



UNIVERSITI PUTRA MALAYSIA

***INTERVENTION PROGRAM FOR REDUCTION OF OVERWEIGHT AND
OBESITY AMONG 11- TO 15- YEAR OLD SCHOOL CHILDREN IN
DISTRICT 1 OF SHIRAZ, IRAN***

ROZINA RAHNAMA

FPSK(P) 2015 31



**INTERVENTION PROGRAM FOR REDUCTION OF OVERWEIGHT AND
OBESITY AMONG 11- TO 15- YEAR OLD SCHOOL CHILDREN IN
DISTRICT 1 OF SHIRAZ, IRAN**

By

ROZINA RAHNAMA

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in
Fulfilment of the Requirements for the Degree of Doctor of Philosophy**

November 2015



All material contained within the thesis, including without limitation text, logos, icons, photographs and all other artwork, is copyright material of Universiti Putra Malaysia unless otherwise stated. Use may be made of any material contained within the thesis for non-commercial purposes from the copyright holder. Commercial use of material may only be made with the express, prior, written permission of Universiti Putra Malaysia.

Copyright © Universiti Putra Malaysia



DEDICATED

This thesis dedicated to my beloved husband, Mehran (Akbar) Dehghani Ghahfarokhi, to my dear daughter Artonis, my dear son Oorand, my dear mother Mahvash Gharibi and my deceased father Majid Rahnama that I owe them all of success in my life.



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirements for the degree of Doctor of Philosophy

INTERVENTION PROGRAM FOR REDUCTION OF OVERWEIGHT AND OBESITY AMONG 11- TO 15- YEAR OLD SCHOOL CHILDREN IN DISTRICT 1 OF SHIRAZ, IRAN

By

ROZINA RAHNAMA

November 2015

Chairman: Professor Lekhraj Rampal, MBBS, MPH, DrPH, FAMM
Faculty: Medicine and Health Sciences

Childhood obesity is one of the most serious public health challenges of the 21st century. The problem is global and is steadily affecting many low- and middle-income countries, particularly in urban settings. In Iran, the overall prevalence of overweight has increased from 10.4% during 2000 to 2004 to 10.8% during 2005 to 2010. The aim of this cluster randomized controlled trial study was to evaluate the impact of an intervention program on BMI, physical activity, diet knowledge and diet behavior for reduction of overweight and obesity among students aged 11-15 years in district 1 of Shiraz/Iran.

Multistage cluster sampling method was used for selection of the sample. Out of 64 schools in District 1 of Shiraz, eight schools randomly selected and assigned to intervention and control group. A self-administered validated questionnaire was used to measure socio-demographic, BMI, physical activity, diet knowledge and diet behavior of the respondents. An educational module adapted based on World Health Organization Guideline for obesity and overweight prevention and delivered by researcher to the intervention groups during one month. Four-hour integrated obesity and overweight prevention program comprising of four structured modules was developed. While, the control group was exposed to normal school program. Descriptive and multivariate statistics were used for analyzing the data using IBM, SPSS version 21. A mixed design repeated measure ANOVA (Generalized Estimating Equation) considering cluster effect and Cohen's range band on effect size (ES) were applied to assess the impact of the intervention. The outcome measures were assessed at baseline and 6 months post-intervention.

Data were collected from 2040 students aged 11-15 years that 1040 respondents randomized to the intervention group and 1000 respondents to the control group. The response rate for the intervention group was 97.8% and for the control group was 96.4%. Out of 2040 respondents, 52.1% were male and the majority were Moslem 98.2%. Respondents in the intervention arm after controlling for cluster effect showed

significant improvements in BMI ($p=0.003$), diet behavior ($p<0.001$) and diet knowledge ($p<0.001$) while the physical activity had no improvements ($p=0.804$).

In conclusion, the developed intervention program related to obesity and overweight prevention was more effective in improving BMI, diet behavior and diet knowledge among Iranian students aged 11-15 years, while it was not effective in increasing physical activity scores. Future school-based interventional research related to prevention of obesity and overweight should be used mixed methodologies while study peer influence among adolescents.



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Doktor Falsafah

**PROGRAM INTERVENSI UNTUK PENGURANGAN BERAT BADAN DAN
OBESITI KALANGAN 11- KE 15- TAHUN SEKOLAH ANAK DALAM
DAERAH 1 TAHUN SHIRAZ, IRAN**

Oleh

ROZINA RAHNAMA

November 2015

Pengerusi: Professor Lekhraj Rampal, MBBS, MPH, DrPH, FAMM
Fakulti: Perubatan dan Sains Kesihatan

Masalah obesiti di kalangan kanak-kanak merupakan antara cabaran pemasalahan bagi kesihatan awam yang semakin membimbangkan di abad 21 ini. Ia juga telah dikenalpasti telah menular ke peringkat global dan sedang menular di kalangan populasi umum di negara-negara berpendapatan rendah dan pertengahan terutamanya yang melibatkan penduduk-penduduk yang tinggal di kawasan bandar. Di negara Iran sahaja, pemasalahan obesiti yang dikesan berlaku di kalangan kanak-kanak telah menunjukkan peningkatan yang tidak memberangsangkan dari 10.4 % kepada 10.8% bagi data terkumpul antara tahun 2000 hingga 2004 dan 2005 hingga 2010. Kajian ujikaji terkawal terhadap kluster kanak-kanak yang telah dipilih secara rawak (Cluster Randomized Controlled Trial) adalah disasarkan untuk menilai impak yang berlaku dari aspek berat badan berlebihan dan obesiti sekiranya usaha-usaha intervensi dilaksanakan melalui program BMI, penglibatan dalam aktiviti fizikal, pengetahuan diet dan amalan pemakanan bagi pelajar-pelajar sekolah di antara umur 11 hingga 15 tahun di Daerah 1, Shiraz, Iran.

Persampelan kluster berperingkat (Multistage Cluster Sampling) telah diaplikasikan dalam menentukan pemilihan sampel bagi tujuan kajian ini. Secara keseluruhan terdapat 64 buah sekolah di Daerah 1, Shiraz di mana lapan sekolah dari jumlah tersebut telah dipilih secara rawak dan pelajar-pelajar terlibat telah dibahagikan kepada kumpulan intervensi dan kumpulan kawalan. Setiap pelajar yang terpilih sebagai responden dalam kajian ini telah diedarkan dengan satu set soalan kajian yang telah disahkan bagi mengukur demografi sosio, BMI, penglibatan dalam aktiviti fizikal, pengetahuan diet dan amalan pemakanan. Dalam kajian ini pengkaji telah menyampaikan sebuah modul pembelajaran selama jangkamasa sebulan terhadap pelajar-pelajar dalam kumpulan intervensi di mana isi kandungan modul tersebut telah diadaptasi dari Garis Panduan Pertubuhan Kesihatan Sedunia (World Health Organization Guideline) bagi menangani pemasalahan obesiti dan berat badan berlebihan. Sebuah program bersepadu yang berdurasi empat jam melibatkan empat modul terstruktur telah dibangunkan bagi menangani pemasalahan obesiti and berat badan berlebihan. Pelajar-pelajar yang terpilih sebagai sampel dalam kumpulan kawalan telah didedahkan kepada program rutin di sekolah masing-masing. Analisis data telah dilaksanakan dengan menggunakan kaedah

statistik Descriptive and multivariate melalui aplikasi perisian IBM, SPSS versi 21. Bagi mengukur impak intervensi, pengkaji menganalisis data terkumpulan melalui kaedah Mixed Design Repeated Measure ANOVA (Generalized Estimating Equation) dalam mengambilkira kesan kluster dan Cohen's Range Band untuk mengukur Effect Size (ES). Hasil pengukuran yang diperolehi ditafsirkan berdasarkan garis dasar dan enam bulan post intervensi.

Data yang diperolehi telah melibatkan responden seramai 2040 orang pelajar di antara umur 11 hingga 15 tahun dari sekolah disekitar Daerah 1, Shiraz. Di mana dari jumlah tersebut seramai 1040 responden telah dipilih secara rawak bagi menyertai kajian sebagai sampel dalam kumpulan intervensi manakala selebihnya 1000 orang pelajar diklasifikasikan sebagai kumpulan kawalan. Inisiatif pengumpulan data merekodkan response rate bagi kumpulan intervensi pada 97.8% manakala bagi kumpulan kawalan adalah 96.4%. Pecahan jantina bagi 2040 responden yang terpilih secara rawak telah melibatkan sebanyak 52.1% lelaki dan majoriti adalah penganut agama islam iaitu 98.2%. Hasil kajian menunjukkan responden di kalangan kumpulan intervensi selepas mengambilkira kawalan terhadap kesan kluster (Controlling for Cluster Effect) menunjukkan terdapat kesan yang positif di mana terdapat perubahan yang signifikan bagi BMI ($p=0.003$), amalan pemakanan ($p<0.001$) dan pengetahuan diet ($p<0.001$) manakala penglibatan dalam aktiviti fizikal tidak menunjukkan apa-apa peningkatan atau perubahan ($p=0.804$).

Secara keseluruhan boleh disimpulkan bahawa program intervensi yang dibangunkan untuk menangani permasalahan obesiti dan berat badan berlebihan adalah lebih berkesan bagi BMI, amalan pemakanan dan pengetahuan diet di kalangan pelajar-pelajar di Iran bagi lingkungan umur 11 hingga 15 tahun. Walaubagaimanapun program ini dilihat tidak begitu berkesan untuk meningkatkan penglibatan pelajar dalam aktiviti fizikal. Bagi tujuan kajian di masa hadapan terutamanya yang melibatkan kajian program intervensi menangani obesiti dan berat badan berlebihan di tahap sekolah, focus kajian disarankan menggunakan metodologi bercampur disamping mengembangkan kajian terhadap faktor pengaruh rakan dan remaja sebaya.

ACKNOWLEDGEMENTS

I thank Allah the Almighty to have bestowed such consciousness and chance to continue this endeavor onward.

I would like to express my deep gratitude and appreciation for a lifetime to Professor Dr. Lekhraj Rampal for his wonderful advice, thoughtful guidance, unceasing support and meaningful friendship throughout my Ph.D.'s degree. His exemplary enthusiasm, inspiration and problem solving efforts have provided me with the answers to many questions. He was always accessible, and with the patience and kindness of a father he listened to my problems and assisted me with my studies. He encouraged me through the difficulties and inspired me to move to a higher level of learning experience. His positive attitude and support have helped me to become a better person.

I would also like to give my heartfelt thanks and deepest appreciation and gratitude to Professor Dato' Dr. Lye Munn Sann for his insightful suggestions and guidance, encouragement, patience, valuable advice, immense knowledge that had helped me to carry on the study successfully. I would like to express my special appreciation and very sincere gratitude to Professor Dr. Sherina Mohd. Sidik. She gave me the time, effort, encouragement and valuable suggestions. I would like to express my special appreciation and very sincere gratitude to Associate Professor Dr. Parvin Abedi. She gave me the time, effort, encouragement and valuable suggestions through data collection and research. They were exceptional role models in teaching, mentoring, and conducting research studies. Without their outstanding assistance and support, I would not have reached my goal.

Also I would like to express a special thanks to all my teachers from the first until now, for their exceptional advice, guidance, and assistance in learning process. I am so grateful to the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia for allowing me to study. Special thanks to the principles of the Ministry of Education and Department of Education of District 1 in Shiraz for allowing me to do my research in Iran. Thanks to the principals, assistants, students, teachers, parents and school canteen provider who have helped and participated in the survey, Thank you, I could not have done it without you all.

I would like to extend a special thanks and deepest gratitude to my dear mother for her great kindness, devotion, encouragement and continuous support. I commend her efforts and her tolerance. She will remain in my heart forever. I would like to extend my deepest love and gratitude to my dearest friend and husband, Mehran (Akbar), and my beloved children Artonis and Oorand, for encouragement, tolerance and unconditional support that they have offered through the long days stretching into months of my studies. I also wish to express my appreciation to all of my family and friends who have inspired me, supported me and encouraged me in all of these years. Thank you all!

Rozina Rahnama

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfillment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

Lekhraj Rampal, MBBS, MPH (Hons), DrPH, FAMM

Professor
Faculty of Medicine and Health Science
Universiti Putra Malaysia
(Chairman)

Lye Munn Sann, MBBS, MPH, DrPH, FAMM

Professor
Faculty of Medicine and Health Science
Universiti Putra Malaysia
(Member)

Sherina Mohd Sidik, PhD

Professor
Faculty of Medicine and Health Science
Universiti Putra Malaysia
(Member)

Parvin Abedi, PhD in Community Nutrition

Associate Professor
School of Nursing & Midwifery
Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
(Member)

BUJANG KIM HUAT, PhD

Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

Declaration by Members of Supervisory Committee

This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) are adhered to.

Signature: _____
Name of Chairman of
Supervisory
Committee: _____

Signature: _____
Name of Member of
Supervisory
Committee: _____

Signature: _____
Name of Member of
Supervisory
Committee: _____

Signature: _____
Name of Member of
Supervisory
Committee: _____

TABLE OF CONTENTS

	ABSTRACT	Page
	ABSTRAK	i
	ACKNOWLEDGEMENTS	iii
	APPROVAL	v
	DECLARATION	vi
	LIST OF TABLES	viii
	LIST OF FIGURES	xiii
	LIST OF ABBREVIATIONS	xiv
		xv
CHAPTER		
1	INTRODUCTION	
	1.1 Background	1
	1.2 Problem Statement	2
	1.3 Significance of the Study	3
	1.4 Research Questions	4
	1.5 Research Objectives	4
	1.5.1 General objective	4
	1.5.2 Specific objectives	5
	1.6 Research Hypothesis	5
2	LITERATURE REVIEW	
	2.1 Childhood Obesity and Overweight	6
	2.2 Body Mass Index as Measurement for Obesity	6
	2.3 Epidemiology of Obesity	7
	2.4 Childhood Overweight and Obesity in Iran	8
	2.5 Complications of Obesity	8
	2.6 Determinants of Child and Adolescent Obesity	10
	2.6.1 Non-modifiable Determinants of Child and Adolescent Obesity	11
	2.6.2 Modifiable Determinants of Child and Adolescent Obesity	12
	2.6.2.1 Factors that Occur in First Year of Life	12
	2.6.2.2 Maternal Behaviors	12
	2.6.2.3 Home Environment	13
	2.6.2.4 Dietary Behaviors and Dietary Pattern	13
	2.6.2.5 Physical Activity	16
	2.6.2.6 Screen Time, Television Viewing and Exposure to Advertising	16
	2.6.2.7 Sleeping Behaviors	17
	2.6.2.8 Environmental Factors	18
	2.6.2.9 Parental Factors and Child Obesity	19
	2.7 Health Behavioral Theories	21
	2.7.1 Health Belief Model	22

2.8	Review of School-based Obesity Prevention Interventions	22
2.9	Review of Programs and Interventions	26
2.10	Overview of Relevant Research	29
2.11	Promotion of physical activity	32
2.12	Strategies Needed to Fight Childhood Obesity	33
2.13	Conceptual Framework	34

3 MATERIALS AND METHODS

3.1	Study Location	36
3.2	Study Design	37
3.2.1	Randomization and Blinding Procedure	37
3.3	Study Duration	37
3.4	Study Population	38
3.4.1	Inclusion Criteria	38
3.4.2	Exclusion Criteria	38
3.5	Sampling	38
3.5.1	Sampling Population	38
3.5.2	Sample Size Estimation	38
3.5.3	Sampling Frame	40
3.5.4	Sampling Methods	40
3.6	Development and Implementation of Education Program	
	Module on Obesity Prevention	41
3.6.1	Focus Group Discussion	41
3.6.2	Intervention	42
3.7	Data Collection	43
3.8	Instruments	44
3.8.1	Questionnaire	44
	3.8.1.1 Diet Behavior	45
	3.8.1.2 Physical Activity	45
	3.8.1.3 Diet Knowledge	45
3.8.2	Anthropometric Measurement	45
	3.8.2.1 Height	45
	3.8.2.2 Weight	46
3.9	Quality Control	46
3.9.1	Validity	46
3.9.2	Reliability	47
3.10	Independent and Dependent variables	48
3.11	Data Analysis	49
3.12	Operational Definitions	50
3.13	Ethical Consideration	51
3.14	Consort Flow Diagram of the Study	52

4 RESULTS

4.1	Response Rate	53
4.2	Treatment for Missing Data	53
4.3	Background Profile of the Respondents	54
4.3.1	Demographic Characteristics	54
4.3.2	Family Characteristics of the Respondents	55

4.4	Baseline Comparison between Intervention and Control Groups	56
4.5	Baseline Outcome Measures Scores	56
4.6	Evaluation of the Effectiveness of the Intervention on Obesity Prevention	57
4.6.1	Effect of the Intervention on Body Mass Index towards Obesity Prevention	57
4.6.2	Effect of the Intervention on Physical Activity	59
4.6.3	Effect of the Intervention on Diet Behavior	60
4.6.4	Effect of the Intervention on Diet Knowledge towards Obesity Prevention	61
5	DISCUSSION	
5.1	Attrition Rate	65
5.2	Effect of Intervention on Body Mass Index	65
5.3	Effect of Intervention on Physical Activity	66
5.4	Effect of Intervention on Diet Behavior	67
5.5	Effect of Intervention on Diet Knowledge	69
6	SUMMARY AND CONCLUSION	
6.1	Summary and Conclusion	71
6.2	Strengths of the Study	71
6.3	Limitations of the Study	71
6.4	Recommendations for Future Research	72
	REFERENCES	74
	APPENDICES	101
	BIODATA OF STUDENT	154
	LIST OF PUBLICATIONS	155

LIST OF TABLES

Table		Page
3.1	Information used in sample size calculation	39
3.2	The content summary of the educational classes	43
3.3	Different parts of the questionnaire	44
3.4	Pre Testing Reliability Test Result (N = 50)	48
3.5	Reliability Test Result after the Study Survey (N= 2040)	48
4.1	Response Rates according to Schools	53
4.2	Background Characteristics of the Respondents	54
4.3	Family characteristics of the Students	55
4.4	Baseline outcome measure	57
4.5	Effect of intervention on BMI	58
4.6	Comparing changes in BMI	58
4.7	Effect of intervention on BMI after controlling for Age, Family Income, Monthly Income, Parents Education, Family Number, Obesity history, Transportation	59
4.8	Effect of intervention on Physical Activity Score	60
4.9	Effect of intervention on Diet Behavior Score	60
4.10	Comparing changes in Diet Behavior	60
4.11	Effect of intervention on Diet Behavior after controlling for Age, Family Income, Monthly Income, Parents Education, Family Number, Obesity history, Transportation	61
4.12	Comparison of Diet Knowledge Score	62
4.13	Comparison of changes in Diet Knowledge Score	62
4.14	Effect of intervention on Diet Knowledge after controlling for Age, Family Income, Monthly Income, Parents Education, Family Number, Obesity history, Transportation	63

LIST OF FIGURES

Figure	Page
2.1 Conceptual Framework of the effect of an educational program for reduction of overweight and obesity	35
3.1 Map of Shiraz, Iran	36
3.2 Multi-stage cluster random sampling methods chart	40
3.3 Consort Flow Diagram of the Study	52

LIST OF ABBREVIATIONS

ADA	American Dietetic Association
BMI	Body Mass Index
CDC	Centres for Disease Control and Prevention
CI	Confidence Interval
ECLS	Early Childhood Longitudinal Survey
FBDG	Food-Based Dietary Guidelines
FFQ	Food Frequency Questionnaire
HBM	Health Belief Model
NHANES	National Health and Nutrition Examination Surveys
NLSY	National Longitudinal Survey of Youth
OR	Odds Ratio
PAQ-A	Physical Activity Questionnaire for Adolescent
PAQ-C	Physical Activity Questionnaire for Children
PA	Physical Activity
RCT	Randomized Control Trial
SPARK	Sports, Play and Active Recreation for Kids
WHO	World Health Organization



CHAPTER 1

INTRODUCTION

1.1 Background

One of the most serious public health challenges of the 21st century is childhood obesity. This is a universal issue and constantly affecting many low and middle income countries, particularly in urban settings (World Health Organization, 2014). The prevalence of childhood overweight and obesity is consistently increasing and has drastically risen in the past decades (Olshansky *et al.*, 2005). Obesity has become a global epidemic, and the children of this generation are the ones who will be the most affected by this drastic up rise (Spruijt-Metz, 2011). With increasing the rate of obesity in each decades, the World Health Organization declared obesity as a global epidemic in 2001 (Spruijt-Metz, 2011). This silent disease is not restricted to any one class, culture, nation or socioeconomic status (Olshansky *et al.*, 2005). Childhood obesity is growing issue of concern in many countries such as United States, United Kingdom, Australia, Asian communities and European countries such as Germany, France, Portugal (Flegal *et al.*, 2006).

The global scale of the problem is evident not only in the WHO initiative, but also in the large international research on the primary and secondary prevention of childhood overweight and obesity. Since 1980 obesity prevalence among children and adolescents has almost tripled (Centers for Disease Control and Prevention, 2010). Worldwide, more than 1.1 billion adults are overweight, and 312 million of them are obese and at least 155 million children are overweight or obese (Haslam & James, 2005). It is estimated that at least 2.8 million people die each year as a result of being overweight or obese (WHO, 2014). In Iran, the overall prevalence of overweight has increased from 10.4% during 2000 to 2004 to 10.8% during 2005 to 2010. This increase for girls were from 4.8% between 2000 and 2004 to 5.7% between 2005 and 2010 and for boys were 5.8% and 7.5%, respectively (Kelishadi *et al.*, 2014). In Malaysia, prevalence of obesity amongst Malaysians 18 years and above has increased from 4.4% in 1996 to 12.3% in 2004, 14.2% in 2006 and 15% in 2011 (Ministry of Health, 1997; Rampal *et al.*, 2007; Ministry of Health, 2008). Obesity among Malaysian children with the age below 18 years is also increased and was higher among boys than girls (12.5% compared to 5.0%) (Mohamud *et al.*, 2011).

Childhood obesity is also correlated with a higher risk of heart disease independent of a diagnosis of diabetes (Daniels, 2006; Barker, 2005). It also increases the risk of morbidity and mortality among the obese (Kiess *et al.*, 2001). Other chronic illnesses that have been associated with childhood overweight and obesity include metabolic syndrome (Cruz *et al.*, 2005; Daniels *et al.*, 2005), polycystic ovarian syndrome (Cruz *et al.*, 2005; Daniels, 2006) hypertension (Daniels *et al.*, 2005; Lee, 2009) arteriosclerosis (Daniels *et al.*, 2005) obstructive sleep apnea (Daniels *et al.*, 2005; Lee, 2009) dyslipidemia (Daniels, 2006; Lee, 2009) hyperlipidemia, pseudotumor cerebri, and Blount's disease which all significantly contribute to increased morbidity. Overweight

and obese children are likely to stay obese into adulthood and more likely to develop non-communicable diseases. These are largely preventable. Prevention of childhood obesity therefore needs high priority (WHO, 2014).

The causes of obesity are complex and multifactorial, an interaction between biological and environmental factors. A positive energy balance, which is defined as an excess energy intake to energy expenditure ratio, ultimately leads to weight gain. There is a strong genetic component contributing to the development of obesity. Other biological factors contributing to childhood obesity include genetic disorders and hormone imbalances, such as leptin, and insulin resistance (Farooqi & O'Rahilly, 2008).

Effective interventions to reduce childhood obesity must address multiple levels of influence (Filbert *et al.*, 2009). Previous studies examining the higher-level influences from families, communities, and the healthcare system have found school-based interventions to be effective in some aspects of obesity prevention, either through nutrition education or physical activity (Danielzik *et al.*, 2007; Doak *et al.*, 2006). Researchers have also found that family and community involvement is an essential aspect of obesity intervention or prevention programs (Gittelsohn & Kumar, 2007). Interventions aimed at preventing overweight and obesity in children have reported positive short-term outcomes (Shaya *et al.*, 2008), however, studies have not reported long-term successes (Kropiski *et al.*, 2008; Kamath *et al.*, 2008).

Based on research, children and adolescent are at increased risk of developing overweight and obesity, therefore targeting these communities should be a top priority (Wang & Beydoun, 2007; Kumanyika, 2007). Intervention research for overweight children and adolescents has spanned more than 30 years (Kumanyika, 2000). Unhealthy social and cultural factors have exponentially impacted the prevalence of obesity. Healthcare providers, psychologists, nutritionists, epidemiologists, educators and exercise physiologists have yet been unable to overcome, with their advice and programming, this pervasive unhealthy atmosphere. The escalation of obesity research in the last 10 years is attempting to address and reverse this alarming trend by developing intervention programs that target specific at risk behaviors and cognitions that contribute to the problem of childhood obesity.

1.2 Problem Statement

Obesity is a major health problem in Iran (Rahmani *et al.*, 2015). Approximately 70% (385,000) of all recorded mortalities in 2002 in Iran have been attributed to chronic diseases, the most important reason of which is obesity and overweight (Stice *et al.*, 2006). Iran has experienced a rapid "nutrition transition" during the last decade, with urbanization and decreases in physical activity, and increases in calorie and fat intake (Mirmohammadi *et al.*, 2011). In recent years, various prevalence rates for childhood overweight and obesity have been reported (Kelishadi *et al.*, 2014). It was reported that the prevalence of overweight and obesity among Tehrani students aged 11-17 years was 21.1% and 7.8%, respectively (Moayeri *et al.*, 2006). In Tabriz, west Iran, the prevalence of overweight and obesity in high school girls aged 14 -20 years was 11.1% and 3.6%,

respectively (Gargari *et al.*, 2004). In Shiraz, south Iran, the prevalence of overweight and obesity among adolescents aged 13- 18 years was 11.3% and 2.9%, respectively (Mostafavi *et al.*, 2005). Iran has a high prevalence of obesity and related disorders, such as metabolic syndrome and diabetes in different age groups (Delavari *et al.*, 2009, Kelishadi *et al.*, 2014). Research shows that among different types of interventional programs for management of childhood obesity in Iran, a multidisciplinary approach in schools can be the most feasible and effective approach (Kelishadi *et al.*, 2014).

Modern society promotes overconsumption through television, billboards, product packaging, and magazine ads. Often times high sugar cereals and prepackaged snack items target young children through the use of familiar animated characters and bright colors. Even grocery store shelf placement of these items is designed to target children, for more times than not, parents will buy the foods they think their child will eat (Glanz *et al.*, 2012). Advertising or marketing appears to be a strong influence on children's food consumption, but simple exposure methods may also influence eating behavior in adults and children. In children, there is also evidence that exposure or visibility as well as decisions of peers may influence children's food consumption (Bevelander *et al.*, 2013). Also, the modern way of living has become more sedentary. In children, increased time spent watching television and playing video games are two major factors to increased sedentary behavior. Additionally, modern sedentary activities promote overconsumption. In recent years, Iran has been experiencing a nutrition transition (Ghassemi *et al.*, 2002), and overweight and obesity have been identified as a serious growing problem (Azizi *et al.*, 2005; MOHI, 2009), particularly among the children and adolescents (Mohammadpour-Ahranjani *et al.*, 2004; Moayeri *et al.*, 2006). There are some models and theories that reflect effective interventions that could be applied to improve the quality of life by reducing some of risk factors. This study reflects underpinning of health belief model.

1.3 Significance of the Study

Prevention of overweight and obesity in adolescent is crucial in controlling the obesity epidemic and global health crisis. Results of this study can help to highlight areas of deficiencies in adolescent's daily practices that could assist educators and public health officials in providing strategies for promoting healthy diet and physical activity that can be integrated into a comprehensive health education tool for adolescents. If adolescents are able to engage in reflection and self-monitoring of certain target behaviors, they may be able to develop better decision-making skills regarding physical activity and dietary practices, as was seen in a previous study that showed that self-monitoring was positively associated with weight loss in adults (Stevens *et al.*, 2007). The results of this study may make it possible to assess the diet and physical activity level, along with other perceived risk factors, in efforts to prevent or reduce the prevalence of obesity among adolescents in Shiraz/Iran.

It is perceived that this type of health promotion will result in an environment that is healthier, safe and satisfying. The information provided can help to create a healthy society by displaying areas where personal and social development can be enhanced through further education and training in positive life skills. This health promotion will

provide opportunities for young people to make choices favorable to health. This education and training will result in attitude modification and an emphasis on the provision of health services, which is desperately needed in order to reverse the current trends of increases in obesity levels and increases in the prevalence of cardiovascular disease.

It is intended that by participating in this study, the student population will begin to critically evaluate their practice of optimistic bias as they use the opportunities and activities provided to increase their awareness of the dangers of negative practices and its eventual negative impact on their health status. Their participation in this study should motivate them to change their attitudes towards diet and physical activity, and to adopt more positive behaviors as they reflect on their current practices. This participation will be a start in the battle against premature morbidity and mortality, which, if sustained, will result in a healthier adult community as they grow older.

The benefit of this study in local level, is to improve knowledge and attitude of the students regarding prevention of obesity and overweight. It also increases perceived risk of obesity and help students to practice healthy lifestyle. In national level, this study will add some information to the existing one and plays an important role in student's lifestyles. It can also be contributed to health policy makers to develop intervention strategies targeting students and to find the most effective strategies for preventing obesity and overweight among students at this age.

1.4 Research Questions

1. Is there any significant differences in BMI scores between the intervention and control groups after 6 months post-intervention?
2. Is there any significant differences in physical activity scores between the intervention and control groups after 6 months post-intervention?
3. Is there any significant differences in diet behaviors towards obesity and overweight prevention between the intervention and control groups after 6 months post-intervention?
4. Is there any significant differences in diet knowledge towards obesity and overweight prevention between the intervention and control groups after 6 months post-intervention?

1.5 Research Objectives

1.5.1 General objective:

To develop, implement, and evaluate the impact of an intervention program on obesity prevention among students aged 11-15 years in district 1 of Shiraz, Iran.

1.5.2 Specific objectives:

- i. To determine baseline information on socio-demographic factors (gender, age, religion, monthly pocket money, family income, father's education, mother's education and family size) of students aged 11-15 years in district 1 of Shiraz, Iran.
- ii. To develop and implement an intervention program to prevent obesity among students aged 11-15 years in district 1 of Shiraz, Iran.
- iii. To compare Body Mass Index (BMI) at baseline and 6 months post intervention among students aged 11-15 years in district 1 of Shiraz, Iran.
- vi. To compare physical activity score at baseline and 6 months post intervention among students aged 11-15 years.
- v. To compare knowledge and behavior regarding diet at baseline and 6 months post intervention among students aged 11-15 years.

1.7 Research Hypothesis

This obesity behavioral intervention study tested the following hypotheses:

1. There is significant decrease in BMI scores between the intervention and control groups after 6 months post-intervention.
2. There is significant increase in physical activity scores between the intervention and control groups after 6 months post-intervention.
3. There is significant increase in diet behaviors towards obesity and overweight prevention between the intervention and control groups after 6 months post-intervention.
4. There is significant increase in diet knowledge towards obesity and overweight prevention between the intervention and control groups after 6 months post-intervention.

REFERENCES

- Abalkhail, B. & Shawky, S. (2002). Prevalence of Daily Breakfast Intake, Iron Deficiency Anaemia and Awareness of Being Anaemic among Saudi School Students. *International Journal of Food Sciences & Nutrition*, 53(3): 519-528.
- Abood, D. A., Black, D. R., & Coster, D. C. (2008). Evaluation of a school-based teen obesity prevention minimal intervention. *Journal of Nutrition Education and Behavior*, 40, 168-174.
- Adams, E., Grummer-Strawn, L., Chavez, G. (2003). Food Insecurity Is Associated With Increased Risk of Obesity in California Women. *Journal of Nutrition*, 133, 1070-1074.
- Alba, J. W. (2000). Dimensions of Consumer Expertise or Lack Thereof. *Advances in Consumer Research*, 27, 1-9.
- American Diabetes Association (ADA). (2003). Type 2 Diabetes in Children and Adolescents. *Diabetes Care*. 23, 381-389.
- Anastasi, A., Urbina, S. (1997). *Psychological Testing* (Seventh Ed.). Upper Saddle River (NJ): Prentice Hall. ISBN 978-0-02-303085-7.
- Anderson, P., Butcher, K., & Levine, P. (2003). Maternal Employment and Overweight Children. *Journal of Health Economics*, 22, 477-504.
- Anderson, S. E., & Whitaker, R. C. (2009). Prevalence of obesity among US preschool children in different racial and ethnic groups. *Archives of Pediatric & Adolescent Medicine*, 163(4), 344-348.
- Angelopoulos, P. D., Millionis, H. J., Grammatikaki, E., Moschonis, G., Manios, Y. (2009). Changes in BMI and blood pressure after a school based intervention: The children study. *European Journal of Public Health*, 19 (3): 319-325.
- Antshel, Kevin, M., Eric, M., Andermann. (2000). Social Influences on Sports Participation During Adolescence. *Journal of Research and Development in Education*, 33: 85-94.
- Ashford, J., Smit, F., Van Lier, Pol, A. C, Cuijpers, P., & Koot, H. (2008). Early Risk Indicators of Internalizing Problems in Late Childhood: A 9-Year Longitudinal Study. *Journal of Child Psychology and Psychiatry*, 49 (7): 774-780.
- Arenz, S., Rucker, R., Koletzko, B., & Von Kries, R. (2004). Breast-feeding and childhood obesity: A systematic review. *International Journal of Obesity*, 28, 1247-1256.
- Azizi, F., Azadbakht, L., Mirmiran, P. (2005). Trends in overweight, obesity and central fat accumulation among Tehranian adults between 1998-1999 and 2001-2002: Tehran lipid and glucose study. *Ann Nutr Metab*, 49(1): 3-8.

- Baker, J. L., Olsen, L. W., Sorensen, T. I. (2007). Childhood body-mass index and the risk of coronary heart disease in adulthood. *The New England Journal of Medicine*, 357, 2329-37.
- Baranowski, T., Cullen, K. W., Nicklas, T., Thompson, D., Baranowski, J. (2003). Are current health behavioral change models helpful in guiding prevention of weight gain efforts? *Obesity research*, 11(2): 23-43.
- Baranowski, T., Baranowski, J., Cullen, K. W., Marsh, T., Islam, N., Zakeri, I., et al. (2003). Squire's Quest Dietary Outcome Evaluation Multimedia Game. *Am J Prev Med*, 24 (1): 1293-6.
- Barker, D. J., Osmond, C., Forsen, T. J., et al. (2005). Trajectories of growth among children who have coronary events as adults. *New England Journal of Medicine*, 353(17):1802-1809.
- Bascetta, C. A. (2005). *Childhood obesity*: Most experts identified physical activity and the use of best practices as key to successful programs. Washington, D.C.: U.S. Government Accountability Office.
- Basiratnia, M., Derakhshan, D., Ajdari, S., Saki, F. (2013). Prevalence of Childhood Obesity and Hypertension in South of Iran. *Iranian Journal of Kidney Diseases*, 7(4): 282-289.
- Batada, A., Seitz, M. D., Wootan, M. G., Story, M. (2008). Nine out of 10 food advertisements shown during Saturday morning children's television programming are for foods high in fat, sodium or added sugars, or low in nutrients. *Journal of the American Dietetic Association*, 108, 673- 678.
- Baumeister, R. (2002). Yielding to Temptation: Self-Control Failure, Impulse Purchasing, and Consumer Behavior. *Journal of Consumer Research*, 12, 670-676.
- Becker, M.H. (1974). The health belief model and personal health behavior. *Health education Monographs*, 2(4), 324-473.
- Bell, J., Rogers, V. W., Dietz, W. H., Ogden, C. L., Schuler, C., & Popovic, T. (2011). CDC Grand Rounds: Childhood obesity in the United States. *MMWR*, 60(2): 42-46.
- Benac, N. (2010). United States shifts focus to food marketing in battle to reduce childhood obesity. *Canadian Medical Association Journal*, 182, 459-460.
- Bervoets, L., Van Noten, C., Van Roosbroeck, S., Hansen, D., Van Hoorenbeeck, K., Verheyen, E., Van Hal, G., Vankerckhoven, V. (2014). Reliability and Validity of the Dutch Physical Activity Questionnaires for Children (PAQ-C) and Adolescents (PAQ-A). *Archives of Public Health, BioMed Center*, 10(3): 72-47.

- Beune, E. J., Haafkens, J. A., Agyemang, C., Bindels, P. J. (2010). Inhibitors and enablers of physical activity in multiethnic hypertensive patients: qualitative study. *Journal of human hypertension*, 24(4): 280-90.
- Bevelander, K. E., Engels R. C., Anschütz, D. J., & Wansink, B. (2013). The effect of an intervention on schoolchildren's susceptibility to a peer's candy intake. *European Journal of Clinical Nutrition*. 67(8): 829-835.
- Birch, L. (2006). Child Feeding Practice and Etiology of Obesity. *Obesity*, 14, 343-344.
- Birch, L. L., & Ventura, A. K. (2009). Preventing childhood obesity: What works? *International Journal of Obesity*, 28, 90-95.
- Bolger, K. E. & Patterson, C. J. (2001). Pathways from Child Maltreatment to Internalizing Problems: Perceptions of Control as Mediators or Moderators. *Development and Psychopathology*, 13, 913-940.
- Borradaile, K. E., Sherman, S., Vander Veur, S. S., McCoy, T., Sandoval, B., Nachmani, J., Foster, G. D. (2009). Snacking in children: The role of urban corner stores. *Pediatrics*, 124(5): 1293-1298.
- Bowman, S., Gortmaker, S., Ebbeling, C., Pereira, M., Ludwig, D. (2004). Effects of fast-food consumption on energy intake and diet quality among children in a national household survey. *Pediatrics*, 113(1): 112-118.
- Bray, G. A. & Champagne, C. M. (2005). Beyond Energy Balance: There is more to obesity than kilocalories. *J Am Diet Assoc*, 105 (5): 17-23.
- Briggs, M., Safaai, S., & Beall, D. L. (2003). American Dietetic Association; Society for Nutrition Education; American School Food Service Association. Position of the American Dietetic Association, Society for Nutrition Education, and American School Food Service Association—Nutrition services: an essential component of comprehensive school health programs. *J Am Diet Assoc*. 103 (4): 505-14.
- Brown, T., & Summerbell, C. (2009). Systematic focus of school-based interventions that focus on changing dietary intake and physical activity levels to prevent childhood obesity: An update to the obesity guideline produced by the National Institute for Health and Clinical Excellence. *Obesity Reviews*, 10, 110-141.
- Budd, G. M., & Volpe, S. L. (2006). School-based obesity prevention: Research, challenges, and recommendations. *Journal of School Health*, 76, 485-495.
- Burdett, H. & Whitaker, R. (2005). A National Study of Neighborhood Safety, Outdoor Play, Televisions Viewing, and Obesity in Preschool Children. *Pediatrics*, 116, 657-662.
- Burdett, H. & Whitaker, R. (2006). Maternal Infant-Feeding Style and Children's Adiposity at 5 Years of Age. *Archives of Pediatrics & Adolescent Medicine*, 160 (4): 513-20.

- Caballero, B., Clay, T., Davis, S. M., Ethelbah, B., Holy Rock, B., Lohman, T., Norman, J., Story, M., Stone, E. J., Stephenson, L. & Stevens, J. (2003). Pathways: a school-based, randomized controlled trial for the prevention of obesity in American Indian schoolchildren, *Am J Clin Nutr.* 78,1030–8.
- Caballero, B. (2004). Obesity prevention in children: Opportunities and challenges. *International Journal of Obesity*, 33, 74-81.
- Canavera, M., Sharma, S., & Murnan, J. (2009). Development and pilot testing a social cognitive theory-based intervention to prevention childhood obesity among elementary students in rural Kentucky. *International Quarterly of Community Health Education*, 29(1): 57-70.
- Cappuccio, F. P., Taggart, F. M., Kandala, N. B., Currie, A., Peile, E., Stranges, S., & Miller, M. A. (2008). Meta-analysis of short sleep duration and obesity in children and adults. *Sleep J*, 31(5): 619-626.
- Carter, R., Mouralidarane A., Ray, S., et al. (2012). Recent advancements in drug treatment of obesity. *Clin Med*, 12(5):456-60.
- Center for Disease Control and Prevention. (2003). Physical activity levels among children aged 9-13 Years - United States, 2002. *MMWR Morbidity and Mortality Weekly Report*, 52(33), 785-788.
- Center for Disease Control and Prevention. (2004). CDC Behavioral Risk Factor Surveillance System Data. <http://www.cdc.gov/brfss/index.htm>.
- Center for Disease Control and Prevention. (2005). Enhanced Physical Education Classes in Schools are Recommended to Increase Physical Activity Among Young People. The Community Guide to Preventive Services. <http://www.thecommunityguide.org/pa/pa-int-school-pe>.
- Center for Disease Control and Prevention. (2005). More Evidence is Needed to Determine the Effectiveness of School-Based Programs to Improve the Nutritional Status of Children and Adolescents. The Community Guide to Preventive Services. <http://www.thecommunityguide.org/nutrition/nutr-int-schools>.
- Centers for Disease Control and Prevention. (2008). Overweight and obesity: Consequences. Retrieved January 12, 2008, from <http://www.cdc.gov/obesity/causes/index.html>.
- Centers for Disease Control and Prevention. (2009). Overweight and obesity. Retrieved November 2, 2009, from <http://www.cdc.gov/obesity/childhood/>.
- Centers for Disease Control and Prevention. (2010). Physical activity for everyone. Retrieved January 10, 2010 from <http://www.cdc.gov/physicalactivity/everyone/health/>.

- Centers for Disease Control and Prevention. (2011). School health guidelines to promote healthy eating and physical activity. *MMWR*, 60(5), 1-77.
- Centers for Disease Control and Prevention (CDC). (2012). National Center for Chronic Disease Prevention and Health Promotion. In Childhood obesity facts.
- Centers for Disease Control and Prevention (CDC). (2013). Healthy People. Adolescents' obesity facts. CDC/National Center for Health Statistics.
- Centers for Disease Control and Prevention. (2014). Defining Childhood Obesity. <http://www.cdc.gov/obesity/childhood/defining.html>.
- Chamberlin, L. A., Sherman, S. N., Jain, A., Powers, S. W., Whitaker, R. C. (2002). The challenge of preventing and treating obesity in low-income, preschool children: perceptions of WIC health care professionals. *Archives of Pediatrics and Adolescent Medicine*, 156,662- 8.
- Chan, R. S. M. & Woo, J. (2010). Prevention of Overweight and Obesity: How Effective is the Current Public Health Approach. *Int. J. Environ. Res. Public Health*, 7, 765-783.
- Chen, J. L., Yeh, C. H., Kennedy, C. (2007). Weight status, self-competence, and coping strategies in Chinese children. *Journal of Pediatric Nursing*, 22(3): 176-185.
- Chen, J. L., & Wu, Y. (2008). Cardiovascular risk factors in Chinese American children: Associations between overweight, acculturation, and physical activity. *Journal of Pediatric Health Care*, 22(2): 103-110.
- Cole, D., Nolen-Hoeksema, S., Girgus, J., & Paul, G. (2006). Stress Exposure and Stress Generation in Child and Adolescent Depression: A Latent Trait-State-Error Approach to Longitudinal Analyses. *Journal of Abnormal Psychology*, 115, 40-51.
- Collard, D. C. M, Chinapaw, M. J. M., Verhagen, E. A. L., Bakker, I., & van Mechelen, W. (2010). Effectiveness of a school-based physical activity-related injury prevention program on risk behavior and neuromotor fitness a cluster randomized controlled trial. *Archives of Child and Adolescents Medicine*, 164(2): 145-50.
- Conklin, M. T., Cranage, D. A., & Lambert, C. U. (2005). College students' use of point of selection nutrition information. *Topics in Clinical Nutrition J*, 20, 97-108.
- Contento, I. R. (2007). Nutrition education linking research, theory and practice. *Asia Pac J Clin Nutr*, 17(1): 176-179.
- Cook-Cottone, C., Casey, C. M., Feeley, T. H., Baran, J. (2009). A meta-analytic review of obesity prevention in the schools: 1997-2008. *Psychology in the Schools*, 46, 695-719.

- Crespo, C. J., Smit, E., Troiano, R. P., Bartlett, S. J., Macera, C. A., Aderson, R. E. (2001). Television watching, energy intake, and obesity in US children. *Archives of Pediatrics & Adolescent Medicine*, 155, 360-365.
- Crossman, A., Sullivan, D., & Benin, M. (2006). The Family Environment and American Adolescents' Risk of Obesity as Young Adults. *Social Science & Medicine*, 63, 2255-2267.
- Cruz, M. L., Shaibi, G. Q., Weigensberg, M. J., Spruijt-Metz, D., Ball, G. D., Goran, M. I. (2005). Pediatric obesity and insulin resistance: chronic disease risk and implications for treatment and prevention beyond body weight modification. *Annu Rev Nutr.* 25,435-468.
- Cutler, D., Glaeser, E. & Shapiro, J. (2003). Why Have Americans Become More Obese? *The Journal of Economic Perspectives*, 17 (3): 93-118.
- Dalton, S. (2004). Schools and the rising rate of overweight children- Prevention and intervention strategies. *Top Clin Nutr*, 19 (1):34-40.
- Daniels, S. R., Arnett, D. K., Eckel, R. H., et al. (2005). Overweight in children and adolescents: pathophysiology, consequences, prevention, and treatment. *Circulation*, 111(15):1999-2012.
- Daniels, S. R. (2006). The consequences of childhood overweight and obesity. *Future Child*, 16(1):47-67.
- Danielzik, S., Pust, S., & Muller, M. J. (2007). School-based interventions to prevent overweight and obesity in prepubertal children: Process and 4-years outcome evaluation of the Kiel Obesity Prevention Study (KOPS). *Acta Paediatrica*, 96, 19-25.
- Datar, & Sturm. (2004). Physical Education in Elementary School and Body Mass Index: Evidence from the Early Childhood Longitudinal Study. *American Journal of Public Health*, 94(9): 1501-1505.
- Davis, M. M., Gance-Cleveland, B., Hassink, S., Johnson, R., Paradis, G., Resnicow, K. (2007). Recommendations for prevention of childhood obesity. *Pediatrics*, 120(4): S229-253.
- Davison, K. K. & Birch, L. L. (2001). Childhood overweight: A contextual model and recommendations for future research. *Obesity Reviews*, 2(3): 159-171.
- Davison, K. K., Cutting, T. M., & Birch, L. L. (2003). Parents' Activity-Related Parenting Practices Predict Girls' Physical Activity. *Medicine and Science in Sports and Exercise*, 35 (9): 1589-1595.
- Davison, K. K., Francis, L. A., Birch, L. L. (2005). Reexamining obesigenic families: Parents' obesity-related behaviors predict girls' change in BMI. *Obesity Research*, 13(11):1980-1990.

- Davison, K. K., Werder, J. L., Lawson, C. T. (2008). Children's active commuting to school: Current knowledge and future directions. *Preventing Chronic Disease*, 5(3): 78- 100.
- Dearry, A. (2004). Editorial: Impacts of Out Built environment on Public Health. *Environmental Health Perspectives*, 112 (1): 600-601.
- DeCaterina, R., Zampolli, A., Turco, D., Madonna, S. R., & Massaro, M. (2006). Nutritional mechanisms that influence cardiovascular disease. *Am J Clin Nutr*, 83 (2): 421-426.
- De Jonge, H. (2006). Deficiencies in clinical reports for registration of drugs. *Statistics in Medicine*, 2(2): 155-166.
- Delavari, A., Forouzanfar, M. H., Alikhani, S., Sharifian, A., Kelishadi, R. (2009). First nationwide study of the prevalence of the metabolic syndrome and optimal cutoff points of waist circumference in the Middle East: the national survey of risk factors for non-communicable diseases of Iran. *Diabetes Care*, 32(4): 1092-7.
- Deliens, T., Clarys, P., Bourdeaudhuij, D. I., Deforche, B. (2014). Determinants of eating behavior in university students: a qualitative study using focus group discussions. *BMC Public Health*, 14(53): 1-12.
- De Onis, M., Blossner, M., & Borghi, E. (2010). Global prevalence and trends of overweight and obesity among preschool children. *The American Journal of Clinical Nutrition* 92 (5): 1257-64.
- Dennison, B. A., Erb, T. A., & Jenkins, P. L. (2002). Television viewing and television in bedroom associated with overweight risk among low-income preschool children. *Pediatrics*, 109(6): 1028-1035.
- Dialektakou, K. & Vranas, P. (2008). Breakfast Skipping and Body Mass Index among Adolescents in Greece: Whether an Association Exists Depends on How Breakfast Skipping Is Defined. *Journal of American Dietetic Association*, 108, 1517-1525.
- Digate Muth, N., Chatterjee, A., Williams, D., Cross, A., Flower, K. (2008). Making an IMPACT: Effect of a school-based pilot intervention. *North Carolina Medical Journal*, 69(6): 432-440.
- Doak, C. M., Visscher, T. L. S., Renders, C. M., & Seidell, J. C. (2006). The prevention of overweight and obesity in children and adolescents: A review of interventions and programmes. *Obesity Reviews*, 7, 111-136.
- Dobbins, M., Lockett, D., Michel, I., Beyers, J., Feldman, L., Vohra, J., Micucci, S. (2001). The effectiveness of school-based interventions in promoting physical activity and fitness among children and youth: A systematic review. *Chronic Disease Prevention*; 43(2):1-122.

- Doheny, K. (2012). Overweight and obese teens show early heart risks. Retrieved from <http://www.teens.webmd.com/news/2012/overweight-obese-teens-show-early>.
- Dubois, L., Giard, M., & Kent, M. (2006). Breakfast Eating and Overweight in Pre-School Population: Is There a Link? *Public Health Nutrition*, 9, 436-442.
- Durant, N., Baskin, M. L., Thomas, O., & Allison, D. B. (2008). School-based obesity treatment and prevention programs: All in all, just another brick in the wall? *International Journal of Obesity*, 32, 1747-1751.
- Dwyer, J., Evans, M., Stone, E., Feldman, H., Lytle, L., Hoelscher, D., Hohnson, C, Zive, M., Yang, M. (2001). Adolescents' Eating Patterns Influence Their Nutrient Intakes. *Journal of American Dietetic Association*, 101, 798-802.
- Dwyer, J. (2006). Starting down the right path: nutrition connections with chronic diseases of later life. *Am J Clin Nutr*, 83 (2): 415-420.
- Ebbeling, C. B., Sinclair, K. B., Pereira, M. A., Garcia-Lago, E., Feldman, H. A., & Ludwig, D. S. (2004). Compensation for energy intake from fast food among overweight and lean adolescents. *Journal of the American Medical Association*, 291(23): 2828-2833.
- Ello-Martin, J. A., Ledikwe, J. H., Rolls, B. J. (2005). The influence of food portion size and energy density on energy intake: Implications for weight management. *American Journal of Clinical Nutrition*, 82, 236-241.
- Eng, J. (2003). Sample size estimation: How many individuals should be studies? *Radiology*, 227, 309-313.
- Erermis, S., Cetin, N., Tamar, M., Bukusoglu, N., Akdeniz, F., & Goksen, D. (2004). Is obesity a risk factor for psychopathology among adolescents? *Pediatrics International*, 46(3): 296-301.
- Esmailzadeh, A., Mirmiran, P., Azadbakht, L., Etemadi, A., Azizi, F. (2006). High prevalence of the metabolic syndrome in Iranian adolescents. *Obesity J*, 14(7): 377-82.
- Estabrooks, P. A., Fisher, E. B., & Hayman, L. L. (2008). What is needed to reverse the trends in childhood obesity? A call to action. *Annals of Behavioral Medicine*, 36, 209-216.
- Fagot-Campagna, A., Saadine, J., Flegal, K. M., & Beckles, G. L. (2001). Diabetes, impaired fasting glucose, and elevated HbA1c in US adolescents: the NHANES. *Diabetes Care*, 24, 834-7.
- Farooqi, I. S., & O'Rahilly, S. (2008). Mutations in ligands and receptors of the leptinmelanocortin pathway that lead to obesity. *Nature Clinical Practice Endocrinology and Metabolism*, 4(10): 569-577.
- Feldman, R. (2009). The development of regulatory functions from birth to 5 years: Insights from premature infants. *Child Development*, 80(2): 544-561.

- Fewtrell, S. M., Kennedy, K., Singhal, A., et al. (2008). How much loss to follow-up is acceptable in long-term randomized trials and prospective studies? *BMJ*, 93(3): 458-461.
- Filbert, E., Chesser, A., Hawley, S. R., Romain, T. (2009). Community-based participatory research in developing an obesity intervention in rural Germany. *Journal of Community Health Nursing*, 26, 35-43.
- Finkelstein, E. A. & Strombotne, K. L. (2010). The economics of obesity. *American Journal of Clinical Nutrition*, 91, 1520-1524.
- Finucane, M. M., Stevens, G. A., Cowan, M. J., Danaei, G., Lin J. K., Paciorek, Ch. J., Singh, G. M., Gutierrez, H. R., Lu, Y., Bahalim, A. N., Farzadfar, F., Riley, L. M., Ezzati, M. (2011). National, regional, and global trends in body-mass index since 1980: systematic analysis of health examination surveys and epidemiological studies with 960 country-years and 9.1 million participants. *Lancet*, 10, 37-5.
- Fiorito, L. M., Marini, M., Francis, L. A., Smiciklas-Wright, H., Birch, L. L. (2009). Beverage intake of girls at age 5 y predicts adiposity and weight status in childhood and adolescence. *American Journal of Clinical Nutrition*, 90(4): 935-942.
- Fisher, J., Rolls, B., & Birch, L. (2003). Children's Bite Size and Intake of An Entree Are Greater With Large Portions Than With Age-Appropriate or Self-Selected Portions. *American Journal of Clinical Nutrition*, 11 (1): 164-170.
- Fisher, J. O., Mitchell, D. C., Smiciklas-Wright, H., Birch, L. .L. (2008). Maternal Milk Consumption Predicts the Tradeoff between Milk and Soft Drinks in Young Girls' Diets. *J Nutr*, 131(2): 246-250.
- Flegal, K. M., Tabak, C. J., & Ogden, C. L. (2006). Overweight in children: Definitions and interpretation. *Health Education Research*, 21(6): 755-760.
- Ford, E. S., Li, C., Zhao, G., Tsai, J. (2011). Trends in obesity and abdominal obesity among adults in the United States from 1999-2008. *International Journal of Obesity*, 35(5): 736-743.
- Forster-Scott, L. (2007). Combating obesity in K-12 learners: Sociological factors affecting childhood obesity. *Journal of Physical Education, Recreation and Dance*, 78 (8): 29-47.
- Foster, G. D., Sherman, S., Borradaile, K. E., Grundy, K. M., Stephanie, S., Veur, V., Nachmani, J., Karpyn, A., Kumanyika, S. H., Shults, J. (2008). A Policy-Based School Intervention to Prevent Overweight and Obesity. *Pediatrics*, 121, 794-802.
- Fox, M., Pac, S., Devaney, B., & Jankowski, L. (2004). Feeding infants and toddlers study: What foods are infants and toddlers eating? *Journal of the American Dietetic Association*, 104(1): 22-30.

- Frank, Lawrence, Andresen, M. & Thomas, Schmid. (2004). Obesity Relationships with Community Design, Physical Activity, and Time Spent in Cars. *American Journal of Preventive Medicine*, 27 (2): 87-96.
- French, S. A., Story, M., Neumark-Sztainer, D., Fulkerson, J. A., Hannan, P. (2001). Fast food restaurant use among adolescents: associations with nutrient intake, food choices and behavioral and psychosocial variables. *Int J Obes Relat Metab Disord*, 25: 1823–1833.
- Fujiwara, T. (2003). Skipping Breakfast is Associated with Dysmenorrhea in Young Women in Japan. *International Journal of Food Sciences & Nutrition*, 54, 505-509.
- Gable, S., Chang, Y., & Krull, J. (2007). Television Watching and Frequency of Family Meals are Predictive of Overweight Onset and Persistence in a National Sample of School-Aged Children. *Journal of American Dietetic Association*, 107, 53-61.
- Garaulet M. A. Martinez, & Victoria, F. (2000). Differences in dietary intake and activity level between normal-weight and overweight or obese adolescents. *J Pediatr Gastroenterol Nutr*, 30 (3): 253-8.
- Gargari, B. P., Behzad, M. H., Ghassabpour, S., et al. (2004). Prevalence of overweight and obesity among high- school girls in Tabriz, Iran, in 2001. *Food Nutr Bull*. 25(3): 288- 91.
- Gentile, D. A., Welk, G., Eisenmann, J. C., Reimer, R. A., Walsh, D. A., Russell, D. W., Fritz, K. (2009). Evaluation of a multiple ecological level child obesity prevention program: Switch what you Do, View, and Chew. *BMC Medicine*, 7, 49-68.
- Ghassemi, H., Harrison, G., Mohammad, K. (2002). An accelerated nutrition transition in Iran. *Public Health Nutr*, 5(1): 149-155.
- Gittelsohn, J., & Kumar, M. B. (2007). Preventing childhood obesity and diabetes: Is it time to move out of the school? *Pediatric Diabetes*, 8(9): 55-69.
- Glanz, K., Rimer, B. K., Viswanath, K. (2008). *Health Behavior and Health Education: Theory, Research, and Practice* (4th ed). San Francisco: Jossey-Bass.
- Glanz, K., Bader, M. D. M., & Lyer, S. (2012). Retail grocery store marketing strategies and obesity. *American Journal of Preventative Medicine*, 42(5): 503-512.
- Gluckman, P. D., & Hanson, M. A. (2004). The developmental origins of the metabolic syndrome. *Trends in Endocrinology Metabolism*, 15, 183-187.
- Gonzalez-Suarez, C., Worley, A., Grimmer-Somers, K., & Dones, V. (2009). School-based interventions on childhood obesity: A meta-analysis. *American Journal of Preventative Medicine*, 37(5): 418-427.

- Goodman, E., & Whitaker, R. (2002). A prospective study of the role of depression in the development and persistence of adolescent obesity. *Pediatrics*, 110(3): 497-504.
- Green, D. J., & Cable, T. (2006). Physical activity to prevent obesity in young children: BMI in the BMJ. *BMJ*, 333(7579): 1171-1172.
- Grunbaum, J., Kann, L., Kinchen, S., Williams, B., Ross, J., & Lowry, R. (2002). Youth Risk Behavior Surveillance-United States, *MMWR*, 51 (4): 1-64.
- Haerens, L., Deforche, B., Maes, L., Cardon, G., Stevens, V., Bourdeaudhuij, I. D. (2006). Evaluation of a 2-year physical activity and healthy eating intervention in middle school children. *Health Education Research*, 21(6): 911-921.
- Haines, J., Neumark-Sztainer, D., Perry, C. L., Hannan, P. J., Levine, M. P. (2006). V.I.K. (Very Important Kids): a school-based program designed to reduce teasing and unhealthy weight-control behaviors. *Health Education Research*, 21(6): 884-895.
- Haire-Joshu, D., Kreuter, M. K., Holt, C., Steger-May, K. (2004). Estimates of fruit and vegetable intake in childhood and adult dietary behaviors of African American women. *Journal of Nutrition Education and Behavior*, 36(6): 309-14.
- Hamidi, A., Fakhrzadeh, H., Moayyeri, A., et al. (2006). Obesity and associated cardiovascular risk factors in Iranian children: a cross-sectional study. *Pediatr Int*, 48(2): 566-71.
- Han, J. C., Lawlor, D. A., Kimm, S. Y. (2010). Childhood obesity. *Lancet*, 375 (9727): 1737-48.
- Hancox, R. J., Milne, B. J., & Poulton, R. (2004). Association between child and adolescent television viewing and adult health: a longitudinal cohort study. *Lancet*, 364(23): 257-262.
- Hardin, J. & Hilbe, J. (2003). *Generalized Estimating Equations*. London: Chapman and Hall/CRC. ISBN 978-1-58488-307-4.
- Harper, M. G. (2006). Childhood obesity: Strategies for prevention. *Family & Community Health*, 29, 288-298.
- Harrell, T. K., Davy, B. M., Stewart, J. L., King, D. S. (2005). Effectiveness of a school-based intervention to increase health knowledge of cardiovascular disease risk factors among rural Mississippi middle school children. *Southern Medical Journal*, 98 (12): 1173-1180.
- Harrington, S. (2008). The role of sugar sweetened beverage consumption in adolescent obesity: A review of the literature. *The Journal of School Nursing*, 24, 3-12.

- Harris, K. C., Kuramoto, L. K., Schulzer, M., Retallack, J. (2009). Effect of school-based physical activity interventions on body mass index in children: a meta-analysis. *CMAJ*, 180(7): 719-26.
- Haslam, D. W. & James, W. P. T. (2005). Obesity. *The Lancet*, 366, 1197-1209.
- Hoelscher, D. M., Evans, A., Parcel, G. S., & Kelder, S. H. (2002). Designing effective nutrition interventions for adolescents. *J Am Diet Assoc*, 102 (3): 52-63.
- Hedley, A., Ogden, C., Johnson, C., Carroll, M., Curtin, L. & Flegal, K. (2004). Overweight and Obesity among US Children, Adolescents, and Adults, 1999-2002. *Journal of the American Medical Association*, 291, 2847-2850.
- Hernandez, R. G., Cheng, T. L., Serwint, J. R. (2010). Parents' Healthy Weight Perceptions and Preferences Regarding Obesity Counseling in Preschoolers: Pediatricians Matter. *Clinical Pediatrics*, 49(8):790-8.
- Hill, O. J. & Wyatt, R. H. (2005). Role of physical activity in preventing and treating obesity. *J Appl Physiol*, 99(2): 765-770.
- Hiller, A. (2008). Childhood Overweight and the Built Environment: Making Technology Part of the Solution Rather than Part of the Problem. *The ANNALS of the American Academy of Political and Social Science*, 615, 56-82.
- Hoelscher, D. M., Evans, A., Parcel, G. S., & Kelder, S. H. (2002). Designing effective nutrition interventions for adolescents. *J Am Diet Assoc*, 102 (3): 52-63.
- Huang, K. C., Kormas, N., Steinbeck, K., Loughnan, G., Caterson, I. D. (2004). Resting metabolic rate in severely obese diabetic and nondiabetic subjects. *Obes Res*. 12(5): 840-5.
- Huang, T. T., & Story, M. T. (2010). A journey just started: Renewing efforts to address childhood obesity. *Obesity*, 18(1): 1-3.
- Institute of Medicine. (2006). Progress in Preventing Childhood Obesity: How Do We Measure Up? Washington DC. 123-134.
- "Iran – City Population – Cities, Towns & Provinces – Statistics & Map", (2014). Citypopulation.de. Retrieved 19 October 2014.
- Jago, R., Baranowski, T., Baranowski, J. C., Thompson, D., & Greaves, K. A. (2005). BMI from 3-6 y of age is predicted by TV viewing and physical activity, not diet. *International Journal of Obesity*, 29(6): 557-564.
- Jahns, L., Siega-Riz, A. M., Popkin, B. M. (2001). The increasing prevalence of snacking among US children from 1977 to 1996. *Journal of Pediatrics*, 138, 493- 498.
- Jakicic, J. M., & Otto, A. D. (2006). Treatment and prevention of obesity: What is the role of exercise? *Nutrition Reviews*, 64(2): 57-61.

- James, J., Thomas, P., Cavan, D., Kerr, D. (2005). Preventing childhood obesity by reducing consumption of carbonated drinks: cluster randomized controlled trial. *BMJ*, 10(2): 458-438.
- James, W.P.T. (2008). The epidemiology of obesity: the size of the problem: *Journal of Internal Medicine*, 36(263): 336-352.
- Janz, K. F., Levy, S. M., Burns, T. L., Torner, J. C., Willing, M. C., & Warren, J. J. (2002). Fatness, physical activity, and television viewing in children during the adiposity rebound period: The Iowa bone development study. *Preventive Medicine*, 35, 563-571.
- Jiang, J., Rosenqvist, U., Wang, H., Greiner, T., Ma, Y., & Toschke, A. M. (2006). Risk factors for overweight in 2- to 6-year-old children in Beijing, China. *International Journal of Pediatric Obesity*, 1(2): 103-108.
- Johannsen, D., Johannsen, N., & Specker, B. (2006). Influence of Parents' Eating Behaviors and Child Feeding Practices on Child Weight Status. *Obesity*, 14 (3): 431-439.
- Johnson, M. S., Figueroa-Colon, R., Herd, S. L., Fields, D. A., Sun, M., Hunter, G. R., et al. (2000). Aerobic fitness, not energy expenditure, influences subsequent increase in adiposity in black and white children. *Pediatrics*, 106(4): 1- 50.
- Johnson, T. D. (2012). Assessment finds: Obesity, diabetes. *The Nation's Health J*, 42(1): 56-67.
- Jordan, A., Hersey, J., McDivitt, J., & Heitzler, C. (2006). Reducing Children's Television Viewing Time: A Qualitative Study of Parents and Their Children. *Pediatrics*, 118 (5): 1303-1310.
- Jordan, A. & Robinson, T. (2008). Children, Television Viewing, and weight Status: Summary and Recommendations from an Expert Panel Meeting. *The ANNALS of the American Academy of Political and Social Science*, 615, 119-132.
- Kamath, C. C., Vickers, K. S., Ehrlich, A., McGovern, L., Johnson, J., Singhal, G., Paulo, R., Hettinger, A., Erwin, P. J., & Montori, V. M. (2008). Behavioral interventions to prevent childhood obesity. A systematic review and meta-analyses of randomized trials. *J Clin Endocrinol Metab*, 93, 4606- 4615.
- Kanekar, A., & Sharma, S. (2009). Meta-analysis of school-based childhood obesity intervention in the U.K and U.S. *International Quarterly of Community Health Education*, 29(3): 241-256.
- Kasa-Vubu, J. Z., Lee, C. C., Rosenthal, A., Singer, K., & Halter, J. B. (2005). Cardiovascular fitness and exercise as determinants of insulin resistance in post-pubertal adolescent females. *J Clin Endocrinol Metab*, 90(2): 849-54.

- Katz, D. L., O'Connell, M., Njike, V. Y., Yeh, M. C., & Nawaz, H. (2008). Strategies for the prevention and control of obesity in the school setting: Systematic review and meta-analysis. *International Journal of Obesity*, 32, 1780-1789.
- Kelishadi, R., Haghdoost, A. K., Sadeghirad PharmD, B., Khajehkazemi, R. (2014). Trend in the prevalence of obesity and overweight among Iranian children and adolescents: A systematic review and meta-analysis. *Nutrition J*, 30 (2014) 393-400.
- Kelly-Schwartz, A. C., Stockard, J., Doyle, S. (2004). Is Sprawl Unhealthy? A Multilevel Analysis of the Relationship of Metropolitan Sprawl to the Health of Individuals. *Journal of Planning Education and Research*, 24, 184-196.
- Kelly, T., Yang, W., Chen, C. S., Reynolds, K., He, J. (2008). Global burden of obesity in 2005 and projections To 2030. *International journal of obesity*, 32(9):1431-7.
- Kiess, W., Galler, A., Reich, A., et al. (2001). Clinical aspects of obesity in childhood and adolescence. *Obes Rev.J*, 2(1): 29-36.
- Kimm, S.Y., Glynn, N. W., Obarzanek, E., Kriska, A. M., Daniels, S. R., Barton, B. A., et al. (2005). Relation between the changes in physical activity and body-mass index during adolescence: a multi-center longitudinal study. *Lancet*, 366(9482), 301-7.
- Kish, Leslie (1965). "Survey Sampling". New York: John Wiley & Sons, Inc. ISBN 0-471-10949-5.
- Kochanska, G., Philibert, R. A., & Barry, R. A. (2009). Interplay of genes and early mother-child relationship in the development of self-regulation from toddler to preschool age. *Journal of Child Psychology and Psychiatry*, 50(11): 1331-1338.
- Koplan, J. P., Liverman, C. T., Kraak, V. I. (2005). *Preventing childhood obesity: health in the balance*. Washington, DC: The National Academies Press.
- Kropf, J. A., Keckley, P. H., & Jensen, G. L. (2008). School-based obesity prevention programs: an evidence-based review. *Obesity*, 16, 1009-1018.
- Kruger, H. S., Puoane, T., Senekal, M., van der Merwe, M. T. (2005). Obesity in South Africa: challenges for government and health professionals. *Public health nutrition*, 8(5):491-500.
- Kubik, M., Lytle, L., & Story, M. (2005). School Wide Food Practices Are Associated With Body Mass Index in Middle School Students. *Archives of Pediatric and Adolescent Medicine*, 159 (12): 1111-1114.
- Kuczmarski, R. J., Odgen, C. L., Grummer-Strawn, L. M., Flegal, K. M., Guo, S. S., Wei, R., Mei, L. R. Z., Curtin, A. F., & Roche, C. L. (2000). CDC growth charts: United States. *Adv. Data*, 8, 1-27.
- Kumanyika, S. (2000). Minisymposium on obesity: Overview on some strategic considerations. *Annual Reviews of Public Health*, 293-308.

- Kumanyika, S., & Grier, S. (2006). Targeting interventions for ethnic minority and low-income populations. *The Future of Children*, 16, 187–207.
- Kumanyika, S. K. (2007). Environmental influences on childhood obesity: ethnic and cultural influences in context. *Physiol & Behav J*, 94(1): 61-70.
- Lakshman, R. R., Sharp, S. J., Ong, K. K., Forouhi, N. G. (2010). A novel school-based intervention to improve nutrition knowledge in children: cluster randomized controlled trial. *BMC Public Health*, 10(123): 2392-2398.
- Lee, Y. S. (2009). Consequences of childhood obesity. *Ann Acad Med Singapore*, 38(1):75-77.
- Lemeshow, et al. (1990). *Adequacy of sample size in health studies*. Wiley.
- Leviton, L. C. (2008). Children's Healthy Weight and the School Environment. *The ANNALS of the American Academy of Political and Social Science*, 615(1): 38-55.
- Levitsky, D. & Mrdjenovic, G. (2003). Nutritional and Energetic Consequences of Sweetened Drink Consumption in 6- to 13-Year-Old Children. *Journal of Pediatrics*, 142 (6): 604-610.
- Levy, L. Z., & Petty, K. (2008). Childhood obesity prevention: Compelling challenge of the twenty-first century. *Early Childhood Development and Care*, 178, 609-615.
- Li, J., & Hooker, N. H. (2010). Childhood obesity and schools: Evidence from the National Survey of Children's Health. *Journal of School Health*, 80, 96-103.
- Liem, E. T., Sauer, P. J., Oldehinkel, A. J., Stolk, R. P. (2008). Association between depressive symptoms in childhood and adolescence and overweight in later life: Review of the recent literature. *Archives of Pediatrics and Adolescent Medicine*, 162(10): 981-988.
- Lin, F. G., Hsieh, Y. H., & Tung, H. J. (2012). Interactive effects of family socioeconomic status and body mass index on depression in school-aged children. *Asia Pacific Journal of Clinical Nutrition*, 21(1): 64-72.
- Lissau, I. (2006). Prevention of overweight in the school arena. *Acta Paediatrica*, 96, 12-18.
- Lobstein, T., Baur, L., Uauy, R. (2004). Obesity in children and young people: a crisis in public health. Obesity reviews: *Journal of the International Association for the Study of Obesity*, 5 (1):4-104.
- Lorson, B. A., Melgar-Quinonez, H. R, Taylor, C. A. (2009). Correlates of fruit and vegetable intakes in US children. *Journal of the American Dietetic Association*, 109 (3): 474-478.

- Ludwig, D. S., Peterson, K. E., Gortmaker, S. L. (2001). Relation between consumption of sugar-sweetened drinks and childhood obesity: A prospective, observational analysis. *The Lancet*, 357, 505-508.
- Ludwig, D. S. (2007). Childhood obesity- the shape of things to come. *N Engl J Med*, 357(23): 2325-2327.
- Lytle, L. (2002). In defense of a low-fat diet for healthy children. *J Am Diet Assoc*, 100(1): 12- 39.
- Magarey, A. M., Daniels, L. A., Boulton, T. J., Cockington, R. A. (2003). Predicting obesity in early adulthood from childhood and parental obesity. *International Journal of Obesity and Related Metabolic Disorders*, 27, 505–513.
- Malmberg, M., Overbeek, G., Kleinjan, M., Vermulst, A., Monshouwer, K., Vollebergh, W. A., Engels, R. C. (2010). Effectiveness of the universal prevention program “Healthy School and Drugs”: Study protocol of a randomized clustered trial. *British Medical College of Public Health*, 10, 541-571.
- Martyn-Nemeth, P., Penckofer, S., Gulanick, M., Velsor-Friedrich, B., Bryant, F. B. (2008). The relationships among self-esteem, stress, coping, eating behavior, and depressive mood in adolescents. *Research in Nursing & Health*, 6(8): 43-56.
- Matheson, D., Killen, J., Wang, Y., Varady, A., Robinson, T. (2004). Children's Food Consumption during TV Viewing. *American Journal of Clinical Nutrition*, 79, 1088-1094.
- McCaffrey, T. A., Rennie, K. L., Kerr, M. A., Wallace, J. M., Hannon-Fletcher, M. P., Coward, W. A., Livingstone, B. E. (2008). Energy density of the diet and change in body fatness from childhood to adolescence; is there a relation? *American Journal of Clinical Nutrition*, 87, 1230–1237.
- Mellin, A. E., Neumark-Sztainer, D., Story, M., Ireland, M., & Resnick, M. D. (2002). Unhealthy behaviors and psychosocial difficulties among overweight adolescents: The potential impact of familial factors. *Journal of Adolescent Health*, 31(2): 145-153.
- Mesman, J. & Koot, H. (2000). Common and Specific Correlates of Preadolescent Internalizing and Externalizing Psychopathology. *Journal of Abnormal Psychology*, 109, 428-437.
- Metallinos-Katsaras, E. S., Freedson, P. S., Fulton, J. E., & Sherry, B. (2007). The association between an objective measure of physical activity and weight status in preschoolers. *Obesity J*, 15(3): 686-694.
- Meyre, D., Boutin, P., Tounian, A., Deweirder, M., Aout, M., Jouret, B., Froguel, P. (2005). Is glutamate decarboxylase 2 (GAD2) a genetic link between low birth weight and subsequent development of obesity in children? *Journal of Clinical Endocrinology & Metabolism*, 90(4): 2384-2390.

- Michell, A. (2006). Physical activity to prevent obesity in young children: Negative outcome or protocol problem? *BMJ*, 333(7579): 1171-1172.
- Miller, P., Moore, R. H., Kral, T. V. (2011). Children's daily fruit and vegetable intake: Associations with maternal intake and child weight status. *Journal of Nutrition Education and Behavior*, 43(5): 396-400.
- Ministry of Health Malaysia (MOH). (1997). Second National Health and Morbidity Survey 1996. NHMS II Report 1997.
- Ministry of Health Malaysia (MOH). (2008). Nutritional Status, the Third National Health and Morbidity Survey. Kuala Lumpur: Institute of Public Health.
- Mirmohammadi, S. J., Hafezi, R., Mehrparvar, A. H., Rezaeian, B., & Akbari, H. (2011). Prevalence of Overweight and Obesity among Iranian School Children in Different Ethnicities. *Iran J Pediatr*, 21 (4): 514-520.
- Mirzazadeh, A., Sadeghirad, B., Haghdoust A. A., Bahrein F., Rezazadeh Kermani, M. (2009). The Prevalence of Obesity in Iran in Recent Decade; a Systematic Review and Meta-Analysis Study. *Iranian J Publ Health*, 38 (3): 1-11.
- Misra, A., Singhal, N., Khurana, L. (2010). Obesity, the metabolic syndrome, and type 2 diabetes in developing countries: role of dietary fats and oils. *Journal of the American College of Nutrition*, 29(3): 289- 301.
- Moayeri, H., Bidad, K., Aghamohammadi, A., et al. (2006). Overweight and obesity and their associated factors in adolescents in Tehran, Iran, 2004-2005. *Eur J Pediatr*, 165(7): 489-493.
- Mohammadpour-Ahranjani, B., Rashidi, A., Karandish, M., Eshraghian, M. R., Kalantari, N. (2004). Prevalence of overweight and obesity in adolescent Tehrani students, 2000-2001: An epidemic health problem. *Public Health Nutr*, 7(5): 645- 648.
- Mohamud, W. N. W., Musa, K. I., Khir, A. S. M., Ismail, A. A. S., Ismail, I. S., Kadir, K. A. et al. (2011). Prevalence of overweight and obesity among adult Malaysians: an update. *Asia Pac J Clin Nutr*, 20 (1): 35-41.
- Monasta, L., Batty, G., Macaluso, A., Ronfani, L., Lutje, V., et al. (2011). Interventions for the prevention of overweight and obesity in preschool children: a systematic review of randomized controlled trials. *Obes Rev*, 12(3): 107-18.
- Montgomery, K. S. (2002). Health promotion with adolescents: examining theoretical perspectives to guide research. *Research & Theory for Nursing Practice*, 16(2): 119-134.
- Montgomery, C., Reilly, J. J., Jackson, D. M., Kelly, L. A., Slater, C., Paton, J. Y., et al. (2004). Relation between physical activity and energy expenditure in a representative sample of young children. *American Journal of Clinical Nutrition*, 80(3): 591-596.

- Morill, A. & Chinn, C. (2004). The Obesity Epidemic in the United States. *Journal of Public Health Policy*, 25 (3/4): 353-366.
- Morland, K., Wing, S., & Diez Roux, A. (2002). The contextual effect of the local food environment on residents' diets. *Am J Public Health*, 92, 7-1761.
- Mostafavi, H., Dabagh Manesh, M. H., Zare, N. (2005). Prevalence of obesity and overweight in adolescents and adult population in Shiraz: Iran. *J Endocrinol Metab*, 7(1):57- 66.
- Mrdjenovic, G., & Levitsky, D. A. (2003). Nutritional and energetic consequences of sweetened drink consumption in 6 to 13 year old children. *Pediatrics*, 142(6): 604-610.
- Murphy, S. P., & Johnson, R. K. (2003). The scientific basis of recent US guidance on sugars intake. *American Journal of Clinical Nutrition*, 78, 827-833.
- Mustillo, S., Worthman, C., Erkanli, A., Keeler, G., Angold, A., Costello, E. J. (2003). Obesity and psychiatric disorder: Developmental trajectories. *Pediatrics*, 111(4): 851-859.
- National Center for Health Statistics. (2012). Health, United States, 2011: With special feature on socioeconomic status and health. Department of Health and Human Services: Hyattsville, MD.
- National Institute of Health (NIH). (2004). Economic burden of overweight and obesity. Available at <http://www.nih.gov>.
- Nelson, J., Carpenter, K., & Chiasson, M. (2006). Diet, Activity, and Overweight Among Preschool-Age Children Enrolled in the Special Supplemental Nutrition Program for Women, Infant, and Children (WIC). *Preventing Chronic Disease*, 3 (2): 1-12.
- Ness, A. R. (2004). The Avon Longitudinal Study of Parents and Children (ALSPAC)- A resource for the study of the environmental determinants of childhood obesity. *European Journal of Endocrinology*, 151(3): 141-149.
- Neumark-Sztainer, D., Wall, M., Perry, C., & Story, M. (2004). Correlates of fruit and vegetable intake among adolescents. Findings from Project EAT. *Prev Med J*, 37(3): 198-208.
- Newby, P. K., Peterson, K. E., Berkey, C. S., Leppert, J., Willett, W. C., Colditz, G. A. (2003). Dietary composition and weight change among low-income preschool children. *Archives of Pediatrics and Adolescent Medicine*, 157(8): 759-764.
- Nguyen, D. M., & El-Serag, H. (2010). The Epidemiology of Obesity. *Gastroenterol Clin North Am J*, 39(1): 1-7.
- Nielson, S. J., & Popkin, B. M. (2003). Patterns and trends in food portion sizes, 1977-1998. *Journal of the American Medical Association*, 289, 450-453.

- Niemeier, H. M., Raynor, H. A., Lloyd-Richardson, E. E., Rogers, M. L., Wing, R. R. (2006). Fast food consumption and breakfast skipping: Predictors of weight gain from adolescence to adulthood in a nationally representative sample. *Journal of Adolescent Health*, 39(6): 842-849.
- Nihiser, A. J., Lee, S. M., Wechsler, H., McKenna, M., Odom, E., Reinold, C., Grummer-Strawn, L. (2007). Body mass index measurement in schools. *Journal of School Health*, 77, 651-671.
- O'Connor, T. M., Yang, S. J., Nicklas, T. A. (2006). Beverage intake among preschool children and its effect on weight status. *Pediatrics*, 118(4): 1010-1018.
- O'Donnell, S. I., Hoerr, S. L., Mendoza, J. A., Goh, E. T. (2008). Nutrient quality of fast food kids meals. *American Journal of Clinical Nutrition*, 88, 1388-1395.
- Ogden, C. L., Carroll, M. D., McDowell, M. A., Flegal, K. M. (2007). Obesity among adults in the United States—no statistically significant change since 2003-2004: *National Center for Health Statistics*, 36(2): 1-8.
- Ogden, C. L., Carroll, M. D., Curtin, L. R., Lamb, M. M., Flegal, K. M. (2010). Prevalence of high body mass index in U.S. children and adolescents, 2007-2008. *JAMA*, 303, 242-249.
- Ogden, C., Carroll, M., Kit, B., Flegal, K. (2012). Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010. *JAMA*, 307(5): 483-490.
- Olshansky, S., Passaro, D., Hershow, R., Layden, J., Carnes, B., Brody, J., Ludwig, D. (2005). A potential decline in life expectancy in the United States in the 21st century. *The New England Journal of Medicine*, 352(11): 1138-1145.
- Ormel, J., Oldehinkel, A., Ferdinand, R., Hartman, C., De Winter, A., Veenstra, R. (2005). Internalizing and Externalizing Problems in Adolescence: General and Dimension-Specific Effects of Familial Loadings and Preadolescent Temperament Traits. *Psychological Medicine*, 35, 1825-1835.
- Orsi, C. M., Hale, D. E., & Lynch, J. L. (2011). Pediatric obesity epidemiology Current Opinion in Endocrinology, Diabetes, and Obesity. *Pediatric obesity epidemiology*, 18(1): 14-22.
- Painter, J. E., Borba, C. P. C., Hynes, M., Mays, D., & Glanz, K. (2008). The Use of Theory in Health Behavior Research from 2000 to 2005: A Systematic Review. *Annals of Behavioral Medicine*, 35, 358-362.
- Pan, L., Blanck, H. M., Sherry, B., Dalenius, K., & Grummer-Strawn, L. M. (2012). Trends in the prevalence of extreme obesity among US preschool-aged children living in low income families, 1998-2010. *Journal of the American Medical Association*, 308(24): 2563-2564.

- Park, E. (2011). Overestimation and underestimation: Adolescents' weight perception in comparison to BMI based weight status and how it varies across socio-demographic factors. *Journal of School Health*, 81(2): 57-64.
- Pate, R. R., Ward, D. S., Saunders, R. P., Felton, G., Dishman, R. K., Dowda, M. (2005). Promotion of Physical Activity Among High-School Girls: A Randomized Controlled Trial. *American Journal of Public Health*, 95(9): 1582- 1587.
- Patrick, K., Norman, G. J., Calfas, K. J., Sallis, J. F., Zabinski, M. F., Rupp, J., et al. (2004). Diet, physical activity, and sedentary behaviors as risk factors for overweight in adolescence. *Arch Pediatr Adolesc Med*, 158 (4): 385-90.
- Patrick, H., & Nicklas, T. A. (2005). A review of family and social determinants of children's eating patterns and diet quality. *Journal of the American College of Nutrition*, 24(2): 83-92.
- Paxton, H. (2005). *The Effects of Childhood Obesity on Self-esteem*. Educational Specialist, School of Psychology, Marshall University.
- Payton, J., Weissberg, R. P., Durlak, J. A., Dymnicki, A. B., Taylor, R. D., Schellinger, K. B., & Pachan, M. (2008). The positive impact of social and emotional learning for kindergarten to eighth-grade students: Findings from three scientific reviews. Chicago, IL: Collaborative for Academic, Social, and Emotional Learning. 64, 1-12.
- Popkin, B. M. (2006). Global nutrition dynamics: the world is shifting rapidly toward a diet linked with non-communicable diseases. *The American journal of clinical nutrition*, 84(2): 289-98.
- Proctor, M. H., Moore, L. L., Gao, D., Cupples, L. A., Bradlee, M. L., Hood, M. Y., et al. (2003). Television viewing and change in body fat from preschool to early adolescence: The Framingham Children's Study. *International Journal of Obesity Related Metabolic Disorders*, 27(7): 827-833.
- Procter, K. L. (2007). The aetiology of childhood obesity: A review. *Nutrition Research*, 20, 29- 45.
- Rahmani, A., Sayehmiri, K., Asadollahi, K., Sarokhani, D., Islami, F., Sarokhani, M. (2015). Investigation of the Prevalence of Obesity in Iran: a Systematic Review and Meta-Analysis Study. *Acta Medica Iranica*, 53(10): 596-607.
- Rampal, L. GR. Sherina, M. S., Rampal, S., Yi Jie, D. W., Lee, C. P., Shya, L. J. & Shun, S. Y. (2007). Prevalence of Overweight among Secondary School Students in Klang District, Selangor. *Mal J Nutr*, 13(1): 1-8.
- Rampal, L., Rampal, S., Khor, G. L., Azhar, M. Z., Shafie, O., Ramlee, R., Sirajoon, N. G., Krishnan, J. (2007). A national study on the prevalence of obesity among 16,127 Malaysians. *Asia Pac J Clin Nutr*, 16 (3): 561-566.

- Rampersaud, G. C., Pereira, M. A., Girard, B. L., Adams, J., Metz, J. D. (2005). Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. *Journal of the American Dietetic Association*, 105(5): 743-760.
- Rashidy-Pour, A., Malek, M., Eskandarian, R., Ghorbani, R. (2009). "Obesity in the Iranian population". *Obes Rev J*, 10 (1): 2-6.
- Reas, D. L., Nygard, J. F., Svensson, E., Sorensen, T., Sandanger, I. (2007). Changes in body mass index by age, gender, and socio-economic status among a cohort of Norwegian men and women (1990 – 2001). *BMC Public Health*, 7(1): 269-275.
- Reilly, J. J., Methven, E., McDowell, Z. C., Hacking, B., Alexander, D., Stewart, L. (2003). Health consequences of obesity. *Archives of Disease in Childhood*, 88(9): 748-752.
- Reilly, J. J., Kelly, L., Montgomery, C., Williamson, A., Fisher, A., McColl, J. H., et al. (2006). Physical activity to prevent obesity in young children: Cluster randomized controlled trial. *BMJ*, 333(7577): 10-41.
- Reinehr, T., Sousa, G., Toschke, A. M., Andler, W. (2006). Long-term follow-up of cardiovascular disease risk factors in children after an obesity intervention. *Am J Clin Nutr*, 84(3): 490-496.
- Richardson, L., Davis, R., Poulton, R., McCauley, E., Moffitt, T. E., Caspi, A., et al. (2003). A longitudinal evaluation of adolescent depression and adult obesity. *Archives of Pediatric and Adolescent Medicine*, 157(8): 739-745.
- Ridder, AM. M., Heuvelmans, A. M., Visscher, LS. T., Seidell, C. J., Renders, M. C. (2009). "We are healthy so we can behave unhealthily". A qualitative study on health behaviour of Dutch lower vocational students. *Health education journal*, 3(2): 1-16.
- Rideout, V., Roberts, D., & Foehr, U. (2005). Generation M: Media in the Lives of 8-18 Years-Olds: Executive Summary. Menlo Park, CA: Henry J. Kaiser Family Foundation.
- Roemmich, J. N., Epstein, L. H., Raja, S., Yin, L., Robinson, J., & Winiewicz, D. (2006). Association of access to parks and recreational facilities with the physical activity of young children. *Preventive Medicine*, 43(6): 437-441.
- Rolls, B. J., Engell, D., Birch, L. L. (2000). Serving Portion Size Influences 5-Year-Old but Not 3-Year-Old Children's Food Intakes. *Journal of the American Dietetic Association*, 100(2): 232-234.
- Rose, D. & Bodor, N. (2006). Household Food Insecurity and Overweight Status in Young Children: Results from the Early Childhood Longitudinal Study. *Pediatrics*, 117, 46-473.
- Ruhm, C. (2008). Maternal Employment and Adolescent Development. *Labour Economics*, 15(5): 958-983.

- Sacher, P. M., Chadwick, P., Wells, J. C. K., Williams, J. E., Cole, T. J., Lawson, M. S. (2005). Assessing the acceptability and feasibility of the MEND Programme in a small group of 7-11-year-old children. *Journal of Human Nutrition & Dietetics*, 18, 3-5.
- Sacher, P. M., Kolotourou, M., Chadwick, P., Cole, T. J., Lawson, M. S., Lucas, A., Singhal, A. (2010). Randomized controlled trial of the MEND Program: A family-based community intervention for childhood obesity. *Obesity*, 18, 62-68.
- Saksvig, B. I., Gittelsohn, J., Harris, S. B., Hanley, A. J. G., Valente, T. W., Zinman, B. (2005). A Pilot School-Based Healthy Eating and Physical Activity Intervention Improves Diet, Food Knowledge, and Self-Efficacy for Native Canadian Children. *The Journal of Nutrition*, 135, 2392-2398.
- Sallis, J. F., Prochaska, J. J., & Taylor, W. C. (2000). A review of correlates of physical activity of children and adolescents. *Medicine & Science in Sports & Exercise*, 32(5): 963-975.
- Sallis, J., McKenzie, T., Alcaraz, J., Kolody, B., Faucette, N., & Hovell, M. (2001). The Effects of a 2-Year Physical Education Program (SPARK) on Physical Activity and Fitness in Elementary School Students. Sports, Play and Active Recreation for Kids. *American Journal of Public Health*, 87 (8), 1328-1334.
- Sallis, J. F., McKenzie, T. L., Conway, T. L., Elder, J. P., Prochaska, J. J., Brown, M., et al. (2003). Environmental interventions for eating and physical activity: a randomized control trial in middle schools. *Am J Prev Med*, 24 (3): 209-17.
- Satia, J. A. (2010). Dietary acculturation and the nutrition transition: an overview. *Applied physiology, nutrition, and metabolism*, 35(2): 219-23.
- Savage, G., Macfarlane, A., Ball, K., Worsley, A., Crawford, D. (2007). Snacking behaviors of adolescents and their association with skipping meals. *The International Journal of Behavioral Nutrition and Physical Activity*, 17(4): 36-44.
- Segal, L. & Gadola, E. (2008). Generation O: Addressing Childhood Overweight Before It's Too Late. *The ANNALS of the American Academy of Political and Social Science*, 615, 195-213.
- Sjoberg, A., Slinde, F., Arvidsson, D., Ellegard, L., Gramatovski, E., Hallberg, L., et al. (2003). Energy intake in Swedish adolescents: validation of diet history with doubly labeled water. *Eur J Clin Nut*, 57 (12): 1643-52.
- Shariff, Z. M., Bukhari, S. S., Othman, N., Hashim, N., Ismail, M., Jamil, Z., Kasim, S. M., Paim, L., Samah, B. A., & Hussain, Z. Z. M. (2008). Nutrition education intervention knowledge improves nutrition knowledge, attitudes, and practices of primary school children: A pilot study. *International Electronic Journal of Health Education*, 11, 119-132.

- Sharma, M., Wagner, D. I., & Wilkerson, J. (2006). Predicting childhood obesity prevention behaviors using social cognitive theory. *International Quarterly of Community Health Education*, 24(3): 191-203.
- Sharma, M., & Ickes, M. J. (2008). Psychosocial determinants of childhood and adolescent obesity. *Journal of Social, Behavioral, and Health Sciences*, 2, 33-49.
- Shaya, F. T., Flores, D., Gbarayor, C. M., & Wang, J. (2008). School-based obesity interventions: A literature review. *Journal of School Health*, 78, 189-196.
- Sherry, B., Mei, Z., Scanlon, K. S., Mokdad, A. H., Grummer-Strawn, L. M. (2004). Trends in state-specific prevalence of overweight and underweight in 2- through 4-year-old children from low-income families from 1989 through 2000. *Archives of Pediatrics & Adolescent Medicine*, 158(12): 1116-1124.
- Singh, A. S., Jeannette, M., Brug, J., Mechelen, W. (2007). Short-term Effects of School-Based Weight Gain Prevention Among Adolescents. *Arch Pediatr Adolesc Med*, 161(6): 565-571.
- Sinha, A., & Kling, S. (2009). A review of adolescent obesity: prevalence, etiology, and treatment. *Obes Surg*, 19(1):113-120.
- Skinner, H., Biscope, S., Poland, B., & Goldberg, E. (2003). How adolescents use technology for health information: implications for health professionals from focus group studies. *J Med Internet Res*, 5 (4): 1-32.
- Snell, E. K., Adam, E. K., & Duncan, G. J. (2007). Sleep and the body mass index and overweight status of children and adolescents. *Child Development*, 78, 309-323.
- Sokol, B. W., & Muller, U. (2007). The development of self-regulation: Toward the integration of cognition and emotion. *Cognitive Development*, 22, 401-405.
- Spruijt-Metz, D. (2011). Etiology, treatment, and prevention of obesity in childhood and adolescence: A decade in review. *Journal of Research on Adolescence*, 21(1): 129-152.
- Stanford. (2007). Building "Generation Play": Addressing the crisis of inactivity among America's children. Stanford Prevention Research Center, Stanford University School of Medicine. 35(2): 147-154.
- Steptoe, A., & Wardle, J. (2004). Health-related behavior: prevalence and links with disease. *Health Psychology*, 4(2): 24-48.
- Stevens, J., Taber, D. R., Murray, D. M., & Ward, D. S. (2007). Advances and controversies in the design of obesity prevention trials. *Obesity J*, 15(9): 2163-70.
- Stevens, J. (2009). *Applied multivariate statistics for the social sciences (5th ed)*. New York, NY, Taylor and Francis Group.

- Stice, E., Presnell, K., & Shaw, H. (2005). Psychological and Behavioral Risk Factors for Obesity Onset in Adolescent Girls: A Prospective Study. *Journal of Consulting and Clinical Psychology*, 73 (2): 195-202.
- Stice, E., Shaw, H., & Marti, C. N. (2006). A meta-analytic review of obesity prevention programs for children and adolescents: The skinny on interventions that work. *Psychological Bulletin*, 132, 667-691.
- Story, M., & French, S. (2004). Food advertising and marketing directed at children and adolescents in the US. *International Journal of Behavioral Nutrition and Physical Activity*, 4(5): 11-33.
- Story, M., & Orleans, T. (2006). Building evidence for environmental and policy solutions to prevent childhood obesity—the healthy eating research program. *American Journal of Preventive Medicine*, 30(1): 96 – 97.
- Story, M., Kaphingst, K. M., & French, S. (2006). The Role of Schools in Obesity Prevention. *The Future of Children*, 16(1): 109-142.
- Story, M., Kaphingst, K. M., Robinson-O'Brien, R., Glanz, K., (2008). Creating healthy food and eating environments: policy and environmental approaches. *Ann Rev Public Health*, 29, 6-29.
- Story, M., Nannery, M. S., & Schwartz, M. B. (2009). Schools and obesity prevention: Creating school environments and policies to promote healthy eating and physical activity. *Milbank Quarterly*, 87, 71-100.
- Stratton, G. & Mullan, E. (2005). The Effect of Multicolor Playground Makings on Children's Physical Activity Level during Recess. *Preventive Medicine*, 41, 828-833.
- Strauss, R. (2000). Childhood Obesity and Self-Esteem. *Pediatrics*, 105 (1):1-5.
- Stroebele, N., & de Castro, J. M. (2004). Effect of ambience of food intake and food choice. *Nutrition*, 20, 821–838.
- Strong, W., Malina, R., Blimkie, C., Daniel, S., Dishman, R., Gutin, B., Hergenroeder, A., Must, A., Nixon, P., & Pivarnik, J. (2005). Evidence Based Physical Activity for School-Age Youth. *Journal of Pediatrics*, 146 (6): 732-77.
- Stutzer, A. (2007). Limited Self-Control, Obesity and the Loss of Happiness. IZA Discussion Paper No. 2925, Institute for the Study of Labor, University of Basel, Department of Business and Economics.
- Sussner, K., Lindsay, A., & Peterson, K. (2009). The influence of maternal acculturation on child body mass index at age 24 months. *Journal of the American Dietetic Association*, 109(2): 218-225.
- Swinburn, B., Caterson, I., Seidell, J., & James, W. (2004). Diet, Nutrition and Prevention of Excess Weight Gain and Obesity. *Public Health Nutrition*, 7 (1): 123-146.

- Tabachnick, B. G., & Fidell, L. S. (1996). *Using multivariate statistics* (3rd ed). New York: HarperCollins.
- Tammelin, T., Laitinen, J., & Nayha, S. (2004). Change in the level of physical activity from adolescence into adulthood and obesity at the age of 31 years. *Int J Obes Relat Metab Disord*, 28(6): 775-82.
- Taveras, E. Rifas-Shiman, S., Berkey, C., Rockett, H., Field, A., Frazier, A., Colditz, G., Gillman, M. (2005). Family Dinner and Adolescent Overweight. *Obesity Research*, 13, 900- 906.
- Taveras, E. M., Berkey, C. S., Rifas-Shiman, S. L., Ludwig, D. S., Rockett, H. R., Field, A. E., et al. (2005). Association of consumption of fried food away from home with body mass index and diet quality in older children and adolescents. *Pediatrics*, 116(4): 518-524.
- Townsend, M., Peerson, J., Love, B., Achterberg, C., Murphy, S. (2001). Food Insecurity Is Positively Related to Overweight in Women. *Journal of Nutrition*, 131, 1738-1745.
- Troiano, R. P., Briefel, R. R., Carroll, M. D., Bialostosky, K., (2000). Energy and fat intakes of children and adolescents in the united states: Data from the National Health and Nutrition Examination Surveys. *American Journal of Clinical Nutrition*, 72(5): 1343-1353.
- Trost, S. G., Kerr, L. M., Ward, D. S., Pate, R. R. (2001). Physical activity and determinants of physical activity in obese and non-obese children. *International Journal of Obesity*, 25, 822 – 829.
- Trost, S. G., Sirard, J. R., Dowda, M., Pfeiffer, K. A., & Pate, R. R. (2003). Physical activity in overweight and nonoverweight preschool children. *International Journal of Obesity Related Metabolic Disorders*, 27(7): 834-839.
- Tsiros, M. D., Sinn, N., Brennan, L., Coates, A. M., Walkley, J. W., Petkov, J., et al. (2008). Cognitive behavioral therapy improves diet and body composite on in overweight and obese adolescents. *Am J Clin Nutr*; 87(5): 1134–40.
- U.S. Department of Health and Human Services. (2012). Healthy People 2020: Nutrition and weight status. Retrieved from <http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?>
- Utter, J., Scragg, R., Schaaf, D., & Mhurchu, C. (2008). Relationship between Frequency of Family Meals, BMI, and Nutritional Aspects of the Home Environment among New Zealand Adolescents. *International Journal of Behavioral Nutrition and Physical Activity*, 5 (50): 1-7.
- Vandewater, E. A., Shim, M. S., & Caplovitz, A. G. (2004). Linking obesity and activity level with children's television and video game use. *Journal of Adolescence*, 27(1): 71-85.

- Van Hook, J., & Baker, E. (2010). Big boys and little girls: Gender, acculturation, and weight among young children of immigrants. *Journal of Health & Social Behavior*, 51(2): 200-214.
- Vasquez, F., Salazar, G., Andrade, M., Vasquez, L., & Diaz, E. (2006). Energy balance and physical activity in obese children attending day-care centers. *European Journal of Clinical Nutrition*, 60(9): 1115-1121.
- Vereecken, C. A., & Maes, L. (2003). A Belgian study on the reliability and relative validity of the Health Behaviour in School-Aged Children food-frequency questionnaire. *Public Health Nutrition*, 6(6): 581-588.
- Verstraet, S., Cardon, G., De Clercq, D., & De Bourdeaudhui, I. (2006). Increasing Children's Physical Activity Levels During Recess Periods in Elementary Schools: The Effect of Providing Game Equipment. *European Journal of Public Health*, 16, 415-419.
- Wadden, T., Brownell, K., & Foster, G. (2004). Presentation on Obesity: Responding to the Global Epidemic. *Journal of Consulting and Clinical Psychology*, 70 (3): 510-525.
- Wadsworth, M., & Achenbach, T. (2005). Explaining the Link between Low Socioeconomic Status and Psychopathology: Testing Two Mechanisms of Social Causation Hypothesis. *Journal of Consulting and Clinical Psychology*, 73, 1146-1153.
- Walley, A. J., Asher, J. E., Froguel, P. (2009). The genetic contribution to non-syndromic human obesity. *Nature Reviews Genetics*, 10, 431-442.
- Walter, C. M., Du Randt, R. & Venter, D. J. L. (2011). The physical activity and health status of two generations of Black South African professional women. *Journal of Interdisciplinary Health Sciences*, 16(1): 538-9.
- Wang, Y. C., Gortmaker, S. L., Sobol, A. M., Kuntz, K. M. (2006). Estimating the energy gap among US children: A counterfactual approach. *Pediatrics*, 118, 1721-1733.
- Wang, Y., & Beydoun, M. A. (2007). The obesity epidemic in the United States gender, age, socioeconomic, racial/ethnic, and geographic characteristics: a systematic review and meta-regression analysis. *Epidemiol Rev*, 29(1): 6-28.
- Wang, Y. (2011). Disparities in pediatric obesity in the United States. *Advances in Nutrition*, 2(1): 23-31.
- Wansink, B. (2005). *Mindless Eating: Why We Eat More Than We Think*. New York: NY.
- Ward, D. S., Saunders, R., Felton, G. M., Williams, E., Epping G. N., Pate, R. R. (2006). Implementation of a school environment intervention to increase physical activity in high school girls. *Health Education Research*, 21(6): 896-910.

- Welsh, J. A., Cogswell, M. E., Rogers, S., Rockett, H., Mei, Z., Grummer-Strawn, L. M. (2005). Overweight among low-income preschool children associated with the consumption of sweet drinks: Missouri, 1999-2002. *Pediatrics*, 115(2): 223-229.
- Westenhoefer, J. (2002). Establishing dietary habits during childhood for long term weight control. *Annals of Nutrition and Metabolism*, 46(1): 18-23.
- Wilkinson, K.M. (2008). Increasing obesity in children and adolescents: An alarming epidemic. *Journal of the American Academy of Physician Assistants*, 21(12): 31- 38.
- World Health Organization. (2006). Gaining Health. The European Strategy for the Prevention and Control of Non-communicable Diseases. WHO Regional Office for Europe, 92, 3-52.
- World Health Organization (WHO). (2011). *Global Strategy on Diet, Physical Activity and Health. Childhood overweight and obesity*. Retrieved from <http://www.who.int/dietphysicalactivity/childhood/en/>.
- World Health Organization (WHO). (2014). Obesity report 2014. <http://www.who.int/topics/obesity/en/>.
- Wosje, K. S., Khoury, P. R., Claytor, R. P., Copeland, K. A., Hornung, R. W., Daniels, S. R., et al. (2010). Dietary patterns associated with fat and bone mass in young children. *American Journal of Clinical Nutrition*, 92(2): 294-303.
- Wrotniak, B., Epstein, L., Paluch, R., & Roenmmich, J. (2004). Parent Weight Change as a Predictor of Child Weight Change in Family-Based Behavioral Obesity Treatment. *Archives of Pediatric & Adolescent Medicine*, 158 (4): 342-347.
- Wrotniak, B. H., Shults, J., Butts, S., Stettler, N. (2009). Gestational weight gain and risk of overweight in the offspring at age 7 y in a multicenter, multiethnic cohort study. *American Journal of Clinical Nutrition*, 87, 1818-1824.
- Yetter, G. (2009). Exercise-based school obesity prevention programs: An overview. *Psychology in the Schools. BMC*, 46, 739-747.
- Youth Risk Behavior Surveillance. (2013). the 2013 Vermont Youth, Risk Behavior Survey. *MMWR*, 53(2): 10-48.
- Yu, H. (2011). Parental communication style's impact on children's attitudes toward obesity and food advertising. *Journal of Consumer Affairs*, 45(1): 87-107.