



ASSESSING GIRLS' SCHOOL MEALS AND SNACK FOOD OPTIONS IN SAUDI ARABIA USING THE UK FOOD STANDARDS AGENCY NUTRIENT-PROFILING MODEL

Elham A. Al-Jaaly*

Head of Clinical Nutrition Department,
Faculty of Applied Medical Sciences,
King Abdulaziz University,
P.O. Box 54539, Jeddah 21524, Saudi Arabia
Tel No: +00966505692467
Fax: +0096626863932
E-mail: ealjaaly@kau.edu.sa
E-mail: aljaalydiet@gmail.com

Nahlaa A. Khalifa

Assistant Professor, Clinical Nutrition Department,
Faculty of Applied Medical Sciences,
King Abdulaziz University
P.O. Box 54539, Jeddah 21524, Saudi Arabia
Tel No: +00966551258877
E-mail: nkhalefa@kau.edu.sa
E-mail: nahlaakhalifa@outlook.com

Arwa M. Badreldin

M.B.B.Ch
M.Sc. Sport Nutrition,
Lecturer of Clinical & Sport Nutrition
P.O. Box 80113, Jeddah 21589, Saudi Arabia
Tel No: +96650766009 or/ +201007994664
E-mail: arwabdr@gmail.com

*Corresponding author

ABSTRACT

Background: The role of schools in contributing to the promotion of health status is more vital compared to other institutions in a country. This could be through providing healthier meals and snack options. The aim of this paper is to assess school meal menus and snack food options, prepared and served by caterers at intermediate and high schools for girls, using the Nutrient Profiling (NP) model.

Methods: A cross section survey was carried out on 18 schools in Jeddah city. Sample menus for school meals and snack options from three public school canteens and one private school were then collected for assessment. The assessment process included the analysis of components of food and beverage items and classification of these items to either High in saturated Fat, Sugar or Salt (HFSS) or non-HFSS foods using the UK Food Standards Agency (FSA) NP model.

Results/Findings: The analysis of the sampled menus showed of the entire number of the total 40 analysed food and beverage items, 67.5 % ($n = 27$) were HFSS items and 30% ($n = 12$) were non-HFSS food and beverage items. One of the items was unclassified due to the unavailability of nutrition information of that item.

Conclusion: The majority of food and beverages provided by Saudi schools in public and private schools for girls were found to have high HFSS content. The study presented the first descriptive analysis of actual school meals and snacks consumed by schoolgirls in Jeddah city, using the UK NP model. We recommend that school meals should be revised at national level in order to encourage all caterers to provide healthier food items.

Keywords: adolescents; schoolgirls; school meals; snack food options; UK Food Standards Agency; FSA; Nutrient-Profiling-Model; NP.

Reference to this paper should be made as follows: Al-Jaaly, E.A., Khalifa, N.A. and Badreldin, A.M. (2016) 'Assessing Girls' School Meals and Snack Food Options in Saudi Arabia using the UK Food Standards Agency Nutrient-Profiling Model', *Int. J. Food, Nutrition and Public Health*, Vol. 8, No. 1, pp.35–41.

INTRODUCTION: BACKGROUND

The physical environment within a community particularly schools, influences accessibility and availability of foods. Schools are considered the most influential in affecting the food choices of adolescents (Story et al., 2002). Schools play a crucial role in promoting healthy food and healthy lifestyle behaviours.

Taking the responsibility for running school meals should be based on healthy international standards. In Saudi Arabia, one contractor is running all the public school meals provision and there is no defined guidance or legislation for the school meal provision. Private schools operate their own canteens by making contracts with different caterers who give them the right to sell fast food meals or snack foods and mostly have no healthy options (Al-Jaaly, 2012). The meals and snack foods in Saudi girls' schools are intended to either supplement foods brought from home or in many cases, these actually constitute the student's meals.

The School Healthcare Department in Saudi Arabia recommended schools to restrict the

selling of high sugar and high-fat foods on school premises. However, no legislation was implemented to enforce these recommendations. The consumption of fresh milk and dates as sources of energy and natural sweets was also encouraged in Saudi schools at all levels (Al-Jaaly, 2012).

Therefore, it is critical to evaluate systematically the food provided in these schools and to evaluate its impact on girls' health.

The objective of this study was to assess schools' meal menus and snack food options prepared and served by caterers at public and private schools. Then to determine whether they were High in saturated Fat, Sugar or Salt (HFSS) or non-HFSS using the Nutrient-Profiling (NP) model described by the UK Food Standards Agency (FSA, 2009).

MATERIALS AND METHODS

Study site and sampling methods

The present study is part of a large school-based survey (Al-Jaaly et al., 2011), which was conducted in 1519 girls (aged 13 to 18-year-olds) from 18

schools in the academic year 2008–2009. The schools were providing general education for girls at the intermediate and secondary level from public and private sectors in Jeddah city. This includes more than 200 governmental and 150 private schools. Schools are distributed in four regions, namely, North, Centre, South East and South West. The 18 schools were selected randomly to participate in the study using a simple random sampling from both intermediate and secondary levels in both public and private sectors. Visits to school canteens to investigate and collect data on types and brands of snacks and beverages served in schools were performed in three public schools and one private school.

Assessment of school meals, snacks and beverages

A one-day sample menu collected for assessment includes all the food and beverage items provided for the visited public schools' canteen. All food and beverage items provided in the selected private school canteen were read and listed according to their types and contents for assessment. The listing of food and beverage items for both schools in both sectors were assessed and analysed using the NP. The NP model was developed by the FSA as a tool to categorise foods on the basis of their nutrient content and to evaluate the overall balance of nutrients in any food or beverage item. The NP model was used for this study to distinguish between HFSS foods and healthier non-HFSS alternatives that were available in Saudi schools for girls.

Data analyses

The components of 40 food items in the surveyed canteens were analysed and classified to either food and beverages HFSS or non-HFSS foods using the UK FSA NP model. The UK FSA developed the model for processed foods in schools and has been introduced in both primary schools in 2008 and in secondary schools in 2009 (FSA, 2009).

This model is based on a scoring system that is using three steps to work out the overall score for a food or beverage item in 100 g/ml. First step is to calculate the total points 'A', which are for energy, saturated fat, sugars and sodium. Second step is to calculate the total points 'C' that relates to fruit, vegetables, nut content, fibre content and protein. The third step is to work out the overall score for A and C points combined (Rayner and Scarborough, 2009).

RESULTS

Based on the nutrition information labelled on each item, the study found a variety of nutritional content in 40 school meals. It concluded that 100% of beverages at schools in both sectors classified as HFSS beverages with NP scores for less than one. Sugars, preserves and candy snacks were all classified as HFSS. A 12 food products made of different ingredients including milk and milk products, vegetables, potatoes and cereals and cereal products for public schools showed that eleven items had adequate food labelling data to calculate the NP score. One item was unclassifiable

Table 1 The overall score for all food and beverage items for public schools

Brand/Product	Values per 100 g for foods and 100 ml for beverages						FSA NP
	Kcal	Protein (g)	Sugar (g)	Sat. Fat (g)	Fiber (g)	Sodium (mg)	
Choco bar bakery	353	7.1	15.7	5.7	5.5	225.7	HFSS
Cheese (Sandwich)	334	17	18	8.7	1.4	556	HFSS
Croissant plain	432	10	3	6	6	340	HFSS
Stuffed paper leaves	349	4.4	3.5	0.9	5.3	795	Non-HFSS
Labnah and Zatar bar	368	8.3	5	5	5	415	Non-HFSS
Pizza	280	11.73	3.2	5.2	1.7	624	HFSS
Falafel sandwich	333	13.3	N/A	2.4	N/A	294	Unclassifiable

Table 1 The overall score for all food and beverage items for public schools (continued)

White cheese bar	333	8.6	5.7	5.7	5.5	382.9	HFSS
White cheese puff	332	8.9	5.7	5.7	5.5	382	HFSS
Al-Rabie apple juice	30	0	7	0	0.5	6	Non-HFSS
Al-Rabie mango juice	60	0	15	0	0.5	5	Non-HFSS
Al-Rabie mix nectar	60	0	15	0	1	10	HFSS
Al-Rabie orange juice	30	0	8	0	0.5	10	Non-HFSS
Al-Rabie apple nectar	50	0	12	0	0.5	5	Non-HFSS
Bounty	470	4.1	47.3	21.4	1.8	30	HFSS
Dates bar	382	3	53.5	3	3	501.8	HFSS
Galaxy caramel	480	5.3	47.8	15.3	1	100	HFSS
Galaxy crispy	515	6.5	48.8	17.5	1.5	150	HFSS
Mini crackers cheese	486	8.6	14.3	10	3	514.3	HFSS
Mini crackers salt	467	6.7	13.3	3	1	1000	HFSS
Ulker cubuk crackers	415	6.8	0	3.1	0.7	900	HFSS

due to the unavailability of its nutritional information. Two products (18%) classified as non-HFSS, including Chocó-bar bakery, stuffed grape leaves, Labnah and Zatar bar, white cheese bar and white cheese puff. The remaining nine items (50%) including Chocó-bar bakery, white cheese bar, white cheese puff, cheese sandwich, plain croissant, pizza, mini cheese crackers, mini salty crackers and ulker cubuk crackers classified as HFSS (Table 1).

Table 2 The overall score for all food and beverage items for private schools

Brand/Product	Values per 100 g for foods and 100 ml for beverages						FSA NP
	Kcal	Protein (g)	Sugar (g)	Sat. Fat (g)	Fiber (g)	Sodium (mg)	
Croissant cheese	414	9.2	11.35	10.63	2.6	360	HFSS
Croissant plain	406	8.2	11.26	11.66	2.6	345	HFSS
Chocolate donuts	412	6.67	35.11	4.67	1.2	345	HFSS
Pizza	276	11.3	5	5.08	2.26	555	HFSS
Popcorn	528	8.69	0.54	6.31	9.9	771	Non-HFSS
Sweet corn	98	3.2	4	0	3.2	4.8	Non-HFSS
Cheese sandwich	334	17	1.8	8.7	1.4	556	HFSS
Ulker biscuits	484	7	21	7	0	74	HFSS
Oreo biscuit	480	5.2	38.5	10	2.4	340	HFSS
Lays potato chips	500	7.9	0.6	13	5.4	700	HFSS
Cocktail nectar	60	0	15	0	1	10	HFSS

Table 2 The overall score for all food and beverage items for private schools (continued)

Apple nectar	50	0	12	0	0.5	5	HFSS
Orange nectar	51	0	12	0	0.5	3	HFSS
Twix	501	4.8	48.4	19	1	198	HFSS
Kit-Kat	518	6.25	49	17.7	1	54	HFSS
Chocolate wafer with nuts	500	6.6	30	11.3	3.4	580	HFSS
Chocolate Ice cream	216	4.72	25.36	6.8	0.9	76	HFSS
Vanilla Ice cream	207	3.5	21.22	6.79	0.7	80	HFSS
Strawberry Ice cream	192	3.2	4.43	5.19	0.9	60	HFSS

In private schools, these products included adequate food labelling information to calculate its NP scores, except for the cheese sandwich and chocolate donuts where their nutritional information were not available. Most food items (84.6%) classified as HFSS except two items (15.4% out of products); the popcorn and sweet corn where both classified as Non-HFSS (Table 2).

DISCUSSION

This study highlighted the variable nutritional contents of food and beverages in Saudi schools when assessed with the UK FSA standards. The analysis of actual food and beverage menus served in Jeddah city school canteens in the academic year 2008–2009 in both public and private sectors showed that most (77.5%, $n = 31$) were HFSS foods. Food provided in government-sponsored schools included a high proportion of non-HFSS items such as un-sugared-juices (100% juice) and cheese bars, compared to those provided by the assessed private school. However, the availability of healthy choices, such as fruit and vegetables, were very low and practically none of the schools were offering them in both sectors. The first School Canteen Survey in Dubai reported similar findings noting that almost half of the schools do not offer fresh fruit to students as a food choice (Zain, 2008). Looking at the situation in the UK government has banned all HFSS foods including crisps, carbonated beverages and chocolate from school

meals and vending machines since September 2006 (Department for Education, 2005; Simpson et al., 2006). Conway et al. (2002), reported the content of packed lunches of 1381 students from middle schools in the USA and results showed that the most common foods are high in salt, sugar, and fat. Snacks are easily available at school in vending machines and 70% of adolescents used vending machines to purchase snacks when at school (Bonnie, 2000).

Government-sponsored schools in Saudi Arabia provide the same menus at both educational levels, while each private school has its own menu and arrangement in providing food and beverages. Some private schools have contracts with more than one restaurant to deliver daily meals to students based on their selected choice of meals on the previous day. Girls that do not order from these restaurants can purchase food available in the canteen, which are stocked by different fast food establishments (personal observations and contacts with students and teachers).

This study is the first in Saudi Arabia to use the UK NP system in analysing school meals and beverages, since no healthy national standards were available for evaluation. This study explored only one city. Future studies should be conducted at a larger national scale to reflect the national standards that could be generalised to Saudi Arabia. However, the assessment of school meals and beverages in this study can help the Saudi government to realise the next steps in implementing healthier nutritional strategies throughout schools and community-based

programmes involving both education and intervention. It is hoped that these preliminary data findings will serve as an impetus for planning appropriate nutrition intervention programs for schoolgirls in Saudi Arabia. It can also help to define actions at school levels to be undertaken so that healthy behaviours and optimal nutrition for adolescents can be achieved.

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

- The present study highlighted that the majority of Saudi school meals were in accordance with international and regional school meals, and 77.5% of Saudi school food/beverages items were to be high in fat, sugar and salt.
- The regulations and policies in providing school meals are different in public and private Saudi schools for girls. However, the majority of meals provided in both sectors are found to be HFSS. It is important that school canteens take an active role in providing nutritious food and beverages. In addition, policies and regulations in schools to provide healthier school meals should start at the primary level.
- The use of NP systems to periodically assess school meals and snacks can encourage all caterers to provide healthier food items.

SOME DEFINITIONS

Public schools: Government-sponsored schools.
Private schools: Independent or non-state schools supervised by the Ministry of Education.

AUTHORS' CONTRIBUTIONS

Dr. Elham Aljaaly conceptualised and designed the study, collected data, interpreted the results, drafted the initial manuscript, critically reviewed the manuscript, wrote the manuscript and approved

the final manuscript as submitted. Dr. Arwa M. Badruldeen and Dr. Nahlaa A. Khalifa collected food and beverage samples for comparisons, carried out the analyses and assessment process, and helped in interpreting the results.

All authors have read and approved the final manuscript.

REFERENCES

- Al-Jaaly, E. (2012) 'Factors affecting nutritional status and eating behaviours of adolescent girls in Saudi Arabia', UCL, London UK – PhD thesis, Available at: http://discovery.ucl.ac.uk/1370576/2/AL-Jaaly.1370576.Redacted__PhD_thesis.pdf.
- Al-Jaaly, E., Lawson, M. and Hesketh, T. (2011) 'Overweight and its determinants in adolescent girls in Jeddah City, Saudi Arabia', *IJFNPH*, Vol. 4, No. 2, pp.95–108.
- Bonnie, S. (2000) 'Development Chapter', *Seminars in Adolescent Medicine*, Vol. 1, p.55 (1985) by Vaughn I. Rickert – 1996.
- Conway, T.L., Sallis, J.F., Pelletier, B.S., Powers, H.S., Marshall, S.J., Zive, M.M. and Elder, J.P. (2002) 'What do middle school children bring in their bag lunches', *Preventive Medicine*, Vol. 34, pp.422–427.
- Department for Education and Skills departmental (2005) *Department for Education and Skills. Departmental Report 2005*, City: The Stationery Office (TSO).
- FSA 09/03/06 (2009) 'Review of the Agency Nutrient Profiling Model: Executive Summary', 25 March 2009, Food Standard Agency, UK, Available at: <http://collections.europarchive.org/tna/20100927130941/http://food.gov.uk/multimedia/pdfs/board/fsa090306v2.pdf>.
- Rayner, M. and Scarborough, P. (2009) 'The UK Ofcom Nutrient Profiling Model Defining 'healthy' and 'unhealthy' foods and drinks for TV advertising to children', Available at: <http://www.dph.ox.ac.uk/bhfhprg/publicationsandreports/acadpublications/bhfcnpnpublished/nutrientprofilemodel>.

- Simpson, C., Abrahams, D. and Steptoe, J.L. (2006) 'Regulating obesity: the right path?' *PLC Cross-Border Life Sciences Handbook 2006/07*, 29 December 2006.
- Story, M., Neumark-Sztainer, D. and French, S. (2002) 'Individual and environmental influences on adolescent eating behaviors', *Journal of the American Dietetic Association*, Vol. 102, Nos. 1–3, pp.40–51.
- Zain, A. (2008) 'Canteens of most schools in Dubai offer poor food choices', *Khaleej Times 2010*, Article originally published by Khaleej Times 08 July 2010.

BIOGRAPHICAL NOTES

Elham A. Al-Jaaly is a Assistant Professor and the Head of the Clinical Nutrition Programme at the Clinical Nutrition Department, Faculty of Applied Medical Sciences, King Abdulaziz University, Jeddah, Saudi Arabia. She is also a Consultant Editor in the International Journal of Food, Nutrition and Public Health (IJFNPH), which is published in the United Kingdom – (2 issues per year). She is the first graduate Saudi Dietitian from the King Saud Clinical Nutrition Programme in Riyadh, SA. Holding a MSc in Human Nutrition from University of Sheffield, UK and PhD in Community Nutrition, Media Nutrition and International Health and Development from University College London (UCL), UK. She also done two Post-Doctoral Fellowships Programmes (UCL) in Clinical Nutrition and Nutrition & Public Health (University of Westminster, UOW) from the UK. Therefore, her research interests focus on research that relate to nutrition and dietetics field, Public Health, Media and International Health and Development and has carried out, reviewed, supervised and published various student research projects, proposal and manuscripts in these fields. She is registered as 'Clinical Dietitian' at the Saudi Council for Health Specialist (SCFHS). She has been an invited speaker at many national, regional and international conferences since 1986 to present.

Nahlaa A. Khalifa is a Assistant Professor at the Clinical Nutrition Department, Faculty of Applied Medical Sciences, King Abdulaziz University, Jeddah, Saudi Arabia. She holds a PhD in food science and nutrition from Khartoum University in cooperation with Hannover University. She is the coordinator of evaluation and quality assurance program, Coordinator of undergraduate and postgraduate curriculum development, revision, Chairperson of academic advising committee, Consultant of the of academic accreditation committee. Member of strategic plans committee. She is a Thinkbuzan licensed instructor (TLI) and trainer of trainee (TOT). She has been awarded certificates for participation and attendance for health, community and educational missions. Being as invited speaker at many conferences and having published articles on food science and nutrition. Her main interests are in nutritional genomic and complementary and alternative medicine (CAM). Her interests also lie in activation of modern information technology applications in teaching and research.

Arwa M. Badreldin is a former Lecturer of Clinical & Sport Nutrition at the Department of Clinical Nutrition, Faculty of Applied Medical Sciences, King Abdulaziz University and currently joining the National Nutrition Institute, Cairo Egypt, as part time lecturer. She had graduated from Kasr Elini School of Medicine, Cairo University and studied Clinical Pathology as a postgraduate before she had developed her interest in nutrition field. Since then she has focused on research and studies related to nutrition field. She worked as a member of Osteoporosis Research Team at King Abdulaziz University, then she joined the Clinical Nutrition Department as an intern. Shortly after; she has awarded her Master Degree Certificate in Sport Nutrition from Loughborough University, UK. Then she joined the Clinical Nutrition Department, Faculty of Applied Medical Sciences, KAU, where she start her academia as a lecturer, where she established and supervised the internship program. At King Fahd Medical Research Center she started the establishment of Exercise Physiology and Geriatric Research Unit. During her Academic years at KAU she had supervised many student research as well as joining her colleagues in researches and some published work. Her great interest is making evidence-based nutritional knowledge easy and accessible to public as well as health professionals.