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Awareness Of Causes, Consequences And Preventive Measures Of Overweight And Obesity In Children's Health Learning Behavior In Katsina State

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ABSTRACT
Childhood overweight and obesity pose significant challenges to the health and learning behavior of children, and Katsina State in Nigeria is no exception to this global concern. This study explores the awareness levels regarding the causes, consequences, and preventive measures of overweight and obesity in children within the educational landscape of Katsina State. Focusing on the intricate interplay between health, learning, and lifestyle factors, the research aims to assess current awareness levels and propose strategies for improvement. The causes of childhood overweight and obesity, including dietary habits, sedentary behaviors, and genetic predispositions, are investigated in the local context. The study delves into the consequences of these conditions, emphasizing their potential impact on children's health, psychosocial well-being, and academic performance. Preventive measures, such as promoting healthy eating habits, encouraging physical activity, and fostering community engagement, are highlighted as essential components of an effective intervention strategy. The research methodology involves a combination of surveys, interviews and data analysis, drawing insights from parents, educators, and community members. The findings aim to provide a comprehensive understanding of the current awareness landscape in Katsina State and serve as a foundation for tailored interventions. Recommendations include targeted awareness campaigns within schools, community workshops, and collaborative efforts involving government agencies and healthcare providers.
Keywords: Overweight, Obesity, Children

1. INTRODUCTION

Childhood overweight and obesity have become significant public health concerns globally, and Katsina State, Nigeria, is no exception. The rising prevalence of these conditions among children can have profound implications on their health, learning behavior, and overall well-being. It is crucial to foster awareness of the causes, consequences, and preventive measures associated with childhood overweight and obesity to initiate informed actions and promote healthier lifestyles among the younger population. Overweight and obesity, recognized as a complex syndrome with multifaceted health implications, can adversely impact overall bodily functions (WHO, 2005). While historically prevalent in highly developed

nations, there has been a noticeable and progressive rise in these conditions in developing countries, including Tanzania (Villamor et al., 2004). Once primarily associated with adults, overweight and obesity have become highly prevalent among children and adolescents, leading to an altered morphological appearance in Tanzanian children characterized by reduced fitness and increased fatness, potentially stemming from prolonged adiposity (Kafyulilo, 2006). Gavin (2005) and Wang (2004) highlight a global trend of increasing overweight and obesity prevalence among school children. They note alarming percentages worldwide, with 50% in the USA, 37% in Australia, 30% in Western Europe, and 17% in India. This surge in overweight and obesity is linked to an elevated risk of various health issues globally, including cancer, cardiovascular diseases, non-insulin-dependent diabetes, severe articular dysfunctions, and hypertension (WHO, 2005). Developing countries, such as South Africa and Cameroon, also grapple with high rates of overweight and obesity, with approximately 40% and 22% of their populations affected, respectively (Puoane et al., 2002; Sobngwi et al., 2002). Tanzania faces a similar risk, as evidenced by increasing prevalence rates among both adults and children, projected to rise by 3% by 2015 (WHO, 2006).

Modern technological advancements and the consumption of processed foods contribute to this rise, shifting children's leisure activities towards sedentary behavior, marked by increased use of electronic devices for entertainment (Gavin, 2005; Ekblom, 2005). Children are now more likely to engage in electronically played games and spend less time in physical activities, affecting their overall health and fitness. Participation in physical activities and sports is integral to children's well-being. According to the World Health Organization (WHO) (2020), obesity is defined as "abnormal or excessive fat accumulation that poses a risk to health." Conversely, the World Obesity Federation, challenging the notion that obesity is solely a risk factor for diseases, classifies it as a chronic, relapsing progressive disease. The escalating rates of obesity among children and adolescents represent a substantial global public health issue. The "Health Behavior in School-aged Children (HBSC)" study, conducted between 2009-2010 across 39 European Union countries, measured the body weight and height of adolescents aged 11-15.

Causes of Childhood Overweight and Obesity

High consumption of energy-dense, nutrient-poor foods, and sugary beverages contributes to excessive calorie intake. Sedentary lifestyles, characterized by limited physical activity and increased screen time, contribute to weight gain. Genetic predisposition and environmental influences, such as socioeconomic status, can play a role in the development of obesity. More also, Overweight and obesity in childhood are associated with various health issues, including type 2 diabetes, cardiovascular diseases, and respiratory problems, Children with obesity may face stigmatization, low self-esteem, and poor mental health, affecting their overall well-being. Obesity can impact learning behavior and academic performance, potentially leading to decreased concentration and cognitive function.

Promoting a balanced diet rich in fruits, vegetables, and whole grains can help prevent excessive calorie intake. Further more Encouraging regular physical activity and limiting sedentary behaviors contribute to maintaining a healthy weight, on the parent side, Engaging parents, educators, and communities in promoting healthy lifestyles fosters a supportive environment for children. In most cases, Implementing educational programs within schools to raise awareness among students about the importance of healthy eating and physical activity help the situation then Conducting workshops and seminars for parents and community members to enhance their understanding of childhood obesity and ways to prevent it. Another way is by Utilizing various media platforms to disseminate information and promote awareness about the causes, consequences, and preventive measures of childhood overweight and obesity. Finally Collaborating with government health agencies to integrate childhood obesity prevention into public health policies and programs and Involving healthcare professionals in regular health check-ups and providing counseling on nutrition and physical activity for children.

Global Trend of Overweight and Obesity on Children's Health Learning Behavior in Katsina State

The global surge in childhood overweight and obesity has become a pressing public health issue with profound consequences on children's well-being and academic performance. Katsina State, situated in Nigeria, is not immune to this alarming trend. This article explores the worldwide prevalence of childhood overweight and obesity and examines its specific impact on the health and learning behavior of

children in Katsina State. Presenting an overview of the escalating rates of childhood overweight and obesity on a global scale, drawing attention to the factors contributing to this phenomenon, such as changing dietary patterns, sedentary lifestyles, and socio-economic influences. Providing a snapshot of the current state of childhood overweight and obesity in Katsina State, emphasizing any unique factors that contribute to or mitigate this trend within the region. Also, examining the health implications of childhood overweight and obesity, including an increased risk of chronic diseases such as diabetes, cardiovascular issues, and respiratory conditions, and the subsequent impact on the overall well-being of children. Investigating how overweight and obesity influence cognitive functions, attention span, and academic performance in children, emphasizing the potential long-term consequences on educational outcomes. Analyzing the influence of cultural practices and socio-economic disparities on children's nutrition, physical activity, and access to healthcare in Katsina State, contributing to a nuanced understanding of the local dynamics. Discussing global and local initiatives that have been successful in addressing childhood overweight and obesity, with a focus on preventive measures, health education, and community engagement. Also to Advocate for collaborative efforts involving government bodies, educational institutions, healthcare providers, and communities to develop comprehensive strategies for combating childhood overweight and obesity in Katsina State.

Method for monitoring obesity

Various methods are commonly employed for defining and monitoring obesity due to their ease, feasibility, and high accuracy rates. These methods include Body Mass Index (BMI), bioelectric impedance analysis, waist circumference, hip circumference, and waist-hip ratio (Can, 2019). Extensive literature demonstrates a robust association between BMI and the perception of weight among children and adolescents. Notably, this relationship has been identified to influence weight loss (Gillison, Standage & Skevington, 2006). Swallen, Reither, Haas, and Meier (2005) reported in their study that BMI correlates with both general and physical health, revealing that overweight children and adolescents tend to experience more negative self-perception compared to their normal-weight peers. Further exploration reveals an inverse correlation between BMI and children's personal well-being (Tsiros et al. 2009). Gender differences are also noted in the perception of weight, with girls more likely to perceive themselves as overweight than boys (Martin, Frisco & May, 2010). Consequently, several studies have been conducted to assess societal obesity awareness and curb the rising incidence of obesity. Murphy and Polivka (2007) investigated the obesity and BMI awareness among parents of school-age students. Li and Hooker (2010) explored the relationship between obesity prevalence and school type based on BMI values obtained from height and weight measurements of students in private and public schools in 2003-2004. Fahlman, Dake, McCaughtry, and Martin (2008) delved into the impact of the Michigan Model, a nutritional education program, on students' nutritional awareness and habits. Meanwhile, Lee, Lai, Chou, Chang, and Chang (2009) evaluated the physical perception of students by implementing a physical activity program for obese students across 11 different groups. The research outcomes indicated a positive improvement in participants' perception of physical activity following the training program.

Objectives of the Study

i. To assess and quantify the current levels of awareness among parents, teachers, and guardians in Katsina State regarding the causes, consequences, and preventive measures of overweight and obesity in children.
ii. To examine the perceptions of parents, teachers, and guardians regarding the consequences of overweight and obesity on children's health and learning behavior in Katsina State.
iii. To identify and analyze the perceived effectiveness of different preventive measures for overweight and obesity in children as recognized by parents, teachers, and guardians in Katsina State.

2. RESEARCH METHOD

Study Design

A descriptive research design was employed to provide a detailed account of the current level of awareness regarding childhood overweight and obesity in Katsina State. This design allows for the collection of both qualitative and quantitative data to describe the phenomenon.

Data collection

Structured surveys and questionnaires was developed to assess awareness levels, understanding of causes and consequences and familiarity with preventive measures. And semi-structured interviews with a subset of participants to gain in-depth visions and qualitative data conducted. About 150 participant where employ for the research. Demographic Information Form containing age, gender (female, male) and school type (public school, private school) and relationship to the child questions was used.

Statistical Analysis

Descriptive statistics is used for data analysis. The result analyzes and presented in tables and figures, data obtained from the subjects who volunteer to participate in this study. Data was analyzed using statistical package for social science SPSS (version 23.0)

3. RESULT AND DISCUSSION

The personal data of the respondents for the research was analysed. The data include: Age of the respondent and relationship to child that is selected for the research.

Age of the respondent	**Frequency**	**Percentage**	**Mean**	**Standard deviation**
Under 30	14	9.3%	2.07	0.557
30 – 40	115	76.7%		
41 – 50	17	11.3%		
51 – Above	4	2.7%		
Total	150	100%		
Relationship to child				
Parent	18	12.0%	1.94	0.421
Teacher	123	82.0%		
Guidance	9	6.0%		
Total	150	100%		

Table 1 Demographic profile of the respondents

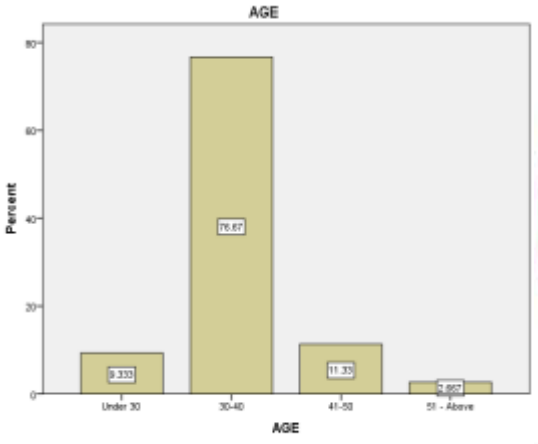

Fig. 1 Bar chart representing age of the respondent

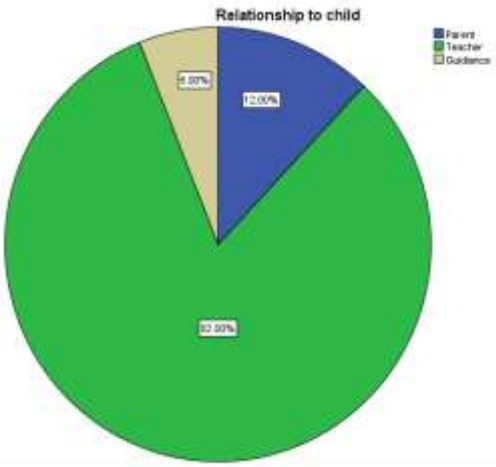

Fig. 2 Pie chart distribution of relationship of respondent to students

Table 1 and figure 1 outlined underscore key aspects of the respondent profile, offering valuable understandings into the context of the study. The prevalence of respondents in the 30-40 age range (76.7%) suggests a predominantly mature and experienced group, potentially reflecting a significant role in the community or educational system. The majority being teachers (82%) further highlights the significance of educators in the study, given their direct influence on children's learning environments. The presence of parents and guidance counselors at 12% and 6%, respectively, underscores the diversity in perspectives, encompassing both those directly responsible for a child's well-being at home and those providing guidance in an educational context. The age distribution implies that the intuitions garnered from this study may be rooted in a wealth of experience and practical knowledge, contributing to the robustness of the findings. The dominance of teachers in the respondent pool indicates that the study can potentially yield comprehensive perspectives on how childhood overweight and obesity are perceived and addressed within educational settings. The inclusion of parents and guidance counselors further broadens the scope, capturing insights from different facets of a child's life. This diverse composition positions the study well for a nuanced exploration of awareness, beliefs, and actions related to childhood overweight and obesity, ultimately enhancing the relevance and applicability of the findings to the broader community.

DATA PRESENTATION AND ANALYSIS

The current levels of awareness among guardians regarding the preventive measures of overweight and obesity in children.

Questions	Yes	%	No	%
Are you aware of the causes of overweight and obesity in children?	85	56.7	65	43.3
Do you believe you are well-informed about the consequences of overweight and obesity on children's health and learning behavior?	70	46.7	80	53.3
Are you familiar with preventive measures to reduce overweight and obesity in children?	59	39.3	91	60.7

Table 2: levels of awareness among guardians regarding the preventive measures of overweight and obesity

The data presented in the table 2 reveals that among the respondents, 56.7% are aware of the causes of overweight and obesity in children, while 43.3% lack this awareness. This indicates a discernible divide in understanding among the surveyed individuals. The prevalence of awareness suggests a substantial portion of the respondents recognize the factors contributing to childhood overweight and obesity, which is crucial for addressing and mitigating these issues. On the other hand, the significant percentage of respondents without awareness underscores a potential need for targeted education and awareness initiatives in the community. Bridging this knowledge gap could empower individuals to contribute actively to preventive measures, emphasizing the importance of comprehensive education and interventions to combat childhood overweight and obesity effectively. The table also indicates a notable distribution of perspectives among respondents regarding their level of awareness about the consequences of overweight and obesity on children's health and learning behavior. While 46.7% express confidence in being well-informed, a slightly higher percentage, 53.3%, acknowledge a lack of such awareness. This dichotomy in beliefs underscores the need for targeted educational efforts to enhance understanding and knowledge dissemination on the multifaceted implications of childhood overweight and obesity. Addressing this gap in awareness is crucial for fostering a more informed community that can actively contribute to the holistic well-being and academic performance of children, emphasizing the importance of comprehensive educational initiatives to promote a better understanding of the consequences associated with these health challenges. The data presented in the table also highlights a significant proportion of respondents, with 39.3%, expressing familiarity with preventive measures to reduce overweight and obesity in children, while a majority of 60.7% indicate a lack of such familiarity. This reveals a potential gap in knowledge regarding strategies to address and prevent childhood overweight

and obesity within the surveyed population. The prevalence of respondents lacking awareness of preventive measures underscores the importance of targeted educational initiatives aimed at equipping individuals with practical strategies to promote healthier lifestyles for children. Closing this knowledge gap is essential for fostering a community that can actively engage in and implement effective preventive measures, thereby contributing to the overall well-being of children and mitigating the prevalence of overweight and obesity. The findings emphasize the necessity of comprehensive awareness campaigns and educational programs tailored to the specific needs of the community in addressing this public health concern.

Perceptions of parents, teachers and guardians regarding the consequences of overweight

Table 3. The perceptions of parents, teachers and guardians regarding the consequences of overweight and obesity on children's health and learning behavior

Questions	Yes	%	No	%
Do you think overweight and obesity have negative consequences on children's health and learning behavior?	85	56.7	65	43.3
Have you noticed any behavioral changes in overweight or obese children that may affect their learning abilities?	112	74.7	38	25.3
Do you believe there is a correlation between a child's weight status and their academic performance?	9	6.0	141	94.0

The table 3 underscores a clear consensus among respondents, with 56.7% acknowledging that overweight and obesity have negative consequences on children's health and learning behavior, while 43.3% hold the opposing view. This prevailing recognition of the adverse impact aligns with existing scientific evidence highlighting the multifaceted consequences of childhood overweight and obesity. The acknowledgment by the majority emphasizes an awareness within the surveyed population about the potential health and educational ramifications of these conditions. Such recognition is vital for fostering community support and engagement in efforts to address and prevent childhood overweight and obesity, further underscoring the importance of comprehensive education and initiatives aimed at mitigating the impact of these health challenges on children's overall well-being and academic performance. The table also reveals a substantial observation among respondents, with 74.7% noting behavioral changes in overweight or obese children that may potentially affect their learning abilities. This overwhelming majority signifies a heightened awareness within the surveyed population regarding the behavioral implications associated with childhood overweight and obesity. The acknowledgment of these changes underscores the interconnectedness between physical health and learning outcomes, highlighting the need for holistic approaches in addressing the challenges posed by overweight and obesity in children. Recognizing such behavioral shifts is crucial for devising targeted interventions that cater to the unique needs of these children, emphasizing the importance of fostering an understanding community that can contribute to creating supportive environments conducive to optimal learning despite these health challenges.

The data from the table illustrates a prevailing perspective among respondents, with 94.0% expressing the belief that there is no correlation between a child's weight status and their academic performance, while only 6.0% acknowledge such a correlation. This overwhelming majority indicating a lack of perceived correlation aligns with conventional academic paradigms that traditionally emphasize cognitive abilities over physical attributes. However, the presence of a small percentage recognizing a potential link suggests a nuanced understanding among a minority of respondents. These findings emphasize the importance of ongoing research and education to explore and disseminate knowledge about the intricate connections between physical health, including weight status, and academic performance, fostering a more comprehensive perspective within the community.

The perceived effectiveness of different preventive measures for overweight and obesity in children

Table 4. Effectiveness of different preventive measures for overweight and obesity in children

Questions	Yes	%	No	%
Are you aware of any specific preventive measures that have been effective in reducing overweight and obesity in children?	135	90.0	15	10.0
Do you think educational programs or initiatives aimed at parents, teachers, and guardians are effective in preventing childhood overweight and obesity?	117	78.0	33	22.0
Are you currently implementing any preventive measures within your capacity to address overweight and obesity in children?	62	41.3	88	58.7

Table 4 presented strong awareness within the surveyed population, with 90.0% of respondents indicating knowledge of specific preventive measures that have proven effective in reducing overweight and obesity in children, while only 10.0% lack such awareness. This high level of awareness underscores a promising foundation for potential community engagement and active participation in combating childhood overweight and obesity. These findings highlight the importance of leveraging this existing awareness to develop and implement targeted initiatives that align with the recognized effective preventive measures, emphasizing the potential for community-driven efforts to address and alleviate the prevalence of childhood overweight and obesity. The table indicates a prevailing sentiment among respondents, with 78.0% expressing the belief that educational programs or initiatives aimed at parents, teachers, and guardians are effective in preventing childhood overweight and obesity, while 22.0% hold a contrary view. This substantial majority endorsing the effectiveness of such educational initiatives highlights a positive inclination toward the potential impact of targeted awareness campaigns within the community. The acknowledgment of the efficacy of education for parents, teachers, and guardians underscores the importance of collaborative efforts to promote healthy lifestyles and preventive measures. However, the existence of a minority expressing skepticism suggests the need for further exploration and tailoring of educational strategies to address potential concerns and enhance overall community engagement in the fight against childhood overweight and obesity.

Furthermore the table reflects a varied response among respondents regarding their current implementation of preventive measures within their capacity to address overweight and obesity in children. Notably, 41.3% affirm actively implementing preventive measures, showcasing a proactive approach within this portion of the surveyed population. On the other hand, 58.7% indicate a lack of current implementation. This diversity in responses underscores the need for tailored interventions and support mechanisms to bolster individuals in their capacity to contribute to the prevention of childhood overweight and obesity. The findings suggest that while a significant portion is engaged in preventive efforts, there remains an opportunity for targeted initiatives and support structures to encourage broader community involvement and action against this public health challenge.

DISCUSSION OF FINDINGS

The findings from the survey reveal a nuanced understanding within the surveyed population regarding childhood overweight and obesity. While a majority of respondents are aware of the causes and consequences of these health challenges, indicating a foundational knowledge base, there is a significant divergence in the perceived effectiveness of preventive measures and the correlation between weight status and academic performance. The majority of respondents acknowledge the negative consequences of overweight and obesity on children's health and learning behavior, with a notable awareness of specific preventive measures. Additionally, a substantial portion recognizes the potential behavioral changes in overweight or obese children that may affect their learning abilities. However, the prevailing belief that there is no direct correlation between a child's weight status and academic performance suggests a perception rooted in conventional academic paradigms, highlighting the need for continued education on the interconnectedness of physical health and academic outcomes. Moreover, the survey indicates a

positive inclination toward the effectiveness of educational programs targeting parents, teachers, and guardians in preventing childhood overweight and obesity. This reflects a community that acknowledges the role of education in fostering healthier lifestyles for children. On the implementation front, while a notable proportion of respondents report actively undertaking preventive measures within their capacity, a substantial portion remains untapped for potential community engagement. This underscores the importance of tailoring interventions to address specific community needs and concerns, fostering a more inclusive and collaborative approach in the ongoing efforts to combat childhood overweight and obesity in Katsina State.

CONCLUSION

The study on the awareness of causes, consequences and preventive measures of overweight and obesity in children's health learning behavior in Katsina State sheds light on critical issues that demand urgent attention. The findings underscore the pressing need for comprehensive strategies to address the rising prevalence of childhood overweight and obesity in the region. The prevalence of overweight and obesity among children in Katsina State signals an urgent need for proactive measures. The study reveals that these health issues are not only present but also reaching concerning levels, emphasizing the necessity for immediate intervention. The study also highlights the relatively low awareness levels among parents, educators and the community. This knowledge gap poses a significant barrier to effective prevention and intervention efforts. In the educational system, such as insufficient integration of health-related topics into school curricula and the need for enhanced teacher training, contribute to the overall lack of awareness. Addressing these challenges is crucial for fostering a health-conscious learning environment. And finally The study underscores the pivotal role of parents in shaping children's health learning behavior. And Community engagement also emerges as a key aspect in the battle against childhood obesity. The study suggests that workshops, seminars, and partnerships with local leaders can be effective tools in disseminating information and fostering a collective commitment to addressing this public health concern.

RECOMMENDATION

Implementing effective measures to raise awareness about the causes, consequences and preventive strategies of overweight and obesity in children's health learning behavior in Katsina State requires a comprehensive approach involving the government. Here are several recommendations for the government:

1. Educational Campaigns: Initiate and support educational campaigns targeted at parents, teachers, and community members. These campaigns should emphasize the importance of a healthy lifestyle, including balanced nutrition and regular physical activity, for children's overall well-being.
2. Parental Involvement Programs: Develop programs that encourage active parental involvement in promoting healthy behaviors at home. Provide resources and guidance for parents on creating a supportive environment for proper nutrition and physical activity.
3. Physical Education Enhancement: Invest in enhancing physical education programs in schools. Ensure that schools have qualified physical education teachers, adequate facilities, and resources to promote regular physical activity among students.
4. Health Screenings in Schools: Implement regular health screenings in schools to monitor children's weight and overall health. Provide feedback to parents and caregivers, along with educational resources on maintaining a healthy lifestyle.
5. Nutritional Standards for School Meals: Establish and enforce nutritional standards for school meals to ensure that children have access to balanced and nutritious food. Collaborate with school cafeterias to promote healthier food choices.

REFERENCES

Ekblom, O. (2005). Physical Fitness and Overweight in Swedish Youths. Stockholm: Reproprint AB

Fahlman, M., Dake, J., McCaughtry, N. & Martin, J. (2008). A pilot study to examine the effects of a nutrition intervention on nutrition knowledge, behaviors, and efficacy expectations in middle school children. Journal of School Health, 78(4), 216-222

Gavin, M. (2005). Overweight and Obesity, www.childhealth.org/parents/general Retrieved on Friday, 26th January, 2007

Gillison, F. B., Standage, M. & Skevington, S. M. (2006). Relationships among adolescents' weight perceptions, exercise goals, exercise motivation, quality of life and leisure-time exercise behavior: A selfdetermination theory approach. Health Education Research, 21(6), 836-847.

Kafyulilo, A. (2006). A Study of Overweight and Obesity among School Children at Mlimani Primary School. Unpublished, B.Ed (PESC), Independent Study, Dar es Salaam, University of Dar es Salaam

Lee, P., Lai, H., Chou, Y., Chang, L. & Chang, W. (2009). Perceptions of exercise in obese school-aged children. Journal of Nursing Research, 17(3), 170-176.

Li, J. & Hooker, N. H. (2010). Childhood obesity and schools: Evidence from the national survey of children's health. Journal of School Health, 80(2), 96-103.

Martin, M. A., Frisco, M. L. & May, A. L. (2009). Gender and race/ethnic differences in inaccurate weight perceptions among US adolescents. Womens Health Issues, 19(5), 292-299.

Murphy, M. & Polivka, B. (2007). Parental perceptions of the school's role in addressing childhood obesity. The Journal of School Nursing, 23(1), 40-46.

Puoane, T., Steyn, K., Lambert, V., and Mbananga, N. (2002). Obesity in South Africa: The South African Demographic and Health Survey. Cape Town: University of Cape Town

Sobngwi, E., Mbanya, J., Unwin, U., & Albert, K. (2002). "Physical Activity and Its Relationship with Obesity, Hypertension and Diabetes in Urban and Rural Cameroon", International Journal of Obesity, Volume 11, No. 26

Swallen, K. C., Reither, E. N., Haas, S. A. & Meier, A. M. (2005). Overweight, obesity, and health-related quality of life among adolescents: the national longitudinal study of adolescent health. Pediatrics, 115(2), 340- 347.

Tsiros, M. D., Olds, T., Buckley, J. D., Grimshaw, P., Brennan, L., Walkley, J., Hills, A. P., Howe, P. R. & Coates, A. M. (2009). Health- related quality of life in obese children and adolescents. International Journal of Obesity, 33(4), 387-400

Villamor, E., Urassa, W., Petraro, P., & Fawzi, W. (2004). "Trends in Obesity, Underweight, and Wasting among Women Attending Prenatal Clinics in Urban Tanzania", American Journal of Clinical Nutrition, Volume 6, No. 83

Wang, Z. (2004). Influences of Socioeconomic Status, Dietary Factors and Physical Activity on Overweight and Obesity of Australian Children and Adolescents. PhD Thesis, Queensland, Queensland University of Technology

World Health Organisation [WHO]. (2010). Global strategy on diet, physical activity and health. Retrieved from https://www.who.int/dietphysicalactivity/strategy/eb11344/strategy_english_web.pdf

World Health Organization [WHO]. (2020). Health topics: Obesity. Retrieved from https://www.who.int/topics/obesity/en/

World Health Organization. (2005). Facing the Facts about BMI, Overweight and Obesity Statistics in Tanzania. www.who.int/en Retrieved Tuesday, 23rd December, 2006

World Health Organization. (2006). The Impact of Chronic Diseases in the United Republic of Tanzania from www.who.int/chp Retrieved on Thursday 4th January, 2008