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Childhood Obesity and the Basis for Child Nutrition Programmes in Kindergartens of Saudi Arabia

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Abstract

Childhood obesity is increasing in the Middle East and across the globe, due to several environmental factors found in schools and at home. Therefore, implementing Child Nutrition Programmes in schools is essential to deliver nutrition education, school meals, and training to children, teachers and caregivers. We have designed a qualitative study on focus groups using interview based questionnaires, which was applied to 48 kindergartens, 20 parents, two bookstores and 12 global nutrition consulting companies. SPSS 21 was used to analyse the frequency and percentages of the data. This study focused on the barriers and factors that will contribute to the successful implementation of Child Nutrition Programmes in the kindergartens of Saudi Arabia. Furthermore, the respondents showed positive attitudes towards developing child nutrition programmes with the following activities: nutrition education for children, training/workshops for teachers and parents and meal planning for healthy meals at home. According to global consulting companies, the greatest obstacles to the delivery of nutrition programmes to educational institutions are lack of awareness, cost coverage and high resistance and reluctance. Parent pressure, marketing uniqueness and awareness generation should be addressed prior to the programme's implementation to facilitate programme appreciation and parental acknowledgment. Finally, support from the government and non-government organisations will facilitate the successful implementation of the Child Nutrition Programmes thereby reducing the incidence of childhood obesity in the kindergartens of Saudi Arabia.

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Introduction

Childhood obesity has surfaced as a new challenge for healthcare providers and parents across the globe.[1] According to the WHO, the prevalence of childhood obesity is increasing in Middle Eastern countries such as Egypt, Tunisia and Kuwait. Many

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studies have confirmed obesity in Saudi Arabian children, however, accurate statistics have yet to be gathered.[2] Obesity is not restricted to western or developed countries and it is also prevalent in high income and developing countries.[3] It is primarily due to the increasing consumption of energy-dense and poor nutritional value foods with high levels of sugar and saturated fats, coupled with reduced physical activity.[4] Eyad *et al.* (2017) indicated that most overweight or obese pre-primary school children hail from high-income or affluent families using the growth profile z scores,[5] due to the poor quality of school meals and low awareness of mothers.[6] This necessitates nutrition training for children, teachers and parents to support healthy eating habits and lifestyles in school and at home.[7-12] Eating out is highly prevalent in Gulf Cooperation Council (GCC) countries, and predominantly in middle-income countries, particularly in urban areas. Many European and United States[13] based fast food chains have entered Gulf Cooperation Council (GCC) countries, particularly the Kingdom of Saudi Arabia[14] and the United Arab Emirates (UAE).[15] This type of diet is more likely to be low in dietary fibres and high in fat, cholesterol, calories, sodium, and artificial food additives.[16] Being overweight, obese or diabetic is correlated with the frequent consumption of sugar, savoury and crispy snacks, flavoured milk and soda drinks, and snacking between meals.[17] These eating habits are prominent among pre-primary school children, which was shown in the Saudi School Meal and Home Meal Study (SSMHMS), where school meal analysis indicated that the total calories in breakfast are low (23% of total requirement) while the total calories in lunch are high (40% of total requirement) compared to the Recommended Dietary Allowance,[18] where both carbohydrates and saturated fats were at a higher level at lunch (>7%) (6). Due to the increased income and large scale urbanisation over the last 20 years, food consumption and nutrient intake have transformed[19] and most calories now come from animal based[20] and processed foods, both of which play a major role in childhood health and obesity.[21]

Dietary habits and nutritional intake amongst Saudi kindergarten children need to be improved to ensure a healthy diet and prevent nutrition-related diseases in the adult population.[22] Thus, Child Nutrition Programmes need to be initiated to educate children, teachers and parents on developing healthier eating habits.[23] In 2010, the World Health Organisation (WHO) framed its first strategic plan on nutrition for 2010–2019 for the Eastern Mediterranean region to improve the nutritional status of people throughout the lifecycle.[24] This involved encouraging countries to reposition nutrition as central to their development program. The World Health Organisation (WHO) set goals and a seven - point target to be achieved by member countries, including Saudi Arabia. It also provided 10 strategic approaches to be conducted by international organisations to provide a strong foundation for nutrition training programmes, including child nutrition. Nutrition training programmes include various services, such as nutrition education for children and training for teachers, staff responsible for meal preparation and the cafeteria, and parents and caregivers. We have carried a systematic review in 2018 to describe excisting Child Nutrition Programs run by the US government, such as the National School lunch Program (NSLP),[25] and in the United Kingdom (UK), such as the British Nutrition foundation (BNF).[26] In addition , we have reviewed successful non-governmental global consulting companies, such as Qua Nutrition (India), Cafe Nutrition (India), SR Nutrition (UK), Judy More Child Nutrition Consultancy (UK) and Pure Vitality Nutrition Concepts Pte. Ltd. (Singapore), where we found that most effective services to improve children nutrition status and health are through improving school meals and providing education, training, and counselling to caregivers, teachers and students. Thus , among all those programmes, the nutrition curriculum run by the British Nutrition Foundation BNF was found to be more suitable for Saudi Population due to convenience and potential needs.[27] According to the National Centre for Education statistics (NCES)[28] in the United States,[13] 99% of public schools offer nutrition education within the curriculum, 50% or more of all schools have district or state requirement for students to receive nutrition education from kindergarten through to eighth grade and 7% of schools report receiving nutrition lesson materials from sources outside the school. Thus, implementing programmes in Saudi kindergartens is essential. This study has three objectives; first, assess the interest of parents and schools in child nutrition programmes in kindergartens. Second, analyse bookstores to determine the availability of learning resources which support our programme.

Third, identify the main factors and barriers facing global consulting companies in running child nutrition programmes in different countries. The aim of this study is to support the development of successful child nutrition programmes in Saudi kindergartens.

Materials and Methods

Study Design

Focus groups interviews were conducted in December 2017 with different target populations (kindergartens (n = 48), parents (n = 20), bookstores (n = 2), global consulting groups (n = 12), using primary/field interview based questionnaires. The focus group discussions were designed to assess teachers and parents' needs and interest in implementing child nutrition programmes in kindergartens. With regards to bookstores, the discussion focused on the availability of learning resources to support possible existing programmes. The discussions with global consulting companies focused on the factors and barriers that influence the success of child nutrition programmes in schools. Inclusion criteria with regards to the parents and kindergartens involved are Saudi subjects with high economic status in Jeddah City, Saudi Arabia. Exclusion criteria included parents and children that are part of any child nutrition programmes.

Statistical Analysis

Descriptive data was reported as frequencies and percentages (%). SPSS (version 21) was used to analyse the date. The responses given in the customised questionnaires were "yes", "no" and "maybe". The statistical significance of the difference between proportions was determined by a non-parametric binomial test. $p < 0.05$ value (two-sided test) was accepted as statistically significant; "a" is significantly different than "b" and "c"; "b" is significantly different than "a" and "b"; and "c" is significantly different than "a" and "b".

Results and Discussion

Kindergarten School's Interest in Child Nutrition Programmes

Kindergartens play an essential role in preventing childhood obesity, which can be achieved by nutrition education, physical activity classes and teacher training.[29] The first objective of this study is to assess the need for child nutrition programmes similar to the nutrition curriculum run by the British Nutrition Foundation BNF[27] in Saudi kindergartens (Table 1). The data revealed child nutrition programmes are a relatively new concept and only 5% of schools indicated running health related activities that cover health assessment, emergency management and identifying students' health status by health professionals, which may affect educational achievement.[30] It was seen by the Health Promoting Schools (HPS) that both parents and children showed significant changes in their eating patterns and lifestyles following child nutrition programmes, such as consuming more fibre, healthy snacks, milk, water, fruit and vegetables, and reducing their intake of creamy, fatty and sugary foods.[23] The literature confirmed that such programmes influenced teachers as well.[31] Saudi Arabian schools primarily focus on their students' academic development rather than their health and diet. In our study, 80 % of schools were willing to invest time and money to implement these child nutrition programmes and 79 % of the respondents (school principals or representatives) had a positive attitude towards the addition of a nutrition module to the curriculum provided it complied with the Ministry of Education's guidelines. In support of our data, 36 interventions and 21 comparison studies between preschool students and first grade students' healthy lifestyles have shown that adding a nutrition curriculum as an afterschool setting improves the selection of healthy snacks.[14] Other studies have shown that most teachers have taught nutrition as part of the curriculum, however, professional training is needed.[18]

Our interviews also covered changing school meals and improving the lunch experience which has been observed with USDA Child Nutrition Program[27] to adopt a healthier approach which meets the recommended dietary intakes and provides healthy food choices.[32] In schools, students usually consume the most available type of food presented, such as pizza and sandwiches.[33] In the Saudi School Meal and Home Meal Study (SSMHMS), 27 % of children were classified as overweight, and school meals consisted of high amounts of carbohydrates and fats were above the RDA.[6] While school nurses and counsellors care for students with special needs, such as allergies and chronic illnesses, the meals are not professionally planned. 92 % of schools do not assign dietitians to plan the meals cooked and

served in school cafeterias and 100 % of schools do not assign a dietitian to plan a diet customised according to health conditions (Table 1). Worldwide, dietitians have a significant role in schools, which includes purchasing ingredients, storage, control, meal planning and services, equipment

Table 1: Child Nutrition Programmes and Services according to School Principal (n=48)

	N%
Would your school be interested in collaborating with an organisation which provides teacher training and personalised diet for children aged 3–6 years?	
Yes	25% b
No	65% c
Maybe	10% a
Does your school provide nutrition-related formal training to students aged 3-6 and teachers?	
Children	
Yes	25% a
No	75% b
Teachers	
Yes	10% a
No	90% b
Who provides formal training to teachers regarding child nutrition issues and healthy food habits? (Of those who said -yes to providing formal training to teachers). Doctors and nutrition consultants.	
Would you be willing to invest time and money on teacher training related to child nutrition? (Of those who said -yes to providing formal training to teachers).	
Yes	80% a
No	20% b
Would your school be interested in adding a nutrition module to the curriculum or introducing nutrition education in one of the existing modules in your curriculum, to be designed by a nutrition specialist following the Ministry of Education guidelines and taught by a trained teacher?	
Yes	79% b
No	10% a
Maybe	10% a
Does your school provide cooked meals or a cafeteria selection of foods?	
Yes	96% b
No	4% a
Does your school assign a clinical dietician to plan meals in schools or to plan cafeteria food selection to fulfil nutrition requirement of children aged 3-5?	
Yes	8% a
No	92% b
Does your school, assign a clinical dietitian to plan customised meals for students with specific health conditions, such as diabetes, cardiovascular issues, allergies, down syndrome, malnutrition or obesity?	
Yes	0% a
No	100% b

Table 2: Child Nutrition Programmes and Services according to Parents (n=20)

	N%
Does your child receive any nutrition training at school?	
Yes	15% a
No	85% b
If yes, which organisation provides the child nutrition programme on behalf of the school? 5% of parents stated that their children receive it through school nurses and doctors. If not, are you interested to getting your child a nutritional programme?	
Yes	94% b
No	6% a
Would you be willing to pay extra in addition to the school fees to provide your child with formal education on food and nutrition?	
Yes	90% b
No	10% a
What is the additional cost you would be willing to bear for your child in order to provide them with a formal food and nutrition program?	
3%	75% c
5%	25% b
7%	0% a
10%	0% a
Do you struggle in teaching/guiding your children about healthy dieting at home? Do you have any suggestions on how it can be done?	
Yes	50% b
No	25% a
Manageable	25% a
Would you (mother/caregiver) want to be part of your child's nutrition program? For instance, workshops and training for mothers to apply nutrition at home (preparing food)?	
Yes	60%
No	40%
Do you struggle in planning your children's diet at home? Do you have any suggestions on how it can be done?	
Yes	65% b
No	35% a
Would you (mother/caregiver) want clinical dietitians to plan your child's diet at home as well? Including training for mothers on food preparation?	
Yes	25% a
No	55% b
Maybe	20% a

Percentages (%) were accepted as statistically significant with $p < 0.05$ value (two-sided test); a means it is significantly different from b and c ; b is significantly different from a and c; c is significantly different than a and b.

management and waste management,[34] however, they are not satisfied with their salaries and work conditions.[35]

Our study also targeted parents and their interest in child nutrition programmes. The literature showed that the main factors influencing the health of kindergarten children in KSA are the type of food presented, knowledge, household income, cost of food, individual preferences, cultural beliefs, and cultural traditions, followed by family and social influencers, such as maternal employment, and the preference for sweets.[36] In KSA, increased social awareness has resulted in more women joining the workforce.[37] Consequently, young children are routinely being fed poor quality meals by care takers. This trend is likely to influence the dietary habits of children outside the home setting, in schools for instance, and increase the risk of developing obesity, diabetes, and allergies.[38] Table 2 shows that 90 % of respondents are willing to receive nutrition education and training for their children. Furthermore, 80 % were willing to pat an addition fee for it. Approximately 75 % indicated that they would not mind spending an additional 0 - 3 % of school fees. Slusser *et al*.'s (2011) qualitative study revealed that even mothers from a low social economic status are interested in having their children participate in child nutrition programmes, therefore governmental sectors must provide funds inorder to support implementation of such programmes.[39] The data showed that 50 % of the respondents struggle to teach their children about healthy eating at home and 25 % stated that it is quite manageable. In 2015, a cross sectional study showed that mothers struggle to feed their children. Most of the difficulty was related to the child sitting at a table or in front of the TV while eating, the frequency of takeaway foods, mother's control and child's quality of diet.[40] Furthermore, 60% of the interviewed parents responded positively towards collaborating with and participating in child nutrition programmes, such as attending workshops and training in how to apply food at home. Nutrition education developed for caregivers can be delivered via mail or social media, however, some caregivers prefer to learn with their peers in a workshop.[41]

Table 3: Child Nutrition Programmes and Services according to Bookstores (n=2)

	N%
Do you provide nutrition education books for children?	
Yes	50%
No	50%
Do you provide any type of learning materials for children?	
Yes	50%
No	50%
If textbooks are provided, are they provided for certain age groups?	
Yes	50%
No	50%
Are there any books provided for mothers/caregivers?	
Yes	50%
No	50%
Would you suggest such learning resources be introduced in your bookstore?	
Yes	100% b
No	0% a

Percentages (%) were accepted as statistically significant with $p < 0.05$ value (two-sided test); a means it is significantly different from b and c ; b is significantly different from a and c; and c is significantly different from a and b.

Another study stated that caregivers prefer to use Facebook, which is a feasible platform that they can access at their own convenience.[42] However, in our study, half the parents responded negatively when asked about receiving a dietitian's help at home.

The third objective of this study was to assess the availability of learning resources in bookstores, such as teaching games, books, recipes that is usually used as tools in Child Nutrition Programs.[27] Developing learning material suitable for children

Table 4: Child Nutrition Programmes and Services according to Global Consulting Companies (n = 12)

	N%
Do you or your organisation provide child nutrition training programmes to schools and teachers?	
Yes	17% a
No	83% b
What are the major challenges you or your company encountered while persuading schools to opt for such a service and provide nutrition related education to students and parents?	
Lack of awareness	50%
Cost coverage	42%
High resistance and reluctance	42%
Which factors moved schools to implement child nutrition training programmes for teachers?	
Parent pressure	92% c
Awareness generation	33% b
Marketing uniqueness	42% b
Suitability with time slots	8% a
Reputation	8% a
What are the additional services you or company offer in addition to formal training in child nutrition for teachers?	
Personal Counselling to parents and nutrition training to teachers.	
What are the other prominent child nutrition training services in your company?	
Workshops (private or public), seminars, presentations on nutrition education.	
Does your company provide diet planning in addition to their education programmes specific for schools? What other services are included in your program?	
Yes	58%
No	42%
Does your company provide learning resources along with education services suitable for children, such as videos, games, apps and colouring books?	
Yes	33% a
No	67% b

Percentages (%) were accepted as statistically significant with $p < 0.05$ value (two-sided test); a means it is significantly different to b and c; b is significantly different from a and c; c is significantly different from a and b. The companies interviewed include: Qua Nutrition, Cafe Nutrition, SR Nutrition, Judy More Child Nutrition Consultancy, Pure Vitality Nutrition Concepts Pte. Ltd., Prime health Consultants, Dr. Nutrition Centre LLC, Cooper Nutrition, Roche Dietitians LLC, Nutrition Consulting Services LLC, Pomegranate Nutrition Consulting, and others

in any health promoting programme plays major role in delivering education to the community.[43] Governmental programmes provide sources online, as seen in the BNF and USDA, such as worksheets, recipes and activities for children which can be used by caregivers and teachers.[25,26] Other tools include computer based tools,[44] or materials found in retails stores, such as, educational books, stories and games, which involve both parents and children at home.[45] In our study, we interviewed the top bookstores in Saudi Arabia, Jarir and Obeikan, which provide educational toys of all types for children of all ages. Obeikan bookstores are expected to release their books on nutrition education soon. Jarir already provides learning materials for children, nutrition education books for certain age groups and books for mothers and caregivers, however, they are primarily cook books. In addition, both bookstores have shown an interest in introducing other learning resources, such as colouring books and games, to enhance health and nutrition among children in Saudi Arabia. According to the Book bag programme several benefits of Child Nutrition Programs has been relying on mostly learning materials, such as books that involve participation of both parents and children. This has led to positive health changes, such as purchasing more fruit and vegetables.[45]

Our third objective was to identify the factors and barriers to delivering child nutrition programmes in schools via global consulting companies. Therefore, we interviewed 12 global consulting companies that deliver child nutrition programmes to schools. Table 4 shows that 83 % of companies that do not provide child nutrition training programmes to schools or teachers face three challenges; lack of awareness, cost coverage and high resistance and reluctance, which is supported with previous studies.[46] In addition, our interviews identified factors associated with considering nutrition education and teacher training in schools, where 92 % stated parental pressure is a major factor . Furthermore, timing and school image are factors to a lesser extent and some schools adopt these programmes to improve their reputations. Personal counselling for parents is one of the most prominent additional services offered by the companies in addition to teacher training. Workshops (Private or Public), seminars, and presentations on nutrition education are the most common child nutrition training services offered by the companies globally.[43] The most common workshop conducted by the consultant companies was 'Private Workshops for Mother and Child' which gained traction in many areas on how to prepare nutritious food and provide 'how to prepare' sheets/papers for food preparation in cafeterias for school.[47] Some of the most common learning resources provided by the companies were videos to support the teachers such as, a teacher's guide, Continuous Professional Development (CPD) for teacher development, games, worksheets, recipes and books.[48] Approximately 66 % of school representatives expressed a positive attitude towards collaborating with third-parties for formal nutrition training for teachers, educating children and providing learning resources.

Conclusion

There is a high prevalence of childhood obesity in the Middle East, and Central and Eastern Europe, and it has been observed to be very high in KSA.[49] Our study revealed that there are no health promoting companies implementing child nutrition programmes or providing materials for kindergartens in Saudi Arabia. School representatives, parents, bookstores and global companies expressed interest, however, the cost and expenses are possible barriers to their implementation. Our findings support developing programmes with a convenient level of expenses that include nutrition education for children, training workshops for parents and teachers, and meal planning in schools and at home. Furthermore, developing materials and books suitable for children has significant potential in the Saudi market, to involve the family and support child nutrition programmes once implemented. Future work should focus on implementing a pilot child nutrition programme and measuring its effectiveness, team quality and health outcomes. Obesity is a health issue which has economic effects. As childhood obesity often persists into adolescence and adulthood, it is necessary to develop health promoting programmes at a younger age.[43]

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