> semester students was more as compared to 4<sup>th</sup> semester students in the post test (p < 0.01; 5.7 [4.5 to 6.9]).

## Detail Report

### Introduction:

The world is witnessing an obesity pandemic that threatens to pose serious challenge to every country's health system. The projected burden of an enormous continuing increase in the co-morbidities such as prevalence of atherosclerotic cardiovascular disease, type2 diabetes, hypertension, stroke and some forms of cancer will not only add to morbidity and mortality but would result in tremendous increase in health care expenditure. Obesity is also associated with an insidious, creeping increase in hitherto uncommon diseases such as non-alcoholic fatty liver disease and polycystic ovaries syndrome. A cluster of cardio metabolic risk factors has been described in association with obesity. These factors, both individually and collectively, enhance the risk of several of above mentioned diseases.

Recent advances in our understanding of the role of adipocyte as a regulator of metabolic functions have resulted in a comprehensive delineation of molecular pathways in several cases of obesity, Adipocyte, once considered as an inert site for lipid storage, is being increasingly recognized as a critical mediator of a variety of physiological and pathological responses including immune-mediated inflammation, vascular remodeling, and energy homeostasis. Adipocytes secrete proteins collectively called adipokines. Which control and regulate a wide array of physiological processes including feeding behavior, energy homeostasis, insulin sensitivity and action, lipid and glucose metabolism, as well as vascular tone and endothelial function. Most of these effects are mediated through paracrine, autocrine, and endocrinal pathways.

Not only the obesity affects the biochemical changes but has far reaching effects on almost all organs of body. The epidemic is not only affecting the affluent but also poor people, children, pregnant women.

Hence, it is a high time that we take stock of situation and prepare our self with necessary knowledge and skill to combat the epidemic at all level.

**Broad objectives: *to enhance knowledge of patho-physiology of obesity and raise awareness of Obesity as a Disease with short and long-term complications; enhance awareness of early diagnosis of childhood obesity and its possible relationship with sleep disorders; specific disease states associated with obesity as Polycystic Ovary Syndrome and Nonalcoholic Fatty Liver Disease. Life-style choices for prevention and management of obesity; indications of the bariatric surgery and its long-term effects; community approaches to prevention of obesity.***

### Specific Learning Objectives:

At the end of symposium, participants would be able to:

- Describe the diagnostic criteria of obesity, defining different parameters used for its diagnosis, and the cut-off points for each parameter relevant to the Indian population.
- Describe the molecular biology of adipocyte and its metabolic role.
- Discuss the role of adipokines in intermediary metabolism relevant to the pathogenesis of obesity.
- Explain the rising trends in prevalence of obesity in the context of changing life-styles and their effects on physiological, nutritional and behavioural changes in different population groups.

- Comprehend the difference between earlier approach of considering obesity as 'at risk' factor for associated co-morbidities, and the new paradigm recognizing obesity as a disease with early and long-term clinic-pathological complications.
- Discuss the long-term impact of childhood obesity and emphasize the need for primary and secondary prevention.
- Describe the management of obesity with emphasis on life-style choices with respect of quantity and quality of food-intake, need of behavioural therapy to ensure continuing compliance with suggested interventions, stress reduction, sleep hygiene, physical activity, cigarette smoking, and heavy intake of alcohol.
- Describe the role of bariatric surgery, its indications & counter-indications, and long-term metabolic effects including associated clinical complications.
- Outline a comprehensive plan incorporating concept of primary, secondary and tertiary care in the prevention and management of obesity.
- Demonstrate use of communication technology in dissemination of relevant information through print, non-print, and electronic media for prevention of obesity as a part of public health system.

#### **Methodology:**

1. The Program consisted of 11 didactic lectures delivered by experts in the field and 2 problem triggers as follows:

- |  |                               |
|--|-------------------------------|
| <b>a. Epidemiologic and demographic determinants of emerging Epidemic of Obesity</b>   | <b>Dr. Prema Ramachandran</b> |
| <b>b. A 2014 portrait of adipocyte: Role of adipocytes.</b>                            | <b>Prof Praveen Sharma</b>    |
| <b>c. Molecular genetics of adiposeness</b>  | <b>Dr. Kuldeep Singh</b>      |
| <b>d. Pediatric obesity: Long term health consequences</b>                             | <b>Dr. Kuldeep Singh</b>      |
| <b>e. Metabolic syndrome: Concept and controversies</b>                                | <b>Dr Praveen Sharma</b>      |
| <b>f. Cardiovascular risk and Metabolic Syndrome</b>                                   | <b>Dr Vineet K Jain</b>       |
| <b>g. Lifestyle choices in prevention of obesity</b>                                   | <b>Dr. Pankaja R Raghav</b>   |
| <b>h. Psycho-social management of Obesity disorders</b>                                | <b>Dr. R K Chadda</b>         |
| <b>i. Medical Management of Obesity</b>  | <b>Dr Naveen Kishoria</b>     |
| <b>j. Bariatric surgery: Current status</b>  | <b>Dr. Divakar Bansal</b>     |
| <b>k. Anthropometric assessment of nutritional status in dual nutrition burden era</b> | <b>Dr Prema Ramachandran</b>  |

#### **Problem Triggers**

- |   |                             |
|---|-----------------------------|
| <b>a. Polycystic Ovary Syndrome (PCOS)</b>                            | <b>Dr Mahendra Singh</b>    |
| <b>b. Problem Trigger II: Non-alcohol Fatty Liver Disease (NAFLD)</b> | <b>Dr Narendra Bhargava</b> |

2. **Synopsis of talks:**

- a. Our Chief guest and speaker of the occasion, Dr Prema Ramachandran spoke about the magnitude of the problem of Obesity, instruments to measure the obesity and their interpretation. Using slides very judiciously she presented evidences for each anthropometric parameter. There were few questions from audience.

- b. Dr Pravin Sharma, Head Biochemistry at AIIMS Jodhpur spoke about Adipocytes which are found in distinct depots throughout the body, and also found mixed with different cell types in other locations, especially in loose connective tissue. There are two types of adipocytes, brown and white, that differ in several important properties. Even among white adipocytes, cells from different sites can have distinct molecular and physiological properties. The conceptual transformation of adipose tissue from a passive organ of energy storage to an active participant in hormonal regulation of homeostatic systems occurred relatively recently. In 1994, adipose tissue was characterized as the source of the hormone leptin, opening the vistas of research focused on adipocyte endocrinology. In the past two decades, the endocrine role of leptin has expanded to include regulation of reproduction and immune function, and numerous other adipose tissue-derived molecules that have an effect on glucose homeostasis, vascular biology, lipoprotein metabolism, and inflammation have been identified. He emphasized that adipocyte size has been linked to an increased risk of metabolic complications such as Type 2 diabetes or cardiovascular disorders. Most of our current knowledge about adipogenesis comes from *in vitro* studies of fibroblasts or preadipocyte cell cultures and slight is known about depot-specific aspects of differentiation.
- c. Dr Kuldeep Singh, Head Pediatrics, explained about the genetic basis for obesity, roles of single gene and multiple genes in Obesity. He made a note of Human Genome wide association studies and deciphering of new genes responsible for obesity. He also stressed that genes may not be solely responsible and presence of genes does not necessarily cause weight gain or obesity. With advent of bio-informatics tool the unclear picture is gradually becoming clear in recent times.
- d. Dr Kuldeep delivered a second talk on Pediatric obesity discussing the burden of disease, criteria for diagnosis, short term and long term consequences and outline of management with special emphasis on prevention going even up to *in-utero* targeting mother.
- e. Metabolic syndrome was discussed in detail by Dr Praveen Sharma. Recently the International Diabetic Federation (IDF) provided worldwide definition for use in clinical practice, considers central obesity and insulin resistance as important causative factors. The IDF consensus group has further highlighted a number of other parameters including pro-inflammatory state that appear to be related to the metabolic syndrome, with the aim to determine the predictive power of these extra criteria for CVD and/or diabetes. The mechanisms that contribute to the pathogenesis of metabolic syndrome (MetS) remain under intense investigation. A number of suggested potential mechanisms contributing to the pathogenesis of MetS include fetal programming, dyshomeostasis of the stress system, and the development of a proinflammatory and prothrombotic state as a result of cytokine production and/or dysregulation from the excessive adipose tissue. He also emphasized that there is still a need to develop uniform criteria that can be used by different clinical and research groups, enabling comparisons between study results, in the hope to better predictor the risk, for CVD and DMT2 and also develop novel therapeutic strategies.

- f. Dr Vineet Jain discussed the effect of obesity on heart disease particularly cardio-metabolic conditions, hypertension and coronary artery diseases.
  - g. Dr Pankaja Raghav enlightened the audience with changing scenario of overweight and obesity and ways to combat at primary and secondary level of prevention.
  - h. Dr R K Chadda talked about our changing lifestyle, campaigns adopted by food companies for attracting everyone for fast food. He also discussed about the psychosocial factors in causation of obesity and stressed on multipronged approach to management including behavioral therapy for certain groups.
  - i. Dr Naveen Kishoria from SNMC discussed details of obesity including medical and surgical management of Obesity. There was some overlap with talks of others.
  - j. What is the role of surgery and Bariatric surgery was discussed by Dr Diwakar Bansal. He was able to convince that it has a definite role in morbid obesity and surgical techniques have also improved. However, pre-surgery evaluation for risk factors and monitoring post surgery can minimize risks of procedure.
  - k. The last didactic lecture was again delivered by Dr Prema Ramachandran. She mainly talked about anthropometric assessments in situation of Double nutrition burden in developing countries. She explained in her lucid style the nutrition transition, effective use of anthropometry for assessment of both-malnutrition and obesity.
  - l. With help of clinical scenarios, Dr Narendra Bhargava from SNMC discussed the situation of Non-alcoholic fatty liver disease in India.
  - m. Lastly Dr Mahendra Singh, endocrinologist discussed about PCOD and clarified many doubts about the condition
3. Video Recording: Whole event was live streamed over the internet and also recorded using HD twin positioned camera.
  4. All participants explained the purpose of the symposium at start of program and were given a pre-validated questionnaire as pretest consisting of 30 multiple choice questions related to obesity which had one correct alternative. At the end also post test was given having 30 different questions but of similar difficulty level. All the participants were also given a Program evaluation questionnaire to determine effectiveness of the activity and future improvement.

### **Results:**

The symposium was well attended by medical students, medical officers, Public health specialist and students and faculty from AIIMS Jodhpur and Dr S N Medical College. We also had foreign students from Nigeria studying Public health at the symposium. Overall, attendance was in congruence with messages spread through email, posts, website and personal communications.

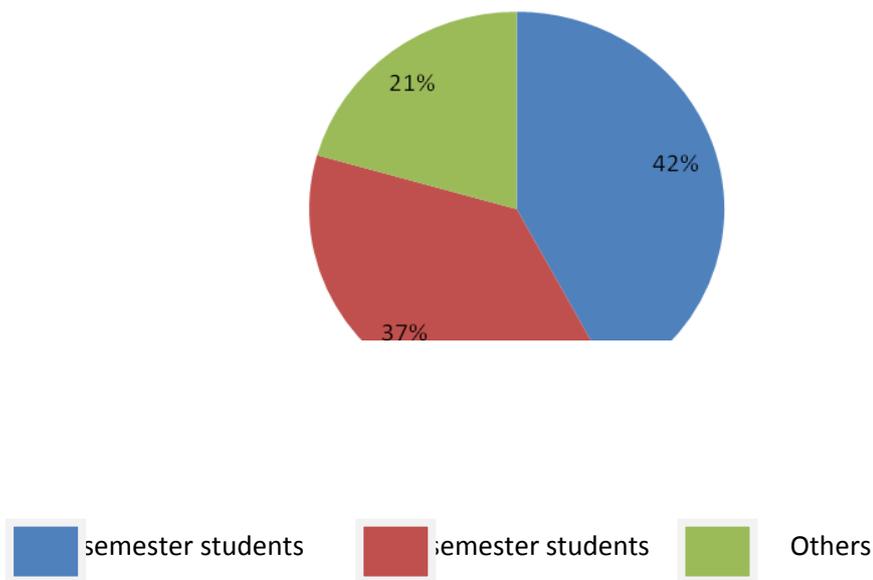
### **Pre test Status**

Total Participants in Pretest n= 146 (Mean

Total participants who appeared in both (Pre-test & Post Test) n= 102

- a. 6<sup>th</sup> sem students: n=43
- b. 4<sup>th</sup> sem students: n=38
- c. Others (Medical Officers, Public health students and faculty): n=21

**Fig. 1: Distribution of Participants**



**Table 1: Scores obtained in pretest (n=102)**

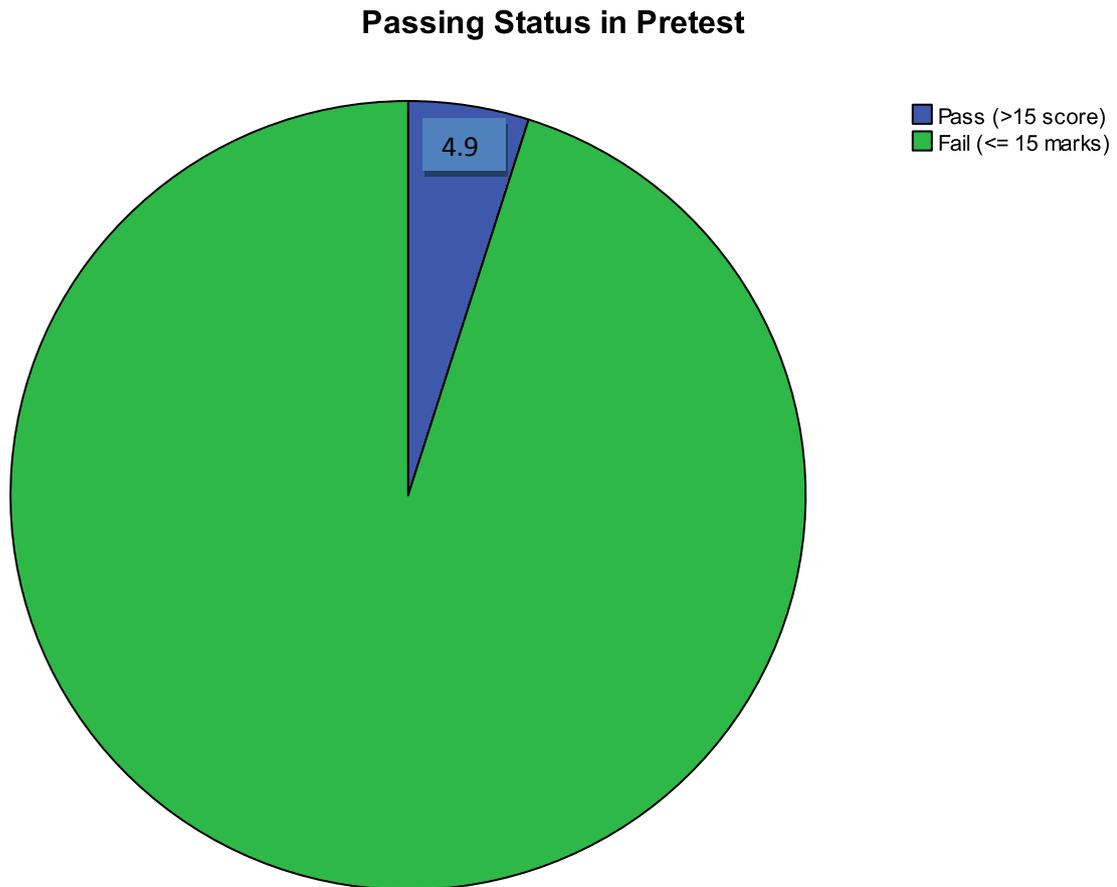
Groups	Mean	Standard deviation
Total	9.7	± 4.1
6 <sup>th</sup> semester	10.3	± 3.5
4 <sup>th</sup> semester	9.0 7.0*	± 5.2 (0, 22)*
Others	9.9	± 2.3

\*Data is skewed- hence shown as median (range)

**Table: 2 Passing status in pretest (n=102)**

Groups	Pass; n (%)
Total	5 (4.9)
6 <sup>th</sup> semester	2 (1.9)
4 <sup>th</sup> semester	3 (3)
Others	0

**Fig.2: Passing status in Pretest**



**Table 3: Comparison of pretest scores among the three groups**

	6 <sup>th</sup> semester	4 <sup>th</sup> semester	Others	P value
<b>Scores</b>	10.3 ± 3.5	9.0 ± 5.2	9.9 ± 2.3	0.38

**Post test status (102)**

Total participants (Post-test) n= 102

- a. 6<sup>th</sup> sem students: n=43
- b. 4<sup>th</sup> sem students: n=38
- c. Others: n=21

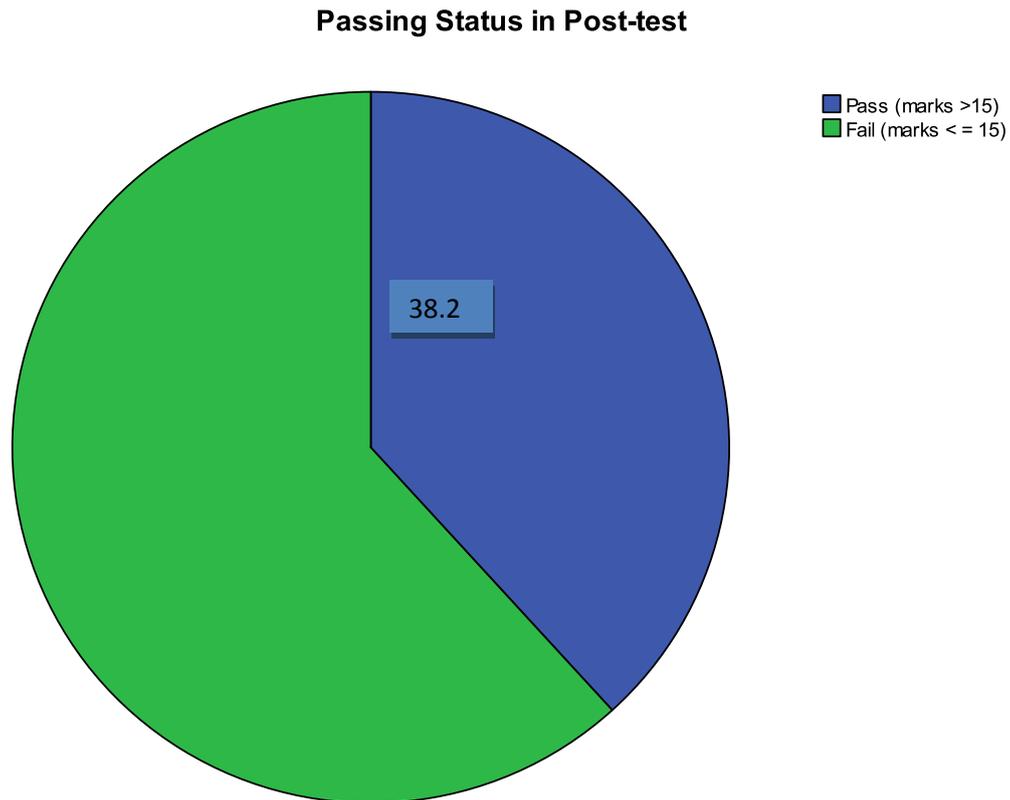
**Table 4: Scores obtained in post test (n=102)**

Groups	Mean	Standard deviation
Total	13.3	± 4.6
6 <sup>th</sup> semester	16.0	± 3.4
4 <sup>th</sup> semester	10.7	± 4.7
Others	12.3	± 3.8

**Table 5: Passing status in post test (n= 102)**

Groups	Pass; n (%)
Total	39 (38.2)
6 <sup>th</sup> semester	26 (25.4)
4 <sup>th</sup> semester	7 (6.9)
Others	6 (5.9)

**Fig. 3: Passing status in post status**



**Table 6: Comparison of post test scores among the three groups**

	6 <sup>th</sup> semester	4 <sup>th</sup> semester	Others	P value
Scores	16.0 ± 3.4	10.7 ± 4.7	12.3 ± 3.8	<0.01

**Table7: Comparison of post test scores of 6<sup>th</sup> semester and 4<sup>th</sup> semester students**

	6 <sup>th</sup> semester	4 <sup>th</sup> semester	P value	Mean difference (95% CI)
Scores	16.0 ± 3.4	10.7 ± 4.7	< 0.01	5.3 (3.4 to 7.1)

### Comparison of pretest scores with post test scores

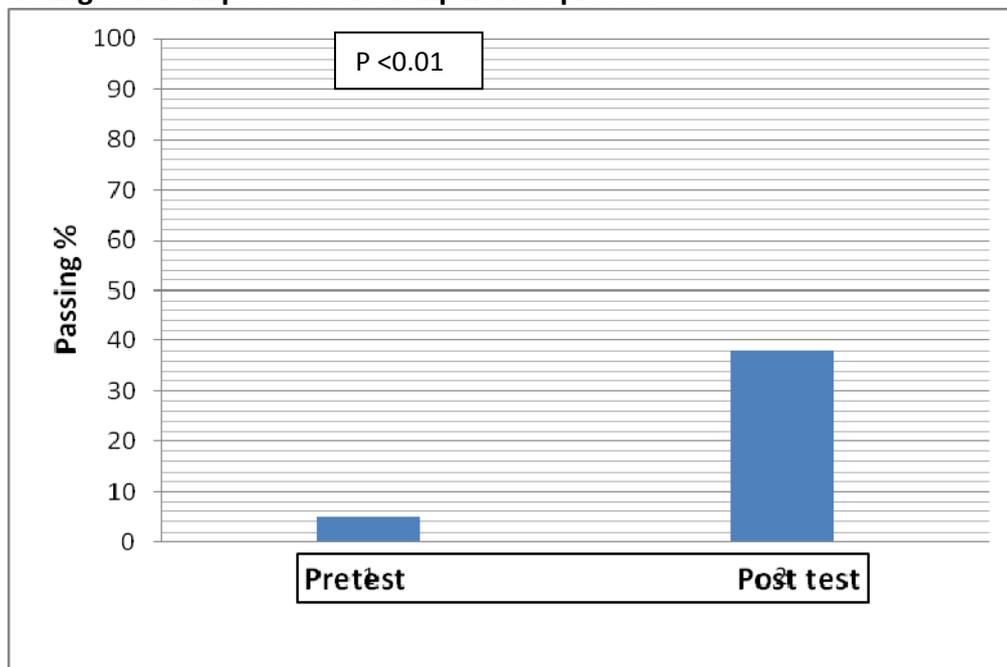
**Table 8: Comparison of scores obtained in pretest and post test (n=102)**

Groups	Pretest	Post test	p value	Mean difference (95% CI)
Total	9.7 ± 4.1	13.3 ± 4.6	< 0.01	3.5 (2.5 to 4.6)
6 <sup>th</sup> semester	10.3 ± 3.5	16.0 ± 3.4	< 0.01	5.7 (4.5 to 6.9)
4 <sup>th</sup> semester	9.0 ± 5.2	10.7 ± 4.7	0.12	
Others	9.9 ± 2.3	12.3 ± 3.8	0.01	2.43 (0.6 to 4.23)

**Table 9: Comparison of pass/fail status among pretest and post test (n=102)**

	Pretest passing status	Post test passing status	P value
Pass	5 (4.9%)	39 (38.2%)	< 0.01
Fail	97 (95.1%)	63 (61.8%)	

**Fig. 4: Passing status in post test as compared to pretest**



#### Summary of the results

1. There were a total of 208 participants for whole symposium. One hundred forty six participants were present at the beginning of symposium who gave the pretest. The mean score was 11.5. Only 102 participants subjected to pre test before the start of symposium on 'obesity' continued to be present till end of symposium and were analyzed in detail. Participants belonged to three groups- 6<sup>th</sup> semester MBBS students (n= 43), 4<sup>th</sup> semester MBBS students (n=38) and others (n=21). All these participants also appeared in the post test.
2. The mean (SD) score obtained in the pretest was 9.7±4.1 and only five (4.2%) participants passed the pretest (score >15).
3. There was no significant difference in the scores obtained in the pretest among the three groups.

4. The mean (SD) score obtained in the post test had increased from  $9.7 \pm 4.1$  to  $13.3 \pm 4.6$  and the result was statistically significant ( $p < 0.01$ ). The mean increase in the post test score was 3.5 (95% CI of 2.5 to 4.6) as compared to pre test score
5. The percentage of participants passing the post test had also increased from 4.9% (5/102) to 38.2% (39/102) and the difference was statistically significant ( $p < 0.01$ ). However, the overall passing percentage was poor with 97 (95.1%) and 63 (61.8%) participants getting failed in pretest and post test respectively.
6. There was statistically significant difference in the scores obtained in the post test among the three groups and on post hoc analysis there was statistically significant difference in the scores obtained by 6<sup>th</sup> semester students as compared to 4<sup>th</sup> semester student. The average score obtained by the 6<sup>th</sup> semester students was more as compared to 4<sup>th</sup> semester students in the post test ( $p < 0.01$ ; 5.7 [4.5 to 6.9]).

**Table 1: Satisfaction Indices between AIIMS and Dr S N Medical College Participants:**

Parameter	Satisfaction Index, SNMC N=63
1. I received precise information in advance on the aims of the Symposium.	79.36
2. The goals of the workshop appeared to me to be of immediate interest for my academic activities.	76.6
3. The content of the workshop dealt with issues I generally encounter in my academic assignments.	78.66
4. Considering my other professional commitments, the Symposium Scheduling was appropriate.	81.3
5. I found the documents provided of acceptable quality.	84.66
6. Time was provided to seek clarification on issues included in the background documentation.	79.3
7. The working methods used during the Symposium encouraged me to take an active interest in the session themes.	74
8. The pace of presentation of the subject content was appropriate.	78
9. The general atmosphere of the Symposium was conducive to serious work.	78.8
10. The organisers gave me opportunity for critical comment.	76.6
11. The organisers made use of any critical comments I made during the Symposium.	72.34

## Photographs







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