

## Macronutrient Adequacy of Breakfast of Saudi Arabian Female Adolescents and its Relationship to Bmi

Vedavalli Sachithanathan<sup>1</sup> and Wedad Flyyh Mtlk Al Rashedi<sup>2</sup>

### Abstract

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**Background:** An alarming increase in the number of overweight and obese children and adolescents in KSA has occurred because in recent decades the Western diet is replacing the traditional Arabic diet. This coupled with faulty eating habits and lifestyle are strongly associated with the development of obesity.

**Aim of the study:** This study tested the hypothesis whether the current breakfast habits of adolescents and early adults are related to the increase in overweight and obesity among Saudi Arabian adolescents.

**Materials and methods:** In 2012, a cross-sectional study was conducted among 1000 female adolescents and early adults (19-24 years old) who were selected by random sampling from four randomly sampled colleges in the University of Hail KSA. The BMI was assessed using anthropometric measurements. Dietary habits were evaluated by a 24 hour dietary recall and a food frequency questionnaire. The percentages of DRIs met by macronutrient intake during breakfast were calculated using ESHA software.

**Results:** The results of the study revealed that a majority of the subjects belonged to the normal weight category (50 %), followed by overweight (28 %), underweight (12 %) and obese (10 %) categories. All the macronutrient intakes (calories, carbohydrates, fats and proteins) during breakfast fell short of the DRIs by 11 to 19 %. No significant differences existed in the macronutrient intake of breakfast between the obese and non obese groups.

**Practical implications:** In summary, increased weight status of Saudi adolescents and early adults was related to their improper dietary habits especially deficient nutrient intakes during breakfast. This indicates the importance of rapid promotion of healthy lifestyle, breakfast habits and advocating the need for nutrient dense food choices among Saudi Arabian adolescents.

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<sup>1</sup> Department of Clinical nutrition, College of Applied Medical sciences, University of Hail, Saudi Arabia. Department of Population and Family health, College of Public health and Medical sciences, Jimma university, Ethiopia. Email: dr\_vedavalli@yahoo.com

<sup>2</sup> Department of Population and Family health, College of Public health and Medical sciences, Jimma university, Ethiopia.

## **Introduction**

The highest per capita income of Saudi Arabia (Madani et al., 2000) has led to high purchasing power, availability of generous and varied food supplies, with varied meal patterns (Al Shammari, 1994). Such dietary pattern associated with an affluent lifestyle has been the cause for the increasing prevalence of health problems associated with overweight and obesity (WHO, 2005). Unhealthy eating habits are major reasons for obesity and cardiac diseases that cause morbidity and mortality (Duangtep et al., 2010).

Higher intake of macronutrients and lower intake of micronutrients in the population are due to food affluence and high income combined with a lack of nutritional awareness (Al Assaf and Al Numair, 2007). Several variables are involved in the etiology of obesity including genetic, lack of physical activity, and consumption of high fat, energy dense foods that are readily accessible, inexpensive, heavily advertised, and palatable (CDC, 2011).

Adolescence is a crucial period to shape and consolidate healthy eating and lifestyle behaviors' (Williams et al., 1995). Unhealthy eating habits such as a low intake of fruits, vegetables, fibre, and dairy foods, a high intake of fast foods and fizzy drinks, snacking outside home and erratic eating behaviours, such as skipping meals, especially breakfast were reported in some Saudi studies (Al-Shoshan, 1990), (Al-Sheri, 1996, Al-Sudairy and Howard, 1992). The primary approach for achieving weight loss is therapeutic lifestyle changes, which includes a reduction in energy intake and saturated fat intake and an increase in physical activity (Albassam et al., 2007).

In conclusion, irregular and infrequent meals together with a low vegetable and fruit intake were the most common unhealthy eating habits of the adolescent population in universities. Lifestyle modification is important, especially in young age groups to inculcate healthy habits earlier in life and prevent cardiovascular diseases and diabetes mellitus in the long run (Abdel-Megeid, 2011).

## **Methodology**

To conduct this study, 1000 female adolescents and early aged 19-24 years were randomly selected from four (out of ten) randomly sampled colleges (Colleges of Medicine, Applied Medical sciences, College of Nursing and College of Information technology) of the University of Hail.

Information relating to socioeconomic status, age, height, weight and 24 hour recall with respect to breakfast consumption were collected.

The food intake during breakfast was fed into the ESHA software to analyze the nutrient intake and to assess the percentage of nutrient consumption during breakfast in comparison with the Dietary Reference intakes (DRIs).

All the data thus collected were fed into the SPSS 17 software to analyze the relationship between BMI and percentage of DRI met by the nutrient consumption during breakfast using T test.

## Results And Discussion

### Socioeconomic Characteristics of the Subjects

The socioeconomic characteristics of the selected subjects such as family income and education of the parents are presented in Table 1

**Table 1: Socioeconomic Characteristics of the Selected Subjects**

Characteristics		Sample Number %	
Sample Size		100	100.0
Age (years)	19-20	40	40.0
	21-24	60	60.0
Income (Saudi riyals)	<8000	36	48.0
	>8000	39	52.0
Education of the Father	Up to school	73	76.8
	University	22	23.2
Education of the Mother	Up to school	79	83.2
	University	16	16.8

A majority of the subjects selected belonged to the age group of 21 to 24 years (60 %), followed by forty percent of the subjects in the age group of 19 to 20 years. Fifty two percent of the subjects belonged to families with an average monthly income greater than 8000 Saudi riyals. A majority of the parents (Fathers – 76.8 % and Mothers – 83.2 %) of the selected subjects were educated only up to school level.

### Body Mass Index (BMI) Category of the Subjects

The BMI category of the selected subjects is presented in Table 2.

**Table 2: BMI Category of the Selected Subjects**

BMI	Percent
Underweight	12.0
Normal Weight	50.0
Overweight	28.0
Obese	10.0

It is evident from Table 2 that a majority of the selected subjects were of normal weight (50 %). Twenty eight percent of the subjects were overweight, followed by 12 % who were underweight and 10% who were obese. In a cross-sectional survey conducted among girls aged 13 to 18 in Jeddah, 24% were overweight or obese and 14% were underweight (Jaaly, et al., 2011). This finding is similar to the findings of the present study.

### Macronutrient Intake of the Subjects During Breakfast

The percentage of DRI (Dietary reference intake) met by the nutrient intake of breakfast is presented in Table 3.

**Table 3: Percentage of Dri Met by the Nutrient Intake of Breakfast**

Percent of DRI met by Breakfast	Mean	Std. Deviation
Calories	13.8339	10.42781
Fat	18.7450	17.21914
Carbohydrates	11.2877	7.96417
Protein	17.6129	13.44226

The percentage of macronutrient intake met by breakfast in comparison to the DRIs revealed that fat intake met 18.8 %, followed by protein (17.6 %), calories (13.8 %) and carbohydrates (11.3 %).

Since breakfast is expected to meet at least 30 % of the day's DRIs, all the macronutrient intakes during breakfast fell short of the DRIs by 11 to 19 %.

**Table 4: Relationship between Bmi and Percentage of Macronutrient Intake Met by Breakfast**

Nutrients	BMI	Mean	Std. Deviation	T-Test
Calories	Obese	15.5694	11.92462	1.225 NS
	Non-Obese	10.9414	6.79935	
Fat	Obese	20.8009	19.46022	0.868 NS
	Non-Obese	15.3184	12.68760	
Protein	Obese	19.2330	14.12262	0.877 NS
	Non-Obese	14.9129	12.32894	
Carbohydrate	Obese	12.4567	9.23033	1.075 NS
	Non-Obese	9.3392	4.99633	

NS – Not significant

No significant differences existed in the macronutrient intake of breakfast between the obese and non obese groups. This could be due to the fact that quantitative nutrient intake is not the primary factor which relates to obesity. Apart from diet quantity, quality of diet in terms of type of fat, composition of carbohydrates whether complex or simple and quality of protein whether in combination with excess saturated fat and sodium and lifecycle attributes such as physical activity, could be major contributory factors in the incidence of obesity.

### Discussion and Conclusion

In conclusion it can be stated that macronutrient intakes during breakfast fell short of the DRIs. For those subjects who are overweight and or obese, the total day's calorie, fat, saturated fat and sodium intakes should be assessed to identify if any of these nutrients contribute to their higher BMI.

Underweight subjects should be counseled on the need to increase macronutrient intakes not only during breakfast but during the whole day.

Since breakfast is the most important meal of the day, steps should be taken to ensure adequate macronutrient intakes during breakfast, to improve basal metabolic rate during the day and thus prevent overweight and obesity. Also attributes such as learning ability, physical performance, productivity and reproductive outcome depend on adequate nutrient intakes during especially during breakfast. Hence efforts should be taken to advocate the need of a qualitative and quantitatively healthy breakfast especially of the female Saudi adolescents and early adults.

## References

- Madani, K.A., N.S. Al-Amoudi and T.A. Kumosani, (2000). The state of nutrition in Saudi Arabia. *Nutr. Health*, 14: 17-31.
- Al-Shammari SA, Khoja TA, Al-Subaie AS. (1994). Transcultural attitude towards being overweight in patients attending health centers, Riyadh, Saudi Arabia. *Family Practice Research Journal*, 14 (2):149-56.
- World Health Organisation WHO (2005). Warns of the rising threat of heart disease and stroke as overweight and obesity rapidly increase. Geneva.
- Duangtep Y, Narksawat K, Chongsuwat R, Rojanavipart P. (2010). Association between an unhealthy lifestyle and other factors with hypertension among hill tribe populations of Mae Fah Luang district, Chiang Rai Province, Thailand. *Southeast Asian J Trop Med Public Health*, 41: 726-734.
- Abdullah H. Al-Assaf and Khalid S. Al-Numair, (2007). Body Mass Index and Dietary Intake of Saudi Adult Males in the Riyadh Region-Saudi Arabia. *Pakistan Journal of Nutrition* 6 (5): 414-418.
- Centers for Disease Control and Prevention (CDC) (2011). National Center for Health Statistics (NCHS). The National Health and Nutrition Examination Survey Data. 2011. Hyattsville (MD): US Department of Health and Human Services, Centers for Disease Control and Prevention. Available from URL: <http://www.cdc.gov/nchs/about/major/nhanes/datalink.htm>
- Williams, C., Bollella, M., & Wynder, E. (1995): A new recommendation for dietary fibre in childhood. *Pediatrics*, 96: pp. 985-988.
- Al-Shoshan, A. (1990): Some socio-demographic factors influencing the nutritional awareness of the Saudi teens and adults: Preliminary observation. *The Journal of the Royal Society for the Promotion of Health*, 110: pp.213.
- Al-Sheri, S. N. (1996): Health profile of Saudi adolescent school girls: a PhD thesis. Health affairs Directorate, Presidency of Girls Education, Riyadh, Saudi Arabia, King Saud Library Book.
- Al-Sudairy A., Howard, K.(1992): Dietary Habits of Technical and Vocational Students in Riyadh, Saudi Arabia – I Meal Skipping. *The Journal of the Royal Society for the Promotion of Health*, 112: 217-218.
- Reem Suliman Albassam, Ensaf S. Abdel Gawwad, Latifa Khanam (2007). Weight Management Practices and their Relationship to Knowledge, Perception and Health Status of Saudi Females Attending Diet Clinics in Riyadh City. *Journal of Egypt Public Health Association*, Vol. 82 No. 1 & 2.
- Elham Al-Jaaly, Margaret Lawson and Therese Hesketh (2011). Overweight and its determinants in adolescents girls in Jeddah city, Saudi Arabia, *International Journal of Food, Nutrition and Public Health*, Vol. 4, No. 2, 2011