ISSN No:-2456-2165

Association between Eating Pattern, Physical Activity and Obesity among Female Students in a College in North Kolkata, West Bengal

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Abstract:- Background: Obesity is one of the most rapidly increasing health problems in the world, not only in developed countries, but also in less affluent economies. Changes in dietary habits and physical activity have been implicated as potential causes of obesity. Breakfast skipping is also an another factor. The present study shows that the percentage prevalence of obesity is high who skipped breakfast . Not only breakfast skipping but its frequency is also important. The present study shows there is a positive association between number of eating episodes and obesity.Objectives: To find out the association between eating pattern and obesity among college going girls in an urban ward in Kolkata .Methods: The study was conducted in a college of a urban area of Bagbazar, Kolkata in the month of January,2015. All students from the different departments were taken by simple random sampling method. Data were collected by self administered questionnaire. Results: The present study shows that according to BMI (S.A Class) 166 are obese, among them 48.19% are in 'Increasing Risk' and 51.81% are in 'High Risk'. The prevalence among non-obese who take meal less than four times a day is 28.27% and who take meal more than four times a day is 73.39%. The present study shows that 60.82% skipped breakfast among obese and 39.17% in non-obese. Physical activity, sedentary life style have direct relation with obesity. The present study shows that 97.42% have low P.A score among obese.93.70% have high among non-obese. Dietary intake is the most important factor that helps in the development obesity. The present study shows that , the intake of high energy(avg. energy -intake by 3-day recall) among obese is 66.66%, whereas the intake of low energy is less than 1500Kcal among non-obese i.e 71.80%.The present study also shows that the intake of high fat(g) more than 40 g/day is 63.64%, among obese whereas the percentage of low-fat intake (less than 30g/day) is higher in non-obese i.e 58.42%.Conclusions: Awareness need to be given to the students regarding healthy eating patterns to prevent obesity.

Keywords:- *Obesity, Eating Pattern, Breakfast skipping, Eating episodes, Dietary Intake, Physical activity, Life Style factors.*

I. INTRODUCTION

The study was done among the college girls having the age group between 18-26 years. Only female subjects were selected for the study because the overall prevalence of obesity is much higher in women compared to men.

Obesity is one of the most rapidly increasing health problems in the world, not only in developed countries, but also in less affluent economies.

Changes in dietary habits and physical activity have been implicated as potential causes of obesity. Previous research has shown that weight depends on energy balance defined as the relation between energy intake and energy expenditure.

Studies have suggested that several characteristics of dietary behaviour such as eating frequency, the temporal distribution of eating events across the day, **"breakfast skipping"** [1][2][3][6][7][15], and the frequency of meals eaten away from home, together referred to as **"eating patterns,"** [1][8][19][21]may influence body weight. However, these earlier studies of the effect of eating patterns on body weight have not accounted for the effects of total energy intake and physical activity, which may confound results and introduce misclassification of dietary variables.

The present study was conducted with the objective to study the distribution of eating patterns among college students, assess the obesity by anthropometric measurements- BMI, WC, BF%,and find out that effect of other factors like physical activity, total energy intake, total body Fat on obesity .

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II. METHODOLOGY

The present study was conducted at Women's College, Calcutta, Baghbazar, Kolkata. The place is basically situated at the urban area of Kolkata. The study was conducted at the month of January,2015. 300 students were taken from the different departments. Data collection was done by the pre structured questionnaire schedules. The schedules are used regarding the students 'socioeconomic status, dietary intake (3 Day Recall Method) and physical activity (INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE). Different types of tools were used to for anthropometric measurements of the students. Statistical analysis was done by the Microsoft Excel Office 2007.

III. RESULT

These following tables shown the percentage of obese and non obese students according to the BMI & Body Fat Percentage , Waist circumference, Eating patterns,Dietary intake, Physical Activity score and Life style factors. The present study showed that there was a positive association between eating patten, dietary intake, physical activity, life style factors and obesity.

TABLE:1DISTRIBUTION OF OBESITY AMONG STUDY PARTICIPANTS ACCORDING TO BODY MASS INDEX (SOUTH-ASIAN CLASSIFICATION)

BMI	NO.	PERCENTAGE (%)
NORMAL (<23)	134	44.66
INCREASING RISK (23-27.5)	**80**	**26.67**
HIGH RISK (>27.5)	**86**	**28.67**
TOTAL	**300**	**100**

TABLE: 2 DISTRIBUTION OF OBESITY AMONG STUDY PARTICIPANTS ACCORDING TO BODY-FAT PERCENTAGE

BODY FAT %	NO.	PERCENTAGE (%)
NORMAL	159	53
HIGH	**90**	**30**
VERY HIGH	**51**	**17**
TOTAL	**300**	**100**

TABLE: 3 DISTRIBUTION OF OBESITY AMONG STUDY PARTICIPANTS ACCORDING TOWAIST CIRCUMFERENCE(cm)

W.C (CUT-OFF)	NO.	PERCENTAGE(%)
NORMAL (<80)	130	43.34
>80	**170**	**56.66**
TOTAL	**300**	**100**

TABLE: 4 DISTRIBUTION OF THE STUDENTS ACCORDING TO EATING PATTERN

NO.OF EATING EPISODES/DAY(NOEP)	OBESE		NON-OBESE		TOTAL
	NO.	%	NO.	%	
<4 TIMES	**137**	**71.60**	54	28.40	191
>4 TIMES	29	26.60	80	73.40	109
TOTAL	**166**	**-**	**134**	**-**	**300**
CHI ^2 SCORE:D.F: 55.356	**P(<0.05)= 0 RESULT= SIGNIFICANT**				
SKIP BREAKFAST (SBF)	**OBESE**		**NON-OBESE**		**TOTAL**
	NO.	**%**	**NO.**	**%**	
YES	**118**	**60.83**	76	39.17	194
NO	48	45.28	58	54.72	106
TOTAL	**166**	**-**	**134**	**-**	**300**
CHI ^2 SCORE: 6.08			**P(<0.05)= 0.0136**		
D.F: 1			**RESULT= SIGNIFICANT**		
AVG.INTERVAL OF FIRST EATING(AIOFE)	**OBESE**		**NON-OBESE**		**TOTAL**
	NO.	**%**	**NO.**	**%**	
1-2 HOURS(0)	54	52.95	48	47.05	102
2-3 HOURS(1)	59	48.36	**63**	**51.64**	122
3-4 HOURS(2)	**27**	**72.97**	10	27.03	37
4-5 HOURS(3)	**26**	**66.66**	13	33.34	39
TOTAL	**166**	**-**	**134**	**-**	**300**

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CHI ^2 SCORE: 0.19 **P(>0.05)= 0.66**

D.F: 1 **RESULT= NOT SIGNIFICANT**

HOW OFTEN TAKEMEAL	**OBESE**		**NON-OBESE**		**TOTAL**
	NO.	**%**	**NO.**	**%**	
1-3 DAYS(0)	61	53.04	54	46.96	115
4-6 DAYS(1)	**58**	**59.18**	40	40.82	98
DAILY(2)	28	50.91	27	49.09	55
TOTAL	**147**		**121**		**268**

CHI ^2 SCORE: 0.42 **P(>0.05)= 0.5169**

D.F: 1 **RESULT= NOT SIGNIFICANT**

EATING FRIED FOOD(EFF)	**OBESE**		**NON-OBESE**		**TOTAL**
	NO.	**%**	**NO.**	**%**	
RARELY(0)	35	31.25	77	**68.75**	112
1-2 TIMES/WK(1)	39	56.53	30	43.47	69
3-4 TIMES/WK(2)	92	**77.32**	27	22.68	119
TOTAL	**166**	-	**134**	-	**300**

CHI ^2 SCORE: 5.67P(<0.05)= 0.017

D.F: 1 **RESULT= SIGNIFICANT**

EATING VEGETABLES(EVEG)	**OBESE**		**NON-OBESE**		**TOTAL**
	NO.	**%**	**NO.**	**%**	
RARELY 1-2 TIMES(0)	**128**	**87.68**	18	12.32	146
DAILY(1)	38	24.67	**116**	**75.33**	154
TOTAL	**166**	-	**134**	-	**300**

CHI ^2 SCORE: 120.33 **P(>0.05)= 0**

D.F: 1 **RESULT= SIGNIFICANT**

TABLE:5 DISTRIBUTION OF THE STUDENTS ACCORDING TO LIFE STYLE FACTORS

PHYSICAL ACTIVITY SCORE(P.A SCORE)	**OBESE**		**NON-OBESE**		**TOTAL**
	NO.	**%**	**NO.**	**%**	
HIGH(≥1500)	8	6.3	**119**	**93.70**	127
MODERATE(600-1500)	45	78.95	12	21.05	57
LOW(<600)	**113**	**97.42**	3	2.58	116
TOTAL	**166**	-	**134**	-	**300**

CHI ^2 SCORE: P(>0.05)=

D.F: 1 **RESULT= SIGNIFICANT**

TABLE:6 DISTRIBUTION OF THE STUDENTS RECALL METHOD ACCORDING TO DIETARY INKE BY 3-DAYS

ENERGY (KCAL)	**OBESE**		**NON-OBESE**		**TOTAL**
	NO.	**%**	**NO.**	**%**	
<1500	11	28.21	28	**71.79**	39
1500-1800	35	42.17	48	57.83	83
>1800	120	66.67	58	33.33	177
TOTAL	**166**	-	**134**	-	**300**

CHI ^2 SCORE= 27.94 **P(>0.05)= 0**

D.F: 1 **RESULT= SIGNIFICANT**

FAT(g)	**OBESE**		**NON-OBESE**		**TOTAL**
	NO.	**%**	**NO.**	**%**	
<30	37	41.58	52	**58.42**	89
30-40	45	56.97	34	43.03	79
>40	84	**63.64**	48	36.36	132
TOTAL	**166**	-	**134**	-	**300**

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CHI ^2 SCORE:	**10.585**	**P(>0.05)=**	**0.00114**
D.F:	**1**	**RESULT=**	**SIGNIFICANT**

IV. DISCUSSION

The present study is carried out in North Kolkata, Bagbazar, West Bengal at Women's College, Calcutta and included 300 students aged more than 18 years.

As per Anthropometric Study:

The present study shows that according to BMI (S.A Class) 166 are obese, among them 48.19% are in 'Increasing Risk' and 51.81% are in 'High Risk'. Rest of the 134 students are having BMI less than 23, so they are normal.

According to the B.F% 141 students are obese among total 300 , and 63.82% are having high B.F% and rest 15 of 159 are normal.

According to Waist Circumference(WC) 170 students i.e 56.66% are obese having W.C more than 80 cm and the rest 130 students are normal.

The present study shows that there is a persistent relationship between BMI and B.F%.

There are some study " **Association between Eating Patterns and Obesity in a Free-living US Adult Population**"[1] shows the same association as the present study.

Another study**" Relationship between Body mass index (BMI) and body fat percentage, estimated by bioelectrical impedance, in a group of Sri Lankan adults: across sectional study"**[11]which supports the present study.

As per the Eating Pattern of the Students:

The present study shows there is a positive association between number of eating episodes and obesity. The prevalence is 71.72% among obese who take meal more than four times per day.

The prevalence among non-obese who take meal less than four times a day is 28.27% and who take meal more than four times a day is 73.39%.

Breakfast skipping is also an another factor. The present study shows that 60.82% skipped breakfast among obese and 39.17% in non-obese.

Not only breakfast skip but its frequency is also important.

The study**" Association between Eating Patterns and Obesity in a Free-living US Adult Population**"[1] shows the same association and there is also another study "**Breakfast consumption is positively associated with nutrient adequacy in Canadian children and adolescents."**[3]Which also supports that.

The present study also shows that **snacks between meals** also cause obesity. The percentage of taking snacks between meals (3-4times/Week) among obese is 71.96% whereas this percentage among non-obese is 28.04%.

The study "**The association of breakfast consumption habit, snacking behaviour and body mass index among university students"**[3]which supports this relation.

Eating fried foods, vegetables and eating with family are indirect factors which are included in "Eating Pattern" , have a positive association with obesity.

The percentage of Eating Fried Foods(EFF) (3-4 times/wks) among obese is 77.32% whereas this % among non-obese is 22.68%

The percentage of Eating Vegetables(EVEG) daily among obese is 24.67% Whereas this percentage among non-obese is 75.33%.

The study **"Obesity and eating habits among college students in Saudi Arabia: a cross sectional study"**[8] which supports this association.

As per the **Life Style Factors and dietary intake concerned**:

Physical activity, sedentary life style have direct relation with obesity.

- The present study shows that 97.42% have low P.A score among obese.93.70% have high among non-obese.
- **Dietary intake** is the most important factor that helps in the development obesity.
- The present study shows that , the **intake of high energy(avg. energy -intake by 3- day recall)** among obese is 66.66%, whereas the intake of low energy is less than 1500Kcal among non-obese i.e 71.80%.
- The present study also shows that the **intake of high fat(g)** more than 40 g/day is 63.64%, among obese whereas the percentage of low-fat intake (less than 30g/day) is higher in non-obese i.e 58.42%.

"OBESITY PREVENTING AND MANAGING THE GLOBAL EPEDEMIC",- a report of a WHO Consultation on Obesity"[9]**supports this association.**

V. CONCLUSION

Obesity was present in 53.33 % according to Body Mass Index& it was found to be associated with the following factors:

NO. OF EATING EPISODES PER DAY(less no. of eating episodes , higher the risk ofobesity)

ISSN No:-2456-2165

SKIPPING BREAKFAST & ITS FREQUENCY(higher the frequency of skipping breakfast, higher the risk of obesity)

SNACKS BETWEEN MEALS(higher the frequency of snacks between meals ,higher the risk of obesity)

EATING FRIED FOODS(higher the frequency of eating fried foods ,higher the risk ofobesity)

EATING VEGETABLES(lesser the frequency of eating vegetables , higher the risk ofobesity)

PHYSICAL ACTIVITY (low physical activity,higher the risk of obesity)

DIETARY INTAKE(ENERGY & FAT): obesity risk was found who consumed high energy/calorie and fat(g)(>1800 Kcal/day) and (>40g/day) respectively.

So , awareness need to be given regarding healthy eating patterns to preventobesity.

ACKNOWLEDGEMENT

This is a matter of immense pleasure & joy to express my sincere regards, gratitude & in datedness to my guide Dr. Debasish Dutta, Prof. & HOD, Epidemiology of A.I.I.H & P.H, Kolkata, and Dr Utsa Basu, MD, Consultant Physician & Diabetologist , Horizon Lifeline Multispecialty Hospital, Kolkata for his valuable & timely guidance, constant inspiration, encouragement & constructive criticism throughout the course of this study.

My sincere thanks & obligation are to Dr. Debnath Chaudhuri, Head of the Department of Biochemistry & Nutrition Department, All India Institute of Hygiene & Public Health, Kolkata, for the arrangement of this dissertation project.

I would like to express my deep sense of gratitude & thanks to Mr. Basanata Kumar Roy, Dr. C.S Taklikar and Mrs. Amrita Bandopadhyay, faculty membersof Department of Biochemistry & Nutrition Department, All India Institute of Hygiene & Public Health, Kolkata for their valuable advice & inspiration throughout these days.

I am extremely grateful to every member of my family for their gracious sacrifice, devotion, & inspiration to make the present scientific endeavour a success.

I would like to thank Dr. Debarati Mukherjee, lecturer, Dept. of Food & Nutrition, Women's college, Calcutta for her help to complete entire data collection regarding this project.

Finally I would like to thank all of my friends of A.I.I.H & P.H, Kolkata for their help and encouragement throughout these days.

In the last but not the least I thank all of those who helped me directly or indirectly in completion of this study.

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