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ROLE OF HEREDITY AND LIFESTYLE IN THE PREVALENCE OF OBESITY AMONG SCHOOL STUDENTS IN SAHIWAL CITY

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ABSTRACT

Background: Obesity results from the energy imbalance that occurs when a person consumes more calories than their body burns.

Objectives: This study was conducting to identify different factors involved in childhood obesity and to explore the relationship between parents' obesity and childhood obesity.

Methodology: This was a descriptive cross sectional institutional based study. Primary school children of age group 10-14 years old children who were attending schools during the study period and whose parent agreed to participate in the research were selected to participate in this study. Measurement of weight in kilograms by using portable scale which was standardized to zero daily. Children were weighed barefoot, wearing light clothes. Measurements were

rounded to the nearest 1 kg. Height was measured of the children with barefoot, by using measuring tape. Measurements were rounded to the nearest 0.5 cm. Calculation of BMI was by using this formula BMI = weight in Kgs/ height (meters)^2, other than that, data was collected from the parents through questionnaire to identify family history and other risk factors associated with obesity.

Results: There are 150 school children with a mean age 15.23 (SD=0/81) of years. Calculated average BMI indicated normal weight 22.60 (SD=1.06), overweight 27.27 (SD=2.32), and obesity 35.98 (SD=1.71). There were 41 (27.3%) children who were involved in physical activity; 24 (16%) were playing different sports daily; 18 (12%) were taking part in physical activity thrice a week; and 108 (72%) never took part in any type of physical activity. There were 39 (26%) who reported playing sports for 30 minutes a day; 2 (1.3%) were spending 40 minutes a day and 108 (72%) never took part in any type of sports. Only 41 (27.3%) were involved in moderate level of activity. There were 93 (62%) school children who were living an inactive lifestyle by spending time to watch TV, playing video games, and spending time on social networking sites and 112 (97.3%) were eating junk food on daily basis. Their parents were also living an inactive lifestyle and parents' BMI was higher than the normal as mothers' average BMI was 32. 10 (SD=5.07) and the fathers' BMI was also higher than the normal as 35.60 (SD=5.72). There was a significantly positive relationship between children's' BMI and their parents BMI.

Conclusion: The results indicated that both hereditary and environmental factors are involved in childhood obesity. Future investigations are needed to find out which factor has a strong impact on childhood obesity.

INTRODUCTION

Obesity results from the energy imbalance that occurs when a person consumes more calories than their body burns. Obesity is a serious public health problem because it is associated with some of the leading causes of death in the US and around the world, including diabetes, heart disease, stroke, and some cancers. In recent decades, obesity has reached epidemic proportions in populations whose environments promote physical inactivity and increased consumption of high-calorie foods. However, not all people living in such environments will become obese, nor will all obese people have the same distribution of body fat or suffer from the same health problems.

These distinctions should be visible in gatherings with similar racial or ethnic foundation and even inside families. Hereditary changes in human populaces happen too leisurely to be in any way answerable for the heftiness scourge. By the by, the variety in how individuals answer a similar climate recommends that qualities really do assume a part in the improvement of corpulence. Qualities give the body directions for answering changes in its current circumstance. Investigations of likenesses and contrasts among relatives, twins, and adoptees offer backhanded logical proof that a sizable piece of the variety in weight among grown-ups is because of hereditary elements. Different examinations have looked at corpulent and non-fat individuals for variety in qualities that could impact ways of behaving, (for example, a drive to gorge, or a propensity to be stationary) or digestion, (for example, a reduced ability to involve dietary fats as fuel, or an expanded propensity to store muscle to fat ratio). These

examinations have distinguished variations in a few qualities that might add to corpulence by expanding craving and food consumption.

Once in a long while, a reasonable example of acquired weight inside a family is brought about by a particular variation of a solitary quality (monogenic stoutness). Most weight, nonetheless, likely outcomes from complex collaborations among numerous qualities and ecological elements that remain ineffectively grasped (multifactorial stoutness). Any clarification of the heftiness pestilence needs to think about both hereditary qualities and the climate. One clarification that is frequently referred to the confusion between the present climate and "energy-frugal qualities" that duplicated in the far off past, when food sources were erratic. As per the "frugal genotype" speculation, the very qualities that assisted our progenitors with enduring intermittent starvations are currently being tested by conditions in which food is ample all year. Different speculations have been proposed including a job for the stomach microbiome as well as early life openings related with epigenetic changes.

Medical services professionals regularly gather family wellbeing history to assist with recognizing individuals at high gamble of weight related sicknesses like diabetes, cardiovascular illnesses, and a few types of malignant growth. Family wellbeing history mirrors the impacts of divided hereditary qualities and climate between direct relations. Families can't change their qualities yet they can change the family climate to support good dieting propensities and actual work. Those changes can work on the strength of relatives and further develop the family wellbeing history of the future.

Inside some random climate, there is a sure variety in regards to body size and shape among people. Some portion of this variety result from hereditary elements. To imagine that corpulence could have a hereditary part isn't is really to be expected, considering that is known for long that stoutness frequently runs in families. Successfully, familial examinations showed that BMI is profoundly related with parental stoutness. Kids who's the two guardians are hefty, have higher gamble of being stout when contrasted and youngsters from non-corpulent guardians. In any case, in familial examinations is challenging to unmistakable in the event that this connection result from hereditary or natural elements.

A few creators recommend that the worldwide ascent of stoutness is being driven generally because of ecological factors, for example, high food utilization, high improved refreshments, less movement, TV watching, and so on as opposed to natural ones. These days, because of social globalization, we are ordinary presented to pictures and offers of high fat/caloric, acceptable and modest food sources. Besides, our actual necessities have changed bringing about an unevenness in energy admission and use. The cutting-edge way of life places people to reside in an obesogenic climate, empowering us to eat more and exercise less. For instance, a few examinations found relationship among weight and time spent staring at the TV in both adults24 and children.25 From a transformative point of view, is absolutely the inverse to the time where people were more actives and had constraints on food consumption.

A few surveys on heftiness highlight the possible commitment of conditions factors that advance exorbitant food utilization and put actual work down. As of late, there has been a developing acknowledgment of financial variables adding to weight. Concerning, model, youngsters, a few variables have been considered to make sense of the ongoing pandemic of experience growing up stoutness. Notwithstanding, the pathways to adolescence corpulence are extremely mind boggling despite everything muddled. Heftiness reflects complex cooperation among hereditary, metabolic, conduct, social and natural factors.26 most of the works depend on kid and parent qualities and has not considered family framework or the staggered setting in which youngster risk factors emerge.27 It is important to think about both organic and social determinants of experience growing up weight at three levels (individual, family and local area) and across youth.

Youth stoutness has turned into a general wellbeing worry in numerous nations due its Significant clinical, mental, and financial outcomes. Youth heftiness is a difficult issue, the pace of overweight and hefty kids and young people has multiplied throughout the course of recent many years. Youngsters in Pakistan like different kids in created and non-industrial nations are progressively captivating in stationary way of behaving, investing less energy practicing outside and additional time staring at the TV and playing computer games. Not many examinations were led around here, and there is absence of information about the ongoing circumstance. More over schools are a possible setting to target the two youngsters and juvenile populace for stoutness counteraction. So this examination mean to mirror the information about circumstance to instructive and wellbeing areas to advance the circumstance and to get wellbeing.

LITERATURE REVIEW

Among various elements that underlie youth stoutness parental and family background of weight can serious areas of investigations through hereditary as well as natural factors. Family factors play a tremendous job since relatives are probably going to have comparable eating regimens, screen time and actual work ways of behaving as well as a significant impact by discernments and mentalities concerning diet and action that prompts corpulence (Jones, 2019). Behind these elements and ways of behaving, the financial status of the family assumes a conclusive part in the etiology of young life weight. Studies have showed a financial slope in youth corpulence. Parental instruction as a mark of financial position has the most predictable, converse relationship with youth weight. Other markers, for example, parental occupation and family pay were more conflicting but the role of hereditary always remained consistent (Hornsby, 2020).

In a meta-examination, Brown, (2017) observed that low financial position is related with a 10% higher gamble for Overweight and 41% higher gamble of stoutness in kids matured 0-15 years in major league salary nations all the more explicitly in America and Europe. Prior examinations in this theme introduced results that showed that stoutness is higher in individuals from a low financial status in the developing nations as opposed to in developed economies (Adair, 2013). Financial variables are probably going to be related with kid adiposity

through various pathways, including information, perspectives, monetary and different limitations on nourishment and actual work designs. Higher dangers of stoutness in kids with lower economic positions in created nations might be connected with less admittance to quality food and safe activity, less interest in weight control, social norms of actual viability, and victimization financial progression.

Notwithstanding, an alternate picture can be tracked down in emerging nations and less financial created regions, where unhealthiness and lavishness coincide, food accessibility stays an everyday test in populaces with low economic positions and heftiness is in this way seen as an indication of wealth. Parental instructive level is more reliably contrarily connected with youth corpulence than different pointers (Kersh, 2016). As a significant financial pointer, parental instructive level impacts the family's information and convictions, and these are viewed as significant for sound ways of life and the advancement of heftiness. Also, higher instructive accomplishment might work with better comprehension and use of accessible nourishment data that helps people's choices on dietary practice (Diamant, 2017) and will generally follow suggestions for wellbeing ways of behaving and answer more effectively to wellbeing related media messages than lower financial gatherings (Jones, 2018).

Kids from additional informed guardians are bound to have breakfast and eat less bites, and they are less inclined to eat food varieties with high-energy content, for example, improved drinks and more products of the soil admission in opposition to youngsters from low economic positions as reported by Gosling, (2015) that will generally have consumes less calories wealthy in minimal expense energy thick food, partook less in actual work sports, and have lower attention to weight control (Kersh, 2017). The climate where families reside can likewise add to a less good dieting diet. Youngsters residing in additional denied places will generally eat less products of the soil however more sugar and desserts, fats handled meats, pungent bites and soda pops contrasted and those from higher pay families. Unreasonable food admission is a significant supporter of stoutness as reported by Teufel, (2019).

One more enormous supporter of heftiness is the absence of actual work and inactive way of behaving estimated by screen time. Kavanagh, (2019) tracked down a social slope in stationary, actual work and admittance to actual work offices in youngsters (Rasanen, 2015). Families living in neediness have unexpected needs in comparison to those with a steady economic positions. Those confronting destitution are bound to accidental disinvestment in wellbeing and sound ways of behaving (Barnes, 2017). The social slope in youth corpulence in a populaces may somewhat be because of smart dieting and active work being viewed as a low need in denied families. This issue is even more complicated when we take a relevant vision of our reality.

Present day food conditions are loaded up with supplement poor and energy-thick food varieties. These food sources are exceptionally attractive and handled in manners that make it challenging for the body to manage admission and weight (Salazar, 2019). This natural weakness to super handled food sources is particularly risky for youngsters since they have a more grounded inclination

for sweet food sources than grown-ups (Chaloupha, 2019). Youth is a time of an individual's life when ventures work to foster brand unwaveringness. Promoting and early openness quite early in life to super handled food sources shape kids' taste assumptions and inclinations for undesirable items.

A meta-investigation of 31 twin examinations showed that for grown-ups, the BMI variety made sense of by hereditary distinction went from 47% to 80%. All the more as of late, a review directed by Koh, (2018), dissecting twin matches from 45 companions likewise finishes up the significant job of hereditary variables in the variety of BMI. In accordance with this information, reception studies showed confirmations of the commitment of hereditary qualities on BMI as reported by Powell, (2017). These investigations exhibited that the BMI of embraced kids associates firmly with organic guardians, and less with new parents (Powell, 2017). It is currently impeccably settled that qualities add to contrasts in body weight inside a given populace. Curiously, a few qualities distinguished as causing stoutness in rodents models, have likewise been recognized as supporters of serious human heftiness as reported by Corsi, (2016). Non-syndromic monogenic types of weight result from transformations in a solitary quality and influence in 5% of the populace. These deficiency of-work changes are uncommon and for the most part cause lacks in food admission, and energy homoeostasis (Afrifa, 2015).

The significant pieces of these transformations have been distinguished in leptin receptor, melanocortin 4 receptor and supportive of other qualities. Polygenic heftiness is the most widely recognized type of stoutness in present day cultures where the climate favors weight gain because of food overflow and absence of active work. With the development of innovation and the finishing of Human genome project our insight on the hereditary premise of corpulence expanded radically somewhat recently. A few examinations arose recognizing in excess of 100 BMI-related loci while contrasting an example created by ordinary weight and stout people. The main locus without a doubt connected with stoutness utilizing an extensive affiliation approach, was the fat-mass and weight related quality. Resulting studies and meta-investigation distinguished various variations related with normal corpulence. The latest meta-examination distinguished 97 BMI-related loci in a review including European grown-ups, bookkeeping to 2.7% of BMI variety (Vilar, 2017).

Making sense of the quick spread of heftiness overall based exclusively in our hereditary background is as yet troublesome. Understanding how qualities impact systems of energy homoeostasis, causing minor departure from body weight inside some random climate is fundamental (Parmer, 2019). Qualities seldom have without help from anyone else the ability to decide a singular's life structures, physiology or conduct. It is the cooperation among qualities and climate at all phases of the existence cycle, which can impact and enact weight gain.

METHODOLOGY

This was a descriptive cross sectional institutional based study. Primary school children of age group 10-14 years old children who were attending schools during the study period and whose parent agreed to participate in the research

were selected to participate in this study. Measurement of weight in kilograms by using portable scale which was standardized to zero daily. Children were weighed barefoot, wearing light clothes. Measurements were rounded to the nearest 1 kg. Height was measured of the children with barefoot, by using measuring tape. Measurements were rounded to the nearest 0.5 cm. Calculation of BMI was by using this formula BMI = weight in Kgs/ height (meters)^2, other than that, data was collected from the parents through questionnaire to identify family history and other risk factors associated with obesity.

RESULTS

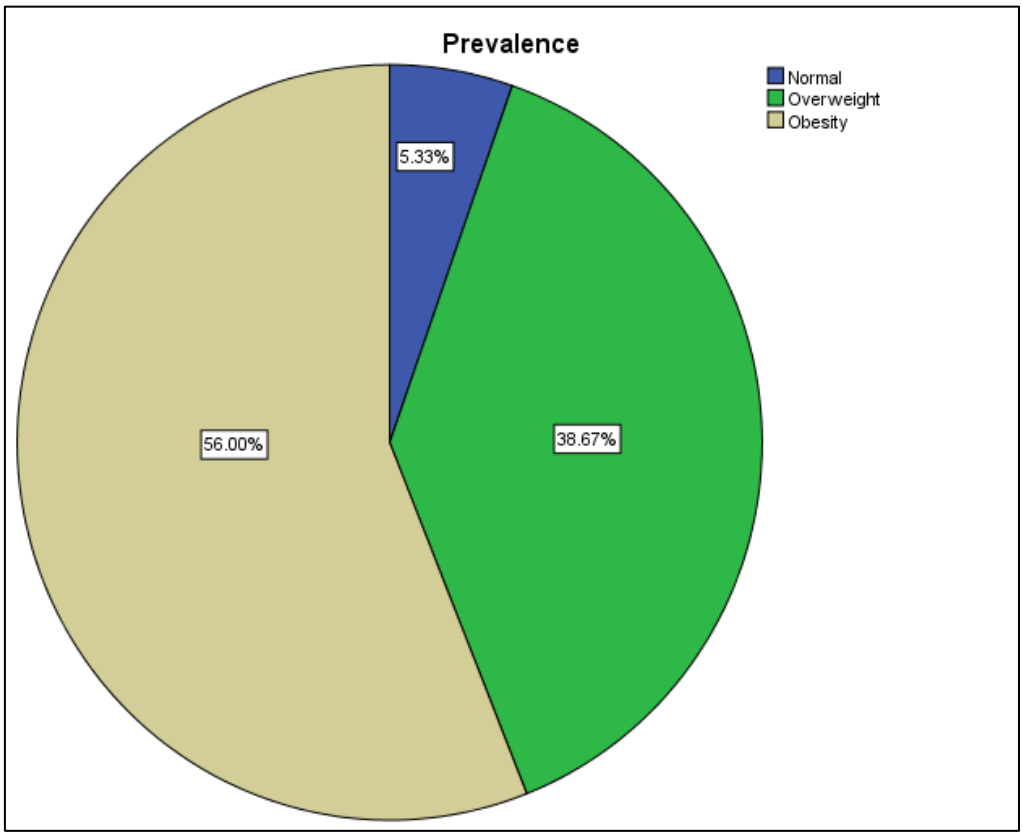
There are 150 school children with a mean age 15.23 (SD=0/81) of years. Calculated average BMI indicated normal weight 22.60 (SD=1.06), overweight 27.27 (SD=2.32), and obesity 35.98 (SD=1.71). There were 41 (27.3%) children who were involved in physical activity; 24 (16%) were playing different sports daily; 18 (12%) were taking part in physical activity thrice a week; and 108 (72%) never took part in any type of physical activity. There were 39 (26%) who reported playing sports for 30 minutes a day; 2 (1.3%) were spending 40 minutes a day and 108 (72%) never took part in any type of sports. Only 41 (27.3%) were involved in moderate level of activity. There were 93 (62%) school children who were living an inactive lifestyle by spending time to watch TV, playing video games, and spending time on social networking sites and 112 (97.3%) were eating junk food on daily basis. Their parents were also living an inactive lifestyle and parents' BMI was higher than the normal as mothers' average BMI was 32. 10 (SD=5.07) and the fathers' BMI was also higher than the normal as 35.60 (SD=5.72). There was a significantly positive relationship between children's' BMI and their parents BMI as shown in Table-2 below. These results indicated that both hereditary and environmental factors are involved in childhood obesity. Future investigations are needed to find out which factor has a strong impact on childhood obesity.

Table-1 Prevalence of Obesity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	8	5.3	5.3	5.3
	Overweight	58	38.7	38.7	44.0
	Obesity	84	56.0	56.0	100.0
	Total	150	100.0	100.0	

Table-1 shows that 84 (56%) of the sampled children were obese and 58 (38.7%) were overweight and only 8 (5.3%) were in the normal range.

Figure-1 Prevalence of Obesity



Note: Figure showing weight categories of school children

Table-2 Relationship between BMI of Children and Parents

		Children BMI	Mother BMI	Father BMI
Children BMI	Pearson Correlation	1	.990**	.993**
	Sig. (2-tailed)		.000	.000
	N	150	150	150
Mother BMI	Pearson Correlation	.990**	1	.993**
	Sig. (2-tailed)	.000		.000
	N	150	150	150
Father BMI	Pearson Correlation	.993**	.993**	1
	Sig. (2-tailed)	.000	.000	
	N	150	150	150

There was a positive and significant relationship between children and their mothers (r=0.99, p= .000) and similar results were found in case of their fathers (r=0.99, p= .000).

DISCUSSION

Obesity is a significant general medical condition bringing about serious social, physical and mental harms (Fernald, 2017). The pervasiveness of heftiness and overweight among grown-ups and youngsters is heightening in created and emerging nations including our district. In spite of that, there are under-conclusion and underreporting of the illness (Young, 2016). In different countries, past examinations recommended that the pervasiveness of life as a youngster overweight and corpulence has extraordinarily expanded during the most recent couple of years (Minasian, 2016). This was affirmed by the consequences of this investigation which discovered that the general predominance of overweight and corpulence among essential and transitional younger students was 29.6%. (Fatemeh, 2018).

The higher pervasiveness of heftiness contrasted with that of past examinations and contrasted with youngsters with overweight in this study, may recommend that is in a momentary condition of expanding youth overweight and stoutness because of urbanization and to the progressions in the way of life when they are young. Albeit the pervasiveness of overweight and corpulence among the younger students in this study was moderately high, it is still lower than that detailed in a few adjoining locales in different nations.

The pervasiveness of overweight and heftiness in the current study was like or higher than that revealed for a few adjoining countries. The predominance of overweight and heftiness in this study was uniquely lower than that revealed for American youngsters, where the general commonness of overweight and stoutness was 48.0% as reported by Jaacks, (2015). The distinctions in the consequences of those reviews can be made sense of by the impact of hereditary, ecological and way of life factors. What's more, essential for the distinctions might be because of the varieties in the age bunches included, concentrate on strategies and meanings of heftiness and overweight across the different examinations (Pettifor, 2016).

It was recommended that the pervasiveness of overweight and heftiness expanded with age. This might give the feeling that corpulence is an advancing peculiarity that once present, will in general increment with time (Lourenço, 2015). The current study exhibited that the pervasiveness of overweight and heftiness expanded with age as the parents were also overweight/obese. The predominance of overweight and heftiness expanded from 16.9% at age 9 years up to at 12 years old or more as reported by Hashemipour, (2018). The findings of the present study are steady with those detailed in other studies and in a few different examinations in both the created, and in the adjoining nations. This finding may be credited to less actual work and more admittance to undesirable food varieties among more seasoned contrasted with more youthful kids. More seasoned youngsters are bound to sit longer on TV games and arrive at drive-through joints regularly and autonomous of their folks (Kunst, 2017).

Stanistreet, (2018) showed that the most elevated pervasiveness was in more youthful age bunch (7-9 years). The current study found likewise that the corpulence in youth was emphatically connected with the ongoing high BMI status. This finding was upheld by a British report which underlined that the

vast majority of the kids who were hefty at outset till 34 months old enough, were experiencing stoutness at age of 7 years (Brown, 2017).

REFERENCES

Adair, L. S., Fall, C. H., Osmond, C., Stein, A. D., Martorell, R., Ramirez-Zea, M., & Micklesfield, L. (2013). Associations of linear growth and relative weight gain during early life with adult health and human capital in countries of low and middle income: findings from five birth cohort studies. The Lancet, 382(9891), 525-534.

Afrifa–Anane, E., Agyemang, C., Codjoe, S. N., Ogedegbe, G., & Aikins, A. D. G. (2015). The association of physical activity, body mass index and the blood pressure levels among urban poor youth in Accra, Ghana. BMC Public Health, 15(1), 269.

Barnes, M., Orzag, P., Benjamin, R., Salazar, K., Duncan, A., et al. (2017). Childhood obesity forum. Pablos-Mendez, A., Chunharas, S., Lansang, M. A., Shademani, R., & Tugwell, P. (09/2005). Knowledge translation in global health. Bulletin of the World Health Organization, 83(10), 04/02/2010-721-800.

Brown, S. L., Teufel, J. A., & Birch, D. A. (2017). Early adolescents perceptions of health and health literacy. Journal of School Health, 77, 7-15; 50-52.

Chaloupha, F. Parmer, S. M., Salisbury-Glennon, J., Shannon, D., & Struempier, B. (2019). School gardens: An experiential learning approach for a nutrition education program to increase fruit and vegetable knowledge, preference, and consumption among second-grade students. Journal of Nutrition Education and Behavior, 41(3), 212-217.

Corsi, D. J.,Checkley, W., Ghannem, H., Irazola, V., Kimaiyo, S., Levitt, N. S., Miranda, J. J., & Rubinstein, A. (2016). Management of NCD in low- and middle-income countries. Global Heart, 9(4), 431- 443.

Diamant, A. Curtis, V., & Aunger, R. (2017). Mapping motivations: Evolutionary health promotion. Douglas, L. (1998). Children's food choice.98(1)

Fatemeh, T., Mohammad-Mehdi, H. T., Toba, K., Afsaneh, N., & Sharifzadeh, G. (2018). Prevalence of overweight and obesity in preschool children (2–5 year-olds) in Birjand, Iran. BMC Research Notes, 5(1), 529.

Fernald, L. C., Alderman, H., Behrman, J., O'Gara, C., Yousafzai, A., & Iltus, S. (2017). Strategies for reducing inequalities and improving developmental outcomes for young children in low-income and middle-income countries. The Lancet, 378(9799), 1339-1353.

Gosling, R., Hastert, T. A., Babey, S. H., Diamant, A. L., & Brown, R. E. (2015). More california teens consume soda and fast

Hashemipour, M., Soghrati, M., Soghrati, M., Mirmoghtadaee, P., & Khavarian, N. (2018). Can a trial of motivational lifestyle counseling be effective for controlling childhood obesity and the associated cardiometabolic risk factors? Pediatrics & Neonatology, 53(2), 90-97

Hornsby, P. P., & Schorling, J. B. (2020). Clinical implications of body image among rural africanamerican women. Journal of General Internal Medicine, 15(4), 235-241.

Jaacks, L. M., Slining, M. M., & Popkin, B. M. (2015). Recent trends in the prevalence of under-and overweight among adolescent girls in low-and middle-income countries. Pediatric Obesity, 10(6), 428-435.

Jones, M., Gosling, R., Stanistreet, D., & Sawmi, V. (2018). "If michael owen drinks it, why Can't I? '--9 and 10 year olds' perceptions of physical activity and healthy eating." Health Education Journal, , 167-167-181.

Jones, M., Yu, H., & Goldstein, H. (2019). Bubbling over: Soda consumption and its link to obesity in califonia. UCLA: Health Policy Research

Katzmarzyk, P. T., Barreira, T. V., Broyles, S. T., Champagne, C. M., Chaput, J. P., Fogelholm, M., & Lambert, E. V. (2015). Relationship between lifestyle behaviors and obesity in children ages 9–11: Results from a 12-country study. Obesity, 23(8), 1696-1702.

Kavanagh, C. & Scheule, B. (2019). Gender differences in food preferences of school-aged children and adolescents. Journal of School Health, 79(11), 532-540.

Kersh, R., Brown, S. L., Teufel, J. A., & Birch, D. A. (2017). Early adolescents' perceptions of health and health literacy. Journal of School Health, 77, 7-15; 50-52.

Kersh, R., Ludwig, D. S., Post, R. C., Puhl, R. M., Schwartz, M. B., et al. (2016). Personal responsibility and obesity: A constructive approach to a controversial issue. Health Affairs, 29(3), 03/10/2010-378-386.

Koh, H. & Marosi, A. (2018). Gender differences in body composition, physical activity, eating behavior and body image among normal weight adolescents – an evolutionary approach. COLLEGIUM ANTROPOLOGICUM, 32(4), 1079-1086.

Kunst, A., Harper, S., Guthold, R., Rekve, D., ... & Chatterji, S. (2017). Socioeconomic inequalities in risk factors for non-communicable diseases in low-income and middle-income countries: results from the World Health Survey. BMC Public Health, 12(1), 1.

Lourenço, B. H., Villamor, E., Augusto, R. A., & Cardoso, M. A. (2015). Influence of early life factors on body mass index trajectory during childhood: a population-based longitudinal analysis in the Western Brazilian Amazon. Maternal & Child Nutrition, 11(2), 240-252

Minasian, V., Marandi, S. M., Kelishadi, R., Khalighinejad, P., & Davari, H. (2016). Prevalence of Obesity and Overweight in 12-14-year-old Students in Isfahan-Iran. International Journal of Preventive Medicine,5(Suppl 2), S120.

Parmer, S. M., Salisbury-Glennon, J., Shannon, D., & Struempier, B. (2019). Choosing health? exploring Children's eating practices at home and at school Antipode, 41(5), 01/28/2010-1084-1109. Retrieved from Scopus database. Rodriguez, J. C. Eating habits.

Pettifor, J. M., Tollman, S. M., Klipstein-Grobusch, K., & Norris, S. A. (2016). Predictors of adolescent weight status and central obesity in rural South Africa. Public Health Nutrition, 14(06), 1114-1122.

Powell, L. M., Slater, S., Mirtcheva, D., Bao, Y., & Chaloupha, F. J. (2017). Food store availability and neighborhood characteristics in the united states. Preventative Medicine, 44(2007), 189-195. Project Healthy Schools. (2011). Project healthy schools executive summary.

Rasanen, L., Raitakara, O. T., Pietinen, P., & Viikari, J. (2015). Consistent dietary patterns identified from childhood to adulthood: The

cardiovascular risk in young finns study British Journal of Nutrition, 93(6), 923-931.

Salazar, K., Parker-Pope, T. (2019). Commercials are the culprit in TV-obesity link. The New York Times, Parker-Pope, T. (2008, 05/28/2008). Knowledge translation in global health. Bulletin of the World Health Organization, 83(10), 04/02/2010-721-800.

Stanistreet, D., & Sawmi, V. (2018). "If michael owen drinks it, why Can't I? '--9 and 10 year olds' perceptions of physical activity and healthy eating." Health Education Journal, , 167-167-181.

Teufel, J. Caine-Bish, N. L., & Scheule, B. (2019). Gender differences in food preferences of school-aged children and adolescents. Journal of School Health, 79(11), 532-540.

Vilar, M., Dancause, K. N., DeHuff, C., Wilson, M., Soloway, L. E., Tarivonda, L., ... & Lum, J. K. (2017). Patterns of childhood and adolescent overweight and obesity during health transition in Vanuatu. Public Health Nutrition, 15(01), 158-166.

Young, T. K., & Egeland, G. M. (2016). Emerging obesity among preschool-aged Canadian Inuit children: results from the Nunavut Inuit Child Health Survey. International Journal of Circumpolar Health, 69(2), 151.